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JOURNAL OF PHOTOGRAPHY.

No. 1548. Vol. XXXVII.—JANUARY 3, 1890.

PLATE-ETCHING.

A friend who has been trying a system of etching on glass plates, described on page 426 of the current Almanac, and illustrated by a specimen drawing, finds that for work which is delicate in the extreme, no application of any varnish which he can procure, or of which he can think, gives a resist sufficiently fine for his requirement, which is to etch by the point of a needle, and with lines which lie very closely together, the details of certain microscopic objects that have been photographed.

This *desideratum* is not difficult of attainment. Assuming that the commercial plates, on one of which the etching in question was executed, are all that need be desired for ordinary artistic work, yet is it possible to make a substratum to the sensitive material on the glass which shall be both thin and opaque.

We have tried several such thin substrata, largely one formed of collodion stained with an aniline non-actinic dye. But ordinary collodion is rather of too skinny a nature; and when a film is cut through with fine lines and cross hatchings, it is apt to tear and leave the glass. This was obviated by employing a collodion made of pyroxyline that had been prepared at a high temperature, and which gave a film of a somewhat rotten and pulverulent character. The glass to which it was applied was first sponged over with albumen which had been diluted with more than twenty times its volume of water, a few drops of ammonia having been added to prevent its decomposition before being employed in future experiments. This answered well as an etching ground, aurine being the colour we employed in dying the collodion. The film thus obtained stood manipulation with the needle-point well, even when the lines were etched so closely as to require the services of a strong magnifying glass in doing so.

Knowing the tough adhesiveness of albumen, we thought that this substance would form a superior etching ground to collodion. And so it did, as regards adhesion and hardness; but when it came to the etching, the needle-point was unable to cut through its film to the glass, unless by an effort altogether too great to permit of fine and delicate lines being made. Having some recollection of the facility with which fine lines could be drawn by the needle-point upon glass which had received a coating of silver, we silvered a glass by the means described year after year in the Almanac, and impressed it with an image by means analogous to the Daguerreotype. The metallic coating was so thin as to dimly permit of the passage of light. Upon an image thus prepared the etching can be effected with singular ease, and with a degree of fineness quite inconceivable to those who have not tried it.

When air etching has been obtained on a glass plate, there is nothing in the realm of photographic printing that cannot be achieved by its agency. Photo-lithography, photo-engraving, silver printing—indeed, printing of every kind are attainable with an almost equal facility.

SALTED PAPER *REDIVIVUS*.

During the past year or so more attention has been given to the subject of silver printing on plain paper than it had received for, possibly, the previous twenty years or more. Salted paper printing has recently, according to report, been even referred to as "a lost art." This will, no doubt, call forth a smile from many of our older readers, who are perfectly familiar with the method.

That plain paper prints—we had almost said the beautiful prints of old—did go out of fashion many years ago every one is aware, also most know that the reason was a simple one, namely, that the public preferred those with a glossy surface. If by chance, as was sometimes the case, a matt-surface print was then demanded, it was often produced in a rough-and-ready way by floating the back of a piece of albumenised paper on the ordinary silver bath and printing and toning as if the image had been on the albumen. Prints so obtained were nothing less than libels on the matt-surface pictures of old, and there is little wonder that they met with nothing but condemnation.

In the early days of photography a large proportion of operators salted their own paper, although paper ready salted was a regular article of commerce, and most of those who did so had a pet formula that they preferred, in the same way that many photographers now have their favourite developer, toning solution, &c., and think them better than all others. But great as was the variety of formulæ for salting used by different workers, the finished results were in every instance practically the same, for no difference was discoverable which could be attributable to formulæ.

The preparation of plain salted paper is a very simple matter. All that is necessary is to float the paper on, or to immerse it in the salting solution, and then suspend it to dry. This bath, as usually made, was merely a solution of chloride of sodium, ammonium, or barium, varying from three to twelve grains to the ounce of water, according as to whether the paper was floated or immersed, and the particular chloride employed. To the salting solution one grain per ounce, or less, of gelatine was sometimes added. In addition to the gelatine, other substances, such as Iceland moss, and other mucilaginous

materials were suggested, but they were rarely used by practical workers. Other salts, with the chlorides, were also proposed, but seldom, if ever, employed in practice. The paper most used for plain prints was the *Save* and Canson's, though English papers—Towgood's, for example—were sometimes used. The paper, after salting and drying, was sensitised with a strong solution of ammonio-nitrate of silver. This was sometimes applied with a brush—such as a Buckle's brush—but more often by spreading with a glass rod, as this did not disturb the fibre of the paper. The prints were toned frequently by the *sel d'or* process, but more generally by the compound toning and fixing bath of hyposulphite of soda and gold.

There is no question that the salted paper print of old was an excellent picture. It was bold and vigorous, and of a rich, warm, velvety black, and was very different from what have more recently passed under the name of salted paper pictures. Now that the subject is again receiving some little attention, it will not be out of place to point out the difference between the old and the more modern method of producing this class of picture, as it will explain why the results now often obtained are so very unlike, as regards vigour and colour, as well as stability, to those of former times.

In modern times the back of ordinary albumenised paper has simply been floated on a plain solution of nitrate of silver, so that, in fact, one side of the paper is salted while the other is sensitised, with the result that the image when printed is really in the body of the paper; hence it necessarily has a mealy and sunken appearance, which destroys all brilliancy, although it may be vigorous enough if it be viewed by transmitted light. If, however, the paper has been specially prepared for the purpose, as a rule it has contained too little chloride, and sometimes other salts, with, frequently, a considerable quantity of gelatine or mucilaginous matter. These were of no advantage whatever, if not really injurious, as they kept the image almost as much on the surface of the paper as albumen does. After printing, the picture has been toned—and usually over-toned, too—in the alkaline bath, which is not well adapted for the purpose.

In the veritable old method the salting was effected with a simple chloride, with a trace of gelatine added to the solution, but never sufficient to cause it to gelatinise when cold. Whether the paper was salted by floating or by immersion, the chloride penetrated completely into the body of the paper. In sensitising, instead of a weak plain solution of nitrate of silver, a strong one of the ammonio-nitrate was employed, as this was well-known to yield far better tones than the plain nitrate. Then again—and this is a very important matter in connexion with the subject—the character of the negatives used at the time that salted paper printing was in its perfection was totally different from those now in vogue. They were very dense, and possessed a wide range of tones, from clear glass in the deepest shadows to great opacity in the lights; hence a large amount of silver was necessarily reduced in the printing, not only on the surface, but in the body of the paper itself. Now, to obtain rich tones on salted paper these conditions must be fulfilled. A feeble negative will only yield grey and mealy prints, inasmuch as the image consists only of a very attenuated layer of the reduced metal.

The toning of the prints of old was usually effected in the compound toning and fixing bath—although *sel d'or* was sometimes used—which gave far better tones than was afterwards found to be the case with the alkaline bath when used for plain paper. The toning of the prints was a somewhat slow operation as compared with the alkaline method, but while it was progressing the fixation became very complete by reason of the long continued action of the hyposulphite of soda, which conduced to the stability.

From the above it will be seen that the conditions under which the old pictures were produced differ widely from those existing under the more modern system of working, and this will fully account for the difference in the results obtained. If there were really any "lost art" in making matt-surface silver prints, it must be sought for in the conditions under which they were produced, and not in mere formulæ.

At the December meeting of the Royal Astronomical Society, Mr W. E. Wilson read a very interesting paper upon the application of photography for recording the transits of stars. The object to be attained is one of considerable importance to astronomers, as the Astronomer Royal and Mr. Ainslie Common remarked; and plans for carrying out the automatic recording of star transits have before been devised, but—possibly because of practical difficulty in working—not carried out. Mr. Wilson's plan is to place a sensitive plate just behind the transit wires, and that every second it should be given, by clockwork (connected with the standard clock of the Observatory), a small motion alternating northward and southward, so that the trace left by the star upon the plate would be broken at intervals of a second thus: ¯_¯_¯_¯_¯. After the star has made its transit, leaving its trace upon the plate, Mr. Wilson proposes that the places of the wires should be registered by allowing a faint light to shine through the object glass of the telescope, which would fog the plate, with the exception of the places shielded by the wires.

At the same meeting an instructive discussion on the uses of the imagination was carried on *apropos* of a paper by Professor Holden, in which, from photographs taken at Lick, he had drawn curves passing through lines of stars, indicating certain arrangements and clusterings which he thought were not mere fanciful groupings. At the close of a discussion rather hostile to the idea, it was very properly urged that no conclusion ought to be arrived at without having the original negatives before the members, the President saying that the question was a very speculative one. Captain Noble told the meeting that he had once been shown what looked like a star map, but which turned out to be simply produced by throwing Indian ink upon paper from a tooth brush, and made by the wife of the astronomer, who showed it to Captain Noble.

Every one familiar with chemical operations knows the unpleasant bumping that is so frequent an accompaniment of boiling liquids in a glass flask, whether water for distilling or whatever purpose, and numerous have been the remedies recommended. Mr. S. E. Parkill, in the *Pharmaceutical Era*, describes a very simple method which he has invented for getting rid of the effect. He simply roughens the surface of the flask inside with hydrofluoric acid, extemporised by placing a little fluor spar into the bottle, adding a small quantity of sulphuric acid, and then putting aside for a little time. The method answers admirably, we are informed. It is extremely simple, and seems to utilise the same principle involved in the use of pumice stone, charcoal, &c.—the provision of a large number of points for the discharge of the dissolved air.

In estimating the composition of guncotton, a recently published work states that the mono and di-nitro-cellulose is removed by alcohol ether, and the tri-nitro-cellulose dissolved by long continued boiling in sulphate of soda, unaltered cellulose and mineral matter being left behind. The author, on the authority of Bröckman, objects to the theory that either guncotton or pyroxyline are, as commonly termed, nitro compounds; he would call them ethers of nitric acid.

We have often been struck with the fact that no mention is ever made of the constant slopping of chemical solutions and of plain

water upon the boarded floors of the ordinary rooms set apart for silver printing having been instrumental in producing a growth of dry-rot, an evil greatly dreaded by all who know anything about it, and almost impossible of eradication when once it gets a start in a building, the whole of the woodwork in which it will destroy if not checked. Warm, damp air, without ventilation, are the most favourable conditions for its growth. In reading a report on certain agricultural matters lately, we came across a statement which will probably explain this freedom from the pest. The result of experiments on the properties of a large number of germicides showed "hypo" to be an excellent preventive of parasitic fungi, under which head dry-rot would come. This salt was found even to be superior to the evil-smelling calcium sulphide, which for the lower forms of animal life is a perfect poison.

If ever this form of decay exhibit itself, an architect should at once be called in. We know at this moment of writing of a large warehouse, all the shelves in which, at one portion of the building, have fallen at all sorts of angles, owing to the floor that supports them having decayed entirely through the ravages of dry-rot, though the building is quite a new one and excellently built. The effect of such rotting of shelves supporting a heavy weight of negatives may be very easily imagined. Wherever there is reason to suspect an initial growth, most photographer will have in their laboratory an effectual panacæa in bichloride of mercury, painted on the particular spot indicated and for some distance around.

Unfortunately this—one of the most efficient of its class—is inapplicable to starchy mounting pastes and gelatine, which it will keep free from mould for an indefinite time used in even very small quantities. Iodide of mercury is even still more effective an antiseptic, weight for weight, two grains being equal to three of the bichloride.

THE NEW BENZOLINE LIMELIGHT.*

I.—Conditions of Safety.

When Lieutenant Drummond introduced the limelight for signalling and other purposes in 1826, it was christened the oxyhydrogen light, because it was produced by the intense heat of a blowpipe flame, fed by a mixture of oxygen and hydrogen, acting upon a small ball of lime. The light so obtained was estimated as being equal to 125 wax candles of one and one-eighth of an inch in diameter.

Pure hydrogen, obtained by the action of acids on metals, was employed in the first instance. In order to avoid the expense and trouble of making this gas, the spirit jets incorrectly named the oxy-calcium jet—was introduced, in which a lamp fed with methylated spirit replaced the hydrogen. This is the least powerful form of the limelight, being usually estimated at 150 standard candles. It is now rarely used.

When coal gas became available for lighting purposes, and procurable in every town at a cheap rate, it was natural that, for the limelight, hydrogen should be replaced by the cheaper gas, which gave a light about equally brilliant with the jets thus made.

Coal gas and oxygen are the gases now most popular with lantern-ists, who are the chief users of limelight. The jets which are employed are well known, and are divisible into two distinct classes. The blow-through jet, for which coal gas is supplied from the main, and oxygen from a cylinder or gas bag under pressure boards, gives a light between 150 and 200 candle power. The mixed gas, or chamber jet—in the use of which both gases are compressed into cylinders, or are put separately into bags equally weighted—yield a light with ordinary commercial jets varying from 200 to 400 candle power.

Ether saturators have been for some years before the public, but have not come very largely into use as yet; although, as the conditions of safety are becoming better known, the prejudice created by certain accidents which have occurred is passing away. Ether is perfectly safe if used in a properly made *stuffed* saturator; but to use it in a loose liquid state in an unstuffed tank is dangerous. It is this latter form which has injured the reputation, as regards safety in use, of the ether saturators. I have never heard of any accident caused by a stuffed saturator.

The light produced by the use of ether and oxygen is about equal to that of the oxyhydrogen light with mixed gas jets of small bore; but with jets of larger bore, ether is not quite equal to coal gas in brilliancy; moreover, in the latter case ether burns less quietly, and is more apt to "pop" than coal gas.

I may explain that by a small bore is meant that usually adopted in commercial jets, viz., about one-twentieth or one-twenty-fifth of an inch in diameter: by a large bore is meant an aperture in the nipple of about one-fifteenth or one-twelfth of an inch in diameter.

The "pop," otherwise known as the "pass-back," is the little harmless crack caused by the explosion of the small quantity of mixed gases contained in the mixing chamber of the jet. This crack or "pop" sometimes occurs with coal gas when the gases are turned off quickly. The pop is more apt to occur with a large aperture in the nipple than with a small one, and more likely with a low pressure of gas than with a high pressure; hence it follows that most nipples are only safe from a pop so long as the gas is supplied to it with some degree of pressure; when the pressure is taken off, as occurs in turning off both taps of the jet simultaneously in order to put out the light, then the pop is heard. If one tap is turned off before the other, there is, of course, no pop in the case of the oxyhydrogen light, because neither oxygen nor coal gas is explosive by itself; it is only the mixture of the two which can produce a pass-back. If a pop occurs when an ether saturator is being used, it is evident, as the mixture of oxygen and ether vapour is explosive, that the flame, having reached the mixing chamber, will travel from the jet through the rubber tube down to the ether vessel, that is, if no pumice chamber or flame extinguisher is interposed. As there is more gas in the rubber tube than in the mixing chamber, the pop is much louder with an ether saturator than with coal gas; it is like the crack of a small pistol.

If the saturator is a *stuffed* one, no damage whatever is done; but if it is an unstuffed tank, then a serious accident is more than probable, especially if the charge of ether is half exhausted. There is then enough explosive gas in the saturator to fill a half-pint measure, or, possibly, a larger one, and the explosion of this quantity is sufficient to rend asunder very strong vessels; the liquid ether is splashed about in a flaming condition, and of course there is a great mess.

It is in this way that all the accidents with ether saturators have occurred. A pop has taken place at the nipple, the flame has travelled from the mixing chamber to the tank, and it has exploded; hence, I must denounce all *unstuffed* saturators charged with inflammable liquid as unsafe. If the vessel is stuffed, it does not burst, there is no loose fluid to be scattered about, and consequently there is safety. The pop is easily avoided by keeping up a fair pressure of gas on the nipple as long as the light is wanted. One of the two taps of a jet should be always *full on*: it does not matter which. In extinguishing the ether light, both taps should be turned on full in the first place; then the vapour tap which supplies the ether is turned completely off. A current of pure oxygen quite free from ether vapour will then impinge on the lime. Pure oxygen does not burn in air, consequently the lime soon grows cold. When it has ceased to glow, which will occur in about one minute, the oxygen may be turned off without fear of a pop.

There are some jets made which have their mixing chambers filled with grains of broken pumice stone, which form the pumice chambers invented by the Rev. Hardwich. If properly made, these are flame-proof, and there is then not the slightest chance of a pop. I have described the conditions of safety with ether saturators because they are equally applicable to the new benzoline saturators.

As a pop is caused by insufficient pressure of gas, it is advisable to put out the light before the available supply of oxygen is exhausted. There are some occasions, however, when a pop is useful as part of the programme of an evening's entertainment.

Recently a gentleman was lecturing with an ether saturator before an audience. He had nearly reached the end of his programme, and was exhibiting the set of twelve slides called the *Passions*, a tale of a handsome policeman and two rival servant wenches who were in love with the "bobby." One maid was preferred by the gentleman, who was duly invited to partake of good things in the kitchen by the fortunate cook. A picture was being shown on the screen showing the rejected and disconsolate maiden vowing vengeance on the lovers. Just then the supply of oxygen ceased, the pop took place harmlessly, and the series of pictures was ended. It was subsequently discovered that the audience was under the impression that the pop was part of the programme, and simply meant that the angry damsel had seized a pistol and had *shot* her rival!

Albert W. Scott.

* A brief description of this limelight is given in The British Journal Photographic Almanac for 1890, just issued.

COLOURED *AU NATUREL*.

After digesting the substance of all that has been written concerning the possible imminence of the naturally coloured photograph, after, moreover, tracing step by step the elegant endeavours of the experimentalists, living and dead, to reach the pinnacle of being able to take a coloured image in the camera, it is hard for most persons of average parts to withhold concurrence in the conclusion of the author of that invaluable little work, *The Chemical Effect of the Spectrum*, that "direct photography in natural colours, in which a coloured image is produced on a sensitive plate, will be, like some other things, a long time before being accomplished." The "other things" include, it is to be conjectured, the *Elixir Vitæ*, practical aerial navigation, the conversion of ferric oxide into gold, the occurrence of two Sundays in one week, and such-like.

Yet it appears to be believed, not merely by the outside public, but by numbers of rational individuals who have an association, direct or indirect, with photography, that in the list of discoveries which science has, if one may encroach upon the picturesque slang of the period, "up her sleeve," the naturally coloured photograph holds a place, and that, in effect, the "revolution" may occur at any moment, being immediately followed by an intimation that orders will be executed in rotation, together with notice that permission to work the process may be obtained for certain pounds, shillings, or pence. In times of pessimism and despondency like those through which we are now passing, it is soothing to encounter here and there an heroic soul who looks with such sublime confidence to the future. May it be trusted that this inspiriting optimism neither blinds the understanding nor confuses the judgement? For, taken as a general principle, in assuming a universal colour-sensitive body—call it argentic polychromide—to be isolated, and found susceptible of being distinctively impressed by the colours of whatsoever objects the lens is pointed at, several details arising from the imperative necessity of conceiving each separate impression to be a true negation of the positive colour, in so far as it will allow, by superposition, the reproduction of a correct positive on paper or other support, several details of this character have to be disposed of. If the believers in the ultimate appearance of the naturally coloured photograph appreciate the gravity of these and other preliminaries to the realisation of their hopes, and still preserve an unassailed faith therein, then human nature must be allowed to be steadily nearing its own apotheosis.

Few of us, indeed, know with clearness what we mean and what we imply when we speak of the production of a naturally coloured photograph in the camera; we do not think of what would have to be accomplished before such a consummation could be brought about. In like manner, the interesting experiments that have yielded, among other pretty results, veritable coloured photographs of a sort, have, in their relation to the main subject, been both over-emphasised and misapprehended. They no more presage the advent of naturally coloured photographs, in the sense usually understood, than Mr. Baldwin's dangerous capers with his parachute point to an epoch when we shall travel to and from our shops and offices in balloons. They are nothing but curiosities of photographic science which have at present no practical value, and probably will never possess any.

According to the present state of our general and particular photographic knowledge, we should not be justified in surmising that, were the naturally coloured photograph to be an accomplished fact, we should be able to dispense with the assistance of a lens and a camera; or that a negative would not be a first necessity; or that the positive pictures would not have to be multiplied in a manner similar to one of those now in prevalence, by printing out or by development. But even if we set aside these premises, and conceive science to teach us how to obtain a coloured positive by the simple operation of exposure, dare we hope that her complacence would stretch out to the limit of informing us how to multiply copies thereof in a cheap and expeditious manner? Obviously, without such an advantage, the naturally coloured photograph would be a boon of no value to the community.

The author above quoted gives prominence to the "fundamental idea that the coloured image should be directly produced in the camera by the exposure of a sensitive plate to light." Now, suppose a coloured Fraunhofer chart of the eight spectrum colours to be photographed upon a film of our hypothetical silver polychromide and a negative by development to be sought, can we conceive of the deposit being an accurate negation of those eight colours having a gradation in the inverse value of their positive effects, and just sufficiently translucent to be printed through upon a sensitive surface (? argentic polychromide) that will render us an exact chromatic representation of the *parte*-coloured band from the ultra violet to the infra red? What do we imagine the photographic negation of red, yellow, green, to be? To-day, when we develop the picture of a landscape, the negation of our blue sky is black opacity; in our naturally coloured negative, how are we to imagine the sky to appear, assuming the sensitive substance we employ for the negative to serve a like purpose for the positive print? It is not difficult for us to regard as a feasibility a silver salt possessing the property—as in the instance of the chloride—of exhibiting certain diverse characteristics of colour; but can we imagine a compound that will reproduce for us every shade and tone and *nuance* of a simple landscape, to say nothing of severer tests? Natural colour photography to respond to the above fundamental "idea" would mean nothing less than the perfection of a thousand negative processes, each as beautiful as the one we now possess, all mixed together and boiled down to one divinely, harmonious, miraculous whole. Can we not sympathise with our authority, who, after summarising everything that has been attempted in the direction of natural colour photography, confidently remits its achievement to the Greek kalends?

It does not follow that to any or every problem which the men of science propound there exists a solution that is to be disinterred by the necessary assiduity and diligence. The paths of science are traversed by innumerable wild geese, whose pursuers appear incapable of perceiving the hopelessness of the chase. The photograph in natural colours must, unfortunately, be classed with these evasive fowl. During the half century of photography's existence as a practical art, the aspiration of being able to reproduce nature and mankind and his works in their proper tones has dwelt in the hearts of many worthy persons to the cultivation only of disappointment and sorrow. Alas! that it should be so.

Shall it be said that on the whole many of us, male and female, would prefer that the naturally coloured photograph remained undiscovered until we have got a little bit better looking? Are we not sensible that the royal purple tint that distinguishes our nasal appendage has its chromatic analogue near to G, and would infallibly come out most naturally by the kind offices of the film of silver polychromide? And then our hair, if we have any, is perhaps of the oakum hue, beloved of the P.R.B., the late Rossetti, the still flourishing Burne Jones, and other profound persons; or, maybe, it is chiefly black and partly grey, and would appear as such in the naturally coloured print. Let us think of these things and be grateful. Yet again, have we not moles, wrinkles, crow's feet, brow furrows, innumerable other time and nature marks; and must we not conclude that the retoucher, under the natural colour dispensation, would become extinct unless he engaged to acquire the stupendous accomplishment of working in natural colours? Failing this self-adaptation to the revised style of things, our only hope would rest on the chance of his being able to touch out those imperfections on the face itself by the skilful use of divers cunning paints and pigments, so that the negative would be invested with the required degree of mendacity, and consequently have the, nowadays, strange feature of being untouched.

It is suggested as a congenial task for the handful of wild beings who have lately amused us with their deliverances anent that astonishing cultus, naturalistic photography, that speculation over the probable influence upon landscape art of natural colour photography would be of interest. It requires, however, no such lofty qualification for an ordinary person to understand that the vastnesss of urban ugliness now perpetuated by the lens and the dry plate would, under the natural colour *régime*, be inconceivably embittered and intensified by the glaring brick reds, the bilious stucco, the slate roofs, the flaunting posters, the startling shop fronts, gin palaces, and the rest of it, perfectly *au naturel*, which most of us are now not sorry to have sobered down to the cool austerity of metallic platinum and silver. Furthermore, shall we not rejoice and be glad that all that is colourifically hideous, coarse, vulgar, tasteless in the sartorial adornments of the inferior strata is lovingly subdued by the same kindly agents?

For the mercies that travellers to the common bourne do not come back, that animals cannot tell us what they think of us, that a man is limited to one mother-in-law at a time, that Christmas falls but once per annum, let us be truly thankful, and not less truly, in sooth, than we are for the remoteness of the "naturally" coloured photograph. But of course, in the legal jargon, "without prejudice."

Thomas Bedding.

CHEAP WASHING TROUGHS.

For Plates.—Take a metal plate box and make a very small hole, as small as you can, at the bottom. Put the plate in that you want to wash, and let the tap drip into the box rather faster than the water can run out through the hole at the bottom. The excess will of course run over the top, but the hypo will escape at the lowest point.

Some plate boxes are made so that the glass projects over the top. These do not answer the purpose.

For prints.—What you want to do is to introduce the supply of fresh water at the bottom so that it mixes with and carries away any hypo accumulation that settles down. This can be done by putting a bit of elastic tubing over the nozzle of the tap long enough to reach to the bottom of the vessel.

But an easier plan is to use a funnel. There are two ways of doing this: either let it stand on its big end in the basin with its small end projecting over the surface (see that it is exactly under the tap so that the drip falls down the tube and comes into the basin under the rim of the big end), or, if you have anything you can make a foot of, you can put the big end upwards. I use a small earthenware funnel for this that has no straight part. If the side of the basin is tolerably upright, it is enough to rest the side of the big end of the funnel against the side of the basin and let the drip pass through the former.

Q. D.

COMPOSITION OF PICTURES.

When the photographer puts his head under the cloth, he perceives that there is a certain space to be filled bounded by the four rigid lines of the focussing screen, and though he is conscious that he has not the same freedom in selection as the painter, he feels that much depends upon his ability to adjust the parts to an harmonious relation.

The great desire is to fill that space to the best advantage. The easiest way to do this he knows is to arrange the figures one after the other, faces all turned in the same direction, much in the manner of the wall paintings of the Egyptians; but then such an arrangement involves neither skill nor thought. It requires a good deal of taste and judgment to dispose of the figures in groups so as to produce a pleasing variety in the attitudes.

There are certain general principles which have come to be accepted by the masters as applicable to figure compositions, and these the photographer may make good use of without needing to follow them blindly.

Whatever the subject of the picture, the eye is always attracted by the heads; therefore it is of the utmost importance to carefully consider their relative positions.

The heads in a group should never be equi-distant, or so placed that imaginary lines connecting them would form any regular geometric figure, as an arc of a circle, a square, or triangle. Such a distribution is almost as offensive to the cultivated eye as the all-in-a-row arrangement.

By simply shifting the position of the figures it is easy to break up this unpleasant symmetry.

Two heads should never be in the same vertical line: that is, one perpendicularly below the other. Suppose we have two figures: one standing, the other kneeling or sitting. It will give greater action to the group and more pleasure to the eye by bringing the head of the kneeling figure a little in advance of the standing.

If we have three figures to dispose of, two standing and one sitting, we should not arrange the group so that the sitting figure shall be equi-distant from the two standing ones.

Converging lines in a group are generally objectionable unless the convergence is necessary to the subject depicted. Where all the arms seem to radiate from one fixed point the eye naturally turns, and when it finds there is nothing of interest, disappointment follows.

The management of the arms and hands, especially in a large group, is one of the most difficult problems to deal with. They cannot be put out of sight, but should be so disposed as not to attract special attention.

Sometimes in a group the arms and hands cross, but they should never cross at right angles, and it should also be remembered that obtuse angles in a picture are more pleasing than acute.

Repetition of lines is generally to be avoided, although sometimes a repetition of the same attitude in a minor degree is quite effective by way of emphasis.

The art of grouping cannot be learned without considerable experience.

At first, one has a general idea how the space is to be filled, then the details have to be worked up, and a change in an attitude may require a corresponding change in some or all of the others, until the original idea is abandoned for something else. Success is only attained by a continual process of modification, addition, and omission.

The principal figure of the group, that about which the others centre, should receive the most attention, but it is not necessary to place it in the centre of the picture, neither should it receive the greatest illumination. Unless the secondary or less important figures of the group are so arranged as to show their relation to the leading figure, they will seem like trespassers upon the scene. Now, as regards the size of the figures with reference to the dimensions of the plate. They should not be so large as to look cramped in the space allotted to them. It is well to remember that sufficient room should be given for seated or stooping figures to arise if they felt so disposed. The impression should never be conveyed that they would thereby endanger their heads by coming in contact with the top of the plate.

The figures in the group, on the other hand, should not be so minute as to look stagey.

Finally, take care not to crowd the scene with too many items of interest. It is often a temptation to fill up an empty space, but frequently it is better to leave it vacant.

I. H. Sunderlin.

—*American Journal of Photography.*

PHOTOGRAPHY IN RELATION TO METEOROLOGICAL WORK.

[A Communication to the Photographic Society of Great Britain.]

The prosecution of the study of weather and its changes entails frequent and numerous observations of the various natural phenomena which in the aggregate go to make up what we term weather; popularly these may be described as changes in the various properties of the aerial ocean which surrounds us, and at the bottom of which we live, and move, and have our being. These phenomena are its temperature, its humidity or extent of dryness—*i.e.*, the amount of aqueous vapour it holds in suspension—its motions, its density, and also its electrical condition. Variations in its chemical constitution and in the amount or nature of the objects accidentally floating in it, such as dust, organic or inorganic, under which I would include germs and seeds, although of great interest to the naturalist and sanitarian, are scarcely to be considered as falling within the scope of the science of meteorology as spoken of at the present time. It is to be hoped, however, that as we obtain a fuller knowledge of many of the phenomena first mentioned, those I have later named will come in for more extended notice.

As to treat of all the matters just enumerated would be to cause us to travel very wide of the subject of this paper, I shall not attempt to go into the history of the discovery of the various instruments which were employed by the meteorologist when photography came into notice. It was soon found to be a convenient handmaid which could be brought to his aid, and would relieve him of a considerable amount of watching, by recording instrumental changes which took place during periods when he was elsewhere engaged.

I do not wish to be unjust to any person who may be entitled to the credit of being the earliest in the field of invention in this art, more especially to foreigners, but I refer in this paper only to those gentlemen whom I have been able to find distinctly removed the invention from the region of conjecture to that of actual performance.

In the extreme south-west of England there has existed for fifty-six years a comparatively small scientific and artistic society—the Royal Cornwall Polytechnic Society—founded by some young ladies in 1833, which publishes annually a small volume of "Proceedings."

In 1838 its Secretary, Mr. T. B. Jordan, who was also a mathematical and philosophical instrument maker in Falmouth, described an instrument for recording by photography the variations in the height of the barometer or instrument for weighing the atmospheric column pressing on the earth's surface, by passing light through the torricellian vacuum and allowing the top of the mercurial column to arrest the luminous rays in their passage to the sensitised paper. Mr. Jordan also devised a recording declination magnetograph, and a self-recording actinometer, all of which instruments, with illustrations, are described in the Sixth Annual Report of the Society. The next application of photography, in the order of time, was by Sir Francis Ronalds, at that time Honorary Superintendent of the Kew Observatory, who was hard at work in 1840 on atmospheric electricity. Having constructed an apparatus which he called an electograph, he obtained a record of the rapidity of the sparks passing from a conductor electrified by the air in the following ingenious manner:—A sealing-wax covered metal disc was substituted for the hand, and carried round on an upturned clock dial, beneath a finger connected by a wire with a collecting mast. As sparks passed from the conductor on the mast to the ground they heated and softened the sealing-wax on the disc, so that on powdered chalk being shaken over it Lichtenberger's figures were formed, which were retained in the wax when it cooled. Ronalds had these discs placed in front of an ordinary camera and photographed by Mr. Collen, of Somerset-street, London, a photographer called in for the purpose. This somewhat roundabout process was soon after modified into one of moving a sensitised plate in front of a pair of

electrified gold leaves of a Bohnenberger's electroscope and recording the amount of their divergence.

We next come to the simultaneous labours of Brooke and Ronalds, the results of the incentive of the grants made by the Royal Society for the successful construction of a self-registering instrument. Full accounts of both gentlemen's work will be found in the *Philosophical Transactions* volume for 1847; and the principal parts of the original apparatus, after working for many years—the one at the Royal Observatory, Greenwich, the other at the Kew Observatory—are now in honourable retirement side by side in the loan collection of scientific apparatus at the South Kensington Museum.

Since the time of Brooke and Ronalds their magnetographs and meteorographs have undergone many modifications in detail, but not in principle; these we cannot go into now, but will proceed to other instruments since constructed.

The thermograph and pluviograph are both derived from the barograph; the earth current and Thomson's electograph are both adaptations of the Gauss's mirror method, as used by Brooke in the Greenwich magnetograph; and the Campbell-Stokes and Jordan sunshine recorders, in which the methods of producing records are characterised by extreme simplicity, are descendants of T. B. Jordan's heliograph of 1838. Finally, we must mention the Roscoe recording actinometer, and Abney's cloud cameras, with lightning photography, for which no special instrument is yet constructed, as instruments perhaps less distinctly meteorological, as the latest achievement we can consider to-night.

I now propose to exhibit on the screen lantern slides I have prepared from actual examples of the various instruments enumerated already, which are now in daily work at the Kew Observatory and elsewhere; they are as follows:—

1. Beckley's modification of the Jordan-Ronalds barograph.
2. Beckley and Stewart's modification of the Brooke-Airy thermograph.
3. Welsh and Beckley's improved Gauss-Brooke magnetographs.
   (*a*) The declination magnetometer.
   (*b*) Bifilar or horizontal force magnetometer.
   (*c*) Balance or vertical force magnetometer.
4. Stokes's form of Campbell's sunshine recorder.
5. Jordan's form of sunshine recorder.
6. Whipple's modified Abney's photo-nephograph.

Photographic Processes employed in connexion with the above Instruments.—I believe that the process first used for recording on paper (that used by Jordan) was that of Fox Talbot, and known as the Talbotype, but on account of the sluggishness of the photographic action, and the inability to record rapid movements of the magnets, as well as of the supposed irregularity in the traces produced by the warping and shrinkage of paper in the drying and other operations, Ronalds employed the Daguerreotype process for his instruments, subsequently copying the traces, for the purpose of preservation by hand on gelatine sheets, by scratching the outlines of the curves by means of an etching-point, and afterwards working off impressions by rolling ink over them, as in copperplate printing, for distribution. Specimens of these are exhibited.

The process used by Mr. Brooke, and subsequently by Mr. Glaisher, at the Royal Observatory, Greenwich, was a plain salted paper process, and is described at length in the introduction to the annual volumes of magnetic and meteorological observations made at the Royal Observatory.

The Radcliffe Observatory at Oxford, being provided with a Ronalds barograph, early abandoned the use of the Daguerreotype plate in favour of Le Gray's waxed paper process as improved by Mr. Crookes, and his methods were adopted by the Kew Committee, when continuous registration of the magnetic elements was entered upon at their Observatory in 1857.

The waxing and ironing of the sheets of Canson's paper was an operation which consumed a great deal of time, but in 1859 this part of the work was greatly facilitated by Messrs. de la Rue & Co., the wholesale stationers, who undertook the hotpressing and cutting the paper by means of machinery. The staff at Kew prepared the paper for pressing by arranging it in piles made up of sheets dipped in melted refined white wax, alternating with plain sheets and blotting paper in a certain order beforehand. When, in 1867, the Meteorological Office established their system of seven British Observatories, all working with the Kew pattern instruments and using the same process, and a number of foreign Observatories also were founded, using both magnetographs and meteorographs, all of which came to Kew for their supplies, Messrs. de la Rue were compelled to withdraw their assistance, and so recourse was had to a manufacturer of waxed paper, Mr. John Sandford, who supplied it in considerable quantities, ready prepared for use, until a quite recent date.

The instability of the silver compound in the sensitised sheets rendered waxed paper extremely subject to change, and any variations in the temperature or humidity of the air would bring about great discolouration of the exposed sheets with frequently partial and occasionally total loss of the curves. Hence it was with great pleasure learned that all the requirements of self-recording instruments could be met by the use of gelatinised bromide paper. This could be purchased in the market in adequate quantities ready to be wrapped around the cylinders of the various graphs without occupying time in preparatory processes, and could be dealt with subsequently by very easy methods not liable to any annoying mischances.

Since 1882, with, I think, only two exceptions, Kew and all its affiliated Observatories have entirely abandoned the waxed paper for the gelatinised or A.G.B. paper prepared by Messrs. Morgan & Kidd.

This paper, however, has two rather serious drawbacks. The first is, the unequal shrinkage of the film and paper produce distortion in the curves, which is considerably greater than that found to exist in the case of waxed paper. The other defect is the curling up of the paper in drying. This, at first, was a serious inconvenience in the operations of measuring and tabulating the curves, but is now of little note, care being taken to avoid unnecessary exposure to either sunlight or heat.

Eastman's paper is, I believe, used similarly in America, and Huntinet's on the Continent, but, so far as I am aware, neither are employed in this country.

I will now proceed to the sunshine recorder. The Campbell instrument, which consists of a solid glass sphere placed concentrically in a bowl turned out of a block of mahogany equal in radius to the focal length of the sphere, registers the duration of bright sunshine by the amount of wood burnt or carbonised by the heat of the solar rays concentrated in the focus of the globe. This instrument, originally in operation at the office of the Local Government Board, Whitehall, London, has since 1875 been fixed on the roof of the Kew Observatory, and the charred bowls are renewed every six months, as the sun passes through the summer and winter solstices.

In 1879 Professor Stokes improved the instrument by substituting a grooved brass bowl for the wooden one, so enabling a suitable card to be so placed that the sun's image should traverse it daily from end to end, leaving a blackened path on the card, which shows accurately the periods of the sun's shining and obscuration, hour by hour, or minute by minute. There is, however, some uncertainty attached to these records, because the presence of ever so small an amount of hazy or cirrus cloud in the sky suffices to prevent the charring action of the sun on the paper, and no trace of sunshine is recorded unless the sun should be shining with its full glare. Mr. James B. Jordan's sunshine recorder, which is purely a photographic instrument, obviates this by recording varying intensities of sunshine by varying amount of discolouration produced in a paper sensitised by the ferrocyanide process.

A strip of prepared paper is put into a brass box, and the sun's light allowed to pass through a small slit in the side of the box and fall upon the paper. After exposure, the paper is fixed in clear water, and we have then upon the surface a blue trace, the intensity of which roughly measures the amount of solar influence upon the earth. As now constructed, a pair of semi-cylindrical boxes are fixed back to back upon a frame which can be placed parallel to the equator of the station.

The next and most recently designed photographic meteorological instrument I have to refer to is the photo-nephograph or cloud camera, an apparatus not yet fully developed. Its object is to obtain simultaneous instantaneous photographs of the same cloud from two or three stations situated at a distance from half a mile to two or three miles from each other.

These simultaneous pictures are then utilised in fixing the positions of clouds above the surface of the earth, and by a knowledge of these facts information is obtained as to the higher currents of the air, their direction and motion at heights far above those at which anemometers can be placed, and in places they may be supposed to be unaffected by the irregularities and eddies formed by excrescences which modify the contour earth's surface, such as hills and valleys.

At Kew, two cameras fitted to theodolites are erected on stands half a mile apart, but electrically connected by a buried telegraph wire. Each camera is provided with an adjustable instantaneous shutter, which can be liberated by an electric current at the will of the directing operator, who first points his camera at a selected cloud, and then, having instructed the observer at the remote station, through a telephone, as to the direction of his, releases both shutters at the same instant of time.

The plates exposed are slow gelatine plates, prepared according to a

formula devised by Captain Abney, to whom is also due most of the details of the arrangement of the instrument. After development by pyrogallic acid and fixing, proofs are printed on albumenised or gelatinised paper, from which, subsequently, measurements are made of the photographs which afford the data necessary for the computation of the cloud positions and motions; whilst at the same time valuable information is also given as to the structural changes continually in progress in the clouds.

With regard to the utilisation of the photograms, suffice it to say that various processes of photographic reproduction by photo-engraving, photo-lithography, &c., have been tried as well as mechanical reproduction by pantagraphy; but for practical use it has been found best to convert the curves into numbers by means of tabulation, and distribute the results to the public under the aspect of printed columns of figures, or the familiar weather charts of the *Times* and other newspapers.

The following is an alphabetical list of the names of the principal observatories at home and abroad where photographically recording meteorological and magnetical apparatus is known by the author to be in action at the present date:—

Great Britain and Ireland.—Aberdeen, Falmouth, Glasgow, Greenwich, Kew, Oxford, Stonyhurst, Valentia.

Colonial.—Adelaide, Bombay, Hong Kong, Mauritius, Melbourne, Sydney, Toronto.

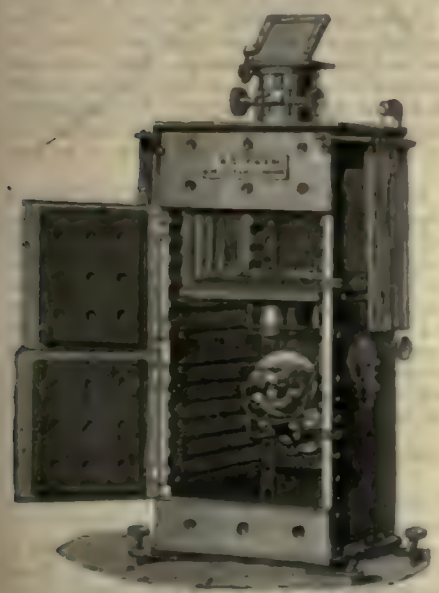
Foreign.—Batavia, Brussels, Coimbra, San Fernando, Lisbon, Lyons, Madrid, Nantes, Nice, Paris, Perpignan, St. Petersburg, Utrecht, Vienna, Washington, Wilhelmshaven, Zi-ka-Wei.

The lantern slides exhibited have been made, under the author's direction, by Mr. W. Hugo, photographic assistant at the Kew Observatory.

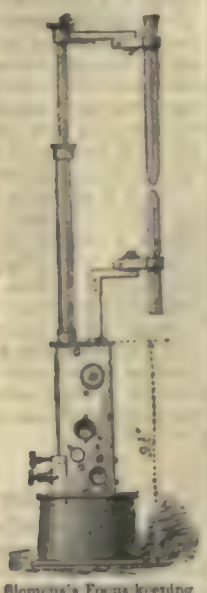
G. M. Whipple.

ELECTRIC LIGHT LANTERNS.

The subject of electrically lighting optical lanterns is sufficiently interesting, from what has passed in the correspondence columns of this Journal lately, and from the questions asked in some of your scientific contemporaries, for some addition to be made to the knowledge at present possessed by some of those who use the optical lantern, or wish to know of modifications and improvements in same. In a previous article I described a lantern made to the design of Dr. Fleming that gave facilities for using the incandescent "focus" lamp, both as a horizontal lantern for direct projection, and as a vertical lantern for experiments that required the objects to be placed horizontally. In order that this may be better understood than it can be from descrip-



Dr. Fleming's Incandescent Electric Light Lantern for Vertical or Horizontal use.



Siemens's Focus keeping Electric Light Arc Lamp.

tion only, I have had illustrations made to show its form and method of use. From this it will be possible for your readers to judge if the "special" lantern has a *raison d'etre*.

From the results obtained practically at the University College, London, there can doubt it is a great acquisition to the class room, and permits of demonstrations being made with great rapidity of not only magnetic and electrical experiments, or for projecting any object that requires to be placed horizontally, but also ordinary photographs of views, diagrams, &c. I recently saw Dr. Fleming exhibit a succession of experiments and photographs alternately with great rapidity, and the simple matter of switching on or off the light in the lantern and lighting up the class room by the ordinary room lamp was instantaneous. The pictures on the screen and the disc of six or seven feet was all that could be desired, and the brilliancy of same quite showed it could be used up to ten or twelve feet in diameter, should the size of room require it for all to see properly, and this with only a 50 candle power lamp. By this I don't mean to say that the "focus" lamp cannot be used in any other lantern, but I do say that the great advantage to the class room, on board ship, and, in fact, everywhere where a current of 50 or 100 volts is obtainable, of a lantern like this one of Dr. Fleming's is very great. The fact of the incandescent electric lamp being capable of burning in any position gives a choice of support, and the stand and pin, as figured in the Journal at p. 734, only giving vertical adjustment, I had a gibbet arm made, and suspended the lamp upside down. By this simple means a lateral as well as vertical adjustment is obtained, and consequently *perfect* centring of light secured; the baseboard on which the stand is supported being propelled (in the lantern made by Mr. Steward) by a rack and pinion worked by a milled head from the outside.

By the courtesy of the Society of Arts, I have just lately had the opportunity of making further experiments with the lantern and lamp, and also of seeing the results obtained by the arc lamp Mr. Davenport uses for projection and experimental work at the institution with which he is connected at the Adelphi.

The heat of powerful arc lights, such as used at the South Kensington Exhibition, and to which I alluded in my letter in the Journal for December 6, was, of course, considerable; but when one knows that they represent 1000 candle power or more, and the incandescent lamps under notice are only 50 or 100 candle power, my first surprise at the heat in working of the latter was natural, when it is considered how cool the ordinary incandescent lamp (say 16 candle power) is compared with gas. Then, again, the original trial of the 100 candle power incandescent lamp was made, for the want of a more convenient supply, direct on to the mains of Messrs. Gatti's installation for supplying the Adelphi Theatre and restaurant, and in a tin enlarging lantern with closed base.

In order to make a comparison under the most *favourable* condition of the two lights, I recently took the temperature of the inside of the lantern, and also of the atmosphere of the stage of both the Society of Arts' electric arc, and Dr. Fleming's incandescent lanterns, with the following result:—The arc light lantern having a naked light power (it will be fair to assume) of 800 or 1000 candles gave a temperature at the stage of only 80° or 85° Fahr., and the slide, after being in the stage for about five minutes, was only warm; while with the incandescent of 50 candles the temperature was 125° Fahr., and the slide on being taken out was, consequently, quite hot. (This with 50 candle power lamp, for I, unfortunately, had not a 100 candle power lamp at hand, and so was far below the original heat I wrote about.) The Society of Arts' lantern, with its Siemens's arc lamp, worked admirably, and left little or nothing to be desired; for the light was perfectly under control, burnt centrally and steadily, and the whole manipulation of the light was performed by one hand underneath the lantern body containing the carbons, and carrying the condensers, stage, and front. This result was arrived at by reducing by resistance the power of the current to a minimum that would give all *necessary* illumination without excess of heat, making it possible to get a *small size* apparatus of great illuminating power. In fact, the lantern body could be much smaller than the ordinary size if desired, providing a table or skeleton support for it was used to raise it above the base and casing containing clock-work and electro-magnets as shown in drawing. The lamp is only eighteen to twenty-four inches high over all when carbons are in of sufficient length for a two hours' run, weighs only a few pounds, and the base is not more than four inches square. Although the screen was placed in full view of a window a short distance from it, the light was sufficiently powerful to project a photograph of the front page of The British Journal of Photography, so that every letter of the advertisements could be read, and the excellent definition obtained by a powerful *point* of light was fully demonstrated.

It must be borne in mind, however, that an arc electric lamp requires considerable knowledge and manipulation to use it successfully, and the current must be adjusted to suit its correct working, according to the nature of the supply of electricity—and the cost of the arc lamps are about as many pounds as the incandescent "focus" lamps are shillings. In this way it is fair to say that both systems have the

use, according to the quantity of light necessary for the purpose in view.

There is no doubt that if a more powerful light than the limelight is required, this small size "Siemens s" lamp serves every likely purpose for optical projection. At the same time, if a *lesser* light than the lime is required for the small size rooms or demonstrations to a class, the 100 candle power, when arranged properly, will be most useful. The difficulty of concentrating the light to a small enough area has been successfully overcome, and in a good lantern, with proper ventilation, the "focus" lamp will be a great addition to the luminants for optical projections; and although, comparatively, the heat is perhaps more than we should like if we could get the light otherwise, it is a far more pleasant light to work with than a paraffin or other oil lantern, and I can therefore confidently advise those who can avail themselves of an electric current of 50 or 100 volts to possess one of these lamps and suitable apparatus for their particular requirements.

G. R. Baker.

THE ACTIONS OF MERCURY ON GLASS *RE* THE MYSTERIOUS SLIDES.

To arrive at the solution of the cause or causes of the surface degradation of the covering glasses of the lantern slides as described at the London and Provincial Society's meeting, and which was further elucidated in your leader of the 27th instant, will more than probably task the combined experiences of a large number of observant workers, and as you express the desire to have explanatory notes, the following may assist toward the desired solution:—

Glass of all kinds, although apparently an almost insoluble crystalline silicate, is by no means insensitive to many of the effects which affect all substances of human construction. Age oxidises its surface and degrades its brilliancy, if it has not the power to reduce it again to its elements, as witness the many examples we have of Egyptian, Etruscan, and Roman. More especially may be mentioned those unearthed from Herculaneum and Pompeii, of which we know about the date and where they were almost completely protected from atmospheric action, yet the combined effects of exhalations from the earth, damp, and air, has thoroughly destroyed the pristine brilliancy and translucency of the greater number of examples we have recovered. The action is such in many cases as to have covered the surface with a mass of scales, which seems with the broken specimens to have penetrated through the body of the metal,* producing the most beautiful iridescent display of prismatic colouring.

But in the case before us, the suggested cause is the metal mercury or its compounds leaving the metal silver by the combined effects of moisture and heat, and a metal for which it has the most acute affinity to attack glass for which it has little or none; I am doubtful whether that will stand investigation.

We have had the mercurial barometer and thermometer in use for hundreds of years, in all kinds of climates and in tubes of all kinds of glass, although principally flint with lead as one of its main components, and I know of no reported case in which the slightest effect has ever been noted, and in an experience of nigh half a century I have never seen anything of the kind, although rather an observant person. With the thermometer there is absolute exclusion of air and moisture, but absolute constant contact between the two substances without visible effect, so that factor may be dismissed. With the barometer there is a very slight atmospheric action, which in time so degrades the mobility of the fluid that the mercury has to be deoxidised—purified—and a thin, adherent film, practically dirt, must be mechanically removed from the inside of the tube, and after refilling it will act again in good order for a large number of years. The glass in this case is not affected in the slightest degree—is not eroded, in fact—and these tubes being generally of flint glass, that puts any action (of the kind mentioned) by mercury on it out of court.

With the compounds, especially those with chlorine, the case is different, for by examination of a number of flint glass bottles, such as are in use by the ordinary chemist, in which hydrargyrum bichloride has been kept in solution for a number of years, an action of a clouding nature is quite visible, and it is irremoveable by any of the ordinary reagents; but the action seems to take place mainly at that point where the surface of the liquid is exposed to the atmosphere by the occasional removal of the stopper in the processes of decanting and filling.

In mercuric toning of the negative there is little doubt of a double action going on simultaneously—the bleaching by the chlorine, and the attacking of the silver image by the mercury which becomes liberated, and of course it takes that substance for which it has the greatest affinity, and this is as great for silver as it is for gold, and greater than for tin or any of the other metals or substances. The causes of the instability of mercuric toning in many instances need not be gone into here, for there is no statement or proof that the albumen prints on glass which these lantern slides are stated to be, were toned with mercury at all; indeed, I should doubt it much, considering how much more likely it is that they would be toned in the ordinary way with gold if toned at all. Many of my own required no toning whatever.

There is one other way in which the apparent action of mercury and glass is worth notice; it is that in which spots and blotches of so-called rust appear in mercurially silvered mirrors, the effects of which are so persistent and pernicious, that they always require repolishing, and, in some cases, grinding and polishing, if the rusting process has been of very long standing, for it seems to be akin in effect to the rust on steel in its biting action on the body of the glass, hence the trade term. I have seen these rust spots develop on a newly silvered new plate within a month after it had been silvered, and before it had left the work-place; with others they occur, apparently, by the action of age, and damp has certainly something to do with their production, for they are developed to an extraordinary extent in the mirrors of sea-going vessels, no matter which climate they may be cruising in or sailing through.

The appearance is generally as if starting from a central nucleus and spreading all round until the edge dies imperceptibly into the bright part of the mirror. A microscopic examination shows that sometimes they are due to the almost invisible air bubbles which sometimes appear in cast glass, and which, on it being ground and polished, if any of them are in the way, they get filled with the *débris* of the sand and other materials used in grinding and polishing the plates, but in many cases no such hollow nuclei can be discovered. In these latter cases I have attributed the effect to some accidental atom of impurity in the tinfoil which forms the ground, and which is amalgamated with the mercury by pressure and friction in the formation of the mirror. In either case the effect of degradation and destruction of surface is as certain as if it had been acted on by fluoric acid, although by no means so rapid; indeed, the effect is very slow on the one hand and very rapid on the other.

I could say much on the effects of the various kinds of heat, solar and artificial, direct and indirect, and on the different qualities and kinds of glass, but it would be beside and away from the immediate question. I have had a sample of foreign glass—French or Belgian, I rather think the latter—which was introduced about twenty years ago or more as colourless sheet, which was an exceedingly fine material and as pure as flint glass, but it turned out to have the unfortunate habit of effloresecing. The substance seemed to be (but unfortunately it was not analysed) a potash salt; it seemed as if a surplusage of one of the ingredients had not entered fully into the vitrification, but found its way to the surface as a similar substance sometimes does on the face of some of the hard limes and cements. May some such effect not have been developed here by light if the dimness is only on those parts uncovered by the mounting paper? It could hardly be damp, for the mounting paper would either prevent that, or the effect, if so caused, would be under the mounting paper as well as where it was uncovered.

As it is perfectly well known that hydrochloric acid has little or no effect on glass, I think I have demonstrated the facts as to the action of mercury and such mercuric compounds as are used in toning. That action may be partial, but in no way can the effect ever be as it has been described. The imperceptible vapourisation of mercury at ordinary temperatures has no effect on ordinary glass, as may be proved by the fact that a wooden bowl of mercury, holding about 120 pounds, which has been in use for over twenty years, and when covered it was so by a bit of plate glass which, for a wonder, was not broken, when I examined it to-day, I found that the surface, save for accidental scratches, is just as it came from the factory.

W. H. Davies.

* Technical term for body of glass.

THE ACTION OF LIGHT ON SILVER CHLORIDE.

[Read before the Chemical Section of the A. A. A. S., Toronto, 1889.]

The plan of investigation, the first results of which I have the honour to bring before you at this time, was proposed by me in May, 1885. Since then I have mentioned the method several times in conversation, but it is only recently that I have been able to put it to a practical test.

The single set of experiments here described are only preliminary to a more thorough examination of the action of light which, it is hoped, may be carried out in future. This includes a study of—

(1) The action of light upon chemically pure haloids of silver; (2) the conditions which favour the decomposition of such compounds by light; (3) the products of the decomposition; (4) the activity of different parts of the spectrum in effecting the decomposition.

The subject is one which has been much studied, but we have scarcely more definite knowledge of the chemical effect of light upon the silver haloids now than was possessed in the time of Scheele, in 1777. I have been carefully over most of the literature of the subject, and it is quite extensive, but the results are confusing and contradictory. Even such an apparently simple question as whether there is a loss in weight when silver chloride is exposed to light, has only been satisfactorily settled by the recent work of Professor Spencer Newberry. Yet the fact that chlorine is set free by the action of light was conclusively proved by Scheele, and that the quantity set free is not inconsiderable is evident from the strong odour observed.

I will not detain you by reviewing even the more important experiments recorded in the past, but will pass on to the considerations which led me to adopt a different method of experimenting. Recognising that there must either be a loss in weight corresponding to the weight of chlorine set free, or else that the chlorine must be replaced by some other element, it seemed quite plausible that an oxychloride might be formed by the action of light, as has been suggested by different writers. If two atoms of oxygen should take the place of one atom of chlorine in some unaccountable manner, then no appreciable change in weight would result. Beebeck and Abney have observed that silver chloride is not acted upon by light except in the presence of moisture, and Hodgkinson concluded that an oxychloride was formed, from which he obtained a small quantity of oxygen by heating it in an exhausted tube. This experiment, and those of Dr. W. Schmid* on the decomposition of plumbic iodide by light, seemed to lend strength to a rather improbable hypothesis.

Nevertheless, the subject seemed to deserve a more critical examination, and I determined as the first step, not only to weigh the chloride before and after exposure to light, but also to determine the amount of chlorine set free. If an oxychloride is formed, the weight of chlorine set free must exceed the loss in weight of the chloride.

But the discrepancies in the results of observations on the loss in weight were too great to be overlooked. Why, for example, should Von Bibra find that there is no loss in weight, while Professor Newberry found a very considerable change? I will answer this question as we go on. First, I wish to remind you of Von Bibra's method of working. He filled small watch glasses with white chloride and exposed them to sunlight under bell jars for five weeks, the chloride being occasionally stirred to expose fresh surfaces. No loss in weight could be detected. The darkened product yielded no silver to nitric acid, but ammonia dissolved the greater part of it, leaving a residue soluble in nitric acid.

In thinking over the subject I became convinced that in all experiments up to this time the action of light upon the chloride has been only superficial. The energy required to effect the separation of the haloid must be considerable, for, as Draper showed long ago, even the thin film of a Daguerreotype plate absorbed the active rays so effectually as to render a beam reflected from one sensitised surface inactive upon another. It therefore became necessary to obtain the chloride in a very finely divided condition, in order to ensure the complete action of the light upon it.

To accomplish this result a number of thin slips of glass, such as are used for cover glasses in mounting microscopical specimens, were numbered with a diamond, cleaned by boiling in nitric acid, washed, and placed in a desiccator over sulphuric acid. These were accurately weighed, and I may here state that throughout these experiments two, and usually three, independent weighings, on different days, were made for each operation. These slips were placed on strips of glass lying on the bottom of a crystallising jar. A very dilute solution of silver nitrate was then precipitated with chlorhydric acid in a beaker, and while the glass slips were held in place, this milky liquid was poured over them. The jar was set aside in a dark closet until the precipitate had deposited. The supernatant liquid was very slowly drawn off with a siphon, and distilled water run in by the same means. The deposited chloride is extremely light and the slightest current in the water will wash it from the glasses. The siphon must therefore have one end drawn out to a rather small point, so that it shall act very slowly. This washing by decantation must be repeated many times on successive days, in order to allow the salts in solution to diffuse thoroughly through the water, for it is not safe to draw off the water entirely, leaving the surfaces of the slips uncovered. Finally the water was drawn off as perfectly as possible, and the jar set aside until the remaining water had evaporated and the slips were quite dry. They were then picked out with forceps and placed in a desiccator, where they were allowed to remain several days or a week. They were then weighed. All these operations were done by artificial light. Slips thus prepared have a beautifully even, translucent coating of white silver chloride. Print can be read through them with ease. The slips measured about three-quarters of an inch in width by one and a half inches in length.

The slips were placed in a glass tube, drawn off at one end to receive a rubber connexion from a set of bulbed U tubes containing a solution of silver nitrate. The other end was closed with a tubulated rubber cork and connected with a hydrogen apparatus. The hydrogen was passed through silver nitrate before it entered this tube. The tube was long enough to take four slips. When all was ready the apparatus was set out on the top of the National Museum in bright sunlight at 11.15 a.m., August 19, and kept running until 4.30 p.m., when the slips were returned to the dessicator, and the tube and U-tubes washed out into a beaker. It should be stated that the U-tubes were shielded from the light during the experiment by a covering of black paper.

The silver chloride from the U-tubes was determined by collecting it in a porcelain crucible. After the slips had remained overnight in the desiccator they were weighed, and the next day weighed again. The results are given in full in the following Table I:—

SUMMARY OF RESULTS.

I. *From Hydrogen Apparatus.*

No.	Wt. of Slips.	Slips + AgCl.	Wt. of AgCl.	Slips exposed.	Loss.
1	Not used.				
2	·49575	·51870	·02295	·51775	·00095
3	·45840	·47420*	·01580	...	...
4	·45563	·48350	·02787	·48225	·00125
5	·49955	·52405	·02450	·52285	·00120
6	·44163	·46575	·02412	·46460	·00115
7	·38590	Lost	...	...	...
8	·33080	·35370	·02290	...	...

The amount of chlorine set free by the action of light was found to be somewhat less than the total loss in weight of the four slips used, but, allowing for experimental errors, the discrepancy is not considerable. I am confident that a closer agreement will be observed in future experiments. The results were:—

Weight of crucible + AgCl	4·0143
" " "	3·9982
" " AgCl	0·0161
Chlorine collected	0·0040
Total loss in weight of slips	0·0045

Professor Newberry dissolved a quantity of silver nitrate corresponding to 0·1 gramme of chloride in water and precipitated the chloride with sodium chloride. The precipitate was exposed to direct sunlight while a current of air was passed through the liquid. The precipitate was then weighed on a Gooch filter. From preliminary experiments he found that the precipitated chloride, before exposure to light, weighed ·0996 to ·0997 gramme instead of 0·1000 gramme. The metallic silver was weighed after dissolving out the chloride on the filter with ammonia. His results are thus given after exposure to sunlight:—

	Weight.	Loss.	Met. Ag.	Met. Ag calc. from loss.
1	·0967	·0029	·0054	·0085
2	·0979	·0018	·0076	·0054
3	·0969	·0027	·0078	·0081
4	·0982	·0015	·0062	·0045

Placing the results of Professor Newberry's experiments and of my own side by side, and reducing them both to represent the loss in weight of ·1 gramme of silver chloride, we have these figures:—

	Weight of AgCl.	Loss. Newberry.	Loss. Hitchcock.
1	0·1000 gramme.	·0030	·00418
2	0·1000	·0018	·00448
3	0·1000	·0027	·00490
4	0·1000	·0015	·00485

Two slips prepared as above, numbered 3 and 8 in Table I., were exposed under a beaker cover, without a current of gas or any attempt to collect the chlorine set free. The dry chloride taken from the desiccator was scarcely discoloured in an hour in bright sunlight. A drop of distilled water on one of the slips caused immediate discolouration in the sunlight, confirming the idea that moisture is necessary for the reaction. The discolouration went on more slowly than in the hydrogen apparatus, and the exposure was continued for two days. The results show that in my experiments with the hydrogen apparatus the decomposition was not complete. The experiment should have continued over two days. It will be a matter of subsequent experiment to determine how long the action of light must continue to ensure its full effect.

The results of this last experiment are as follows:—

No.	Glass.	Glass + AgCl.	Wt. of AgCl.	After exposure.	Loss.	Calc. for 1 gramme.
3	·4584	·4742	·0158	·47325	·00095	·0060
8	·3308	·3537	·0229	·35230	·00140	·0062

It would appear that while the limit of the action of light may not have been reached even in the last experiments, the action proceeds regularly and is proportionate to the duration of the exposure, when the chloride is thus finely divided.

It will be obvious, from a consideration of the figures, that the results cannot be accepted as final, for it is doubtful whether the product representing the ultimate action of light has yet been obtained. It has not been deemed profitable to speculate upon the composition of such a product at this stage of the experiments.

I would state, however, that the product of the action of light in one experiment (slip No. 3) gave up a very considerable portion of silver when heated with dilute nitric acid. This fact, so directly opposed to all pre-

* *Pogg. Ann.*, 127, 7 (1866), 463.

* This slip was not more than two-thirds covered, as it was displaced in the precipitating jar, and slid partly under one of the other slips.

vious results, conclusively shows that the action of the light in these experiments has proceeded further among the particles than in those performed in the usual manner with the chloride in mass. The presumed protective action of a large excess of unchanged chloride upon the product of the reduction is to a great extent eliminated, and we find that product to be readily soluble. The bearing of this fact upon the subchloride hypothesis, and also upon the researches of M. C. Lea on his photo-salts of silver, is obvious.

Perhaps more may justly be claimed for the method than for the few preliminary results. I see no reason why the method should not lead to a solution of the problem of the action of light on the haloids of silver. We may thus accurately determine:—1. The loss of weight when light has fully acted on the compound. 2. The weight of the haloid set free by that action.

From these results one can readily determine whether or not the action is merely a setting free of the haloid or the formation of a compound of silver with some other element, as oxygen for example, at the same time. The results already obtained clearly show, to my mind, that there is no such double decomposition, but they must yet be verified. Water seems to be necessary to the reaction, but it probably does not suffer decomposition.

In conclusion, I would express my indebtedness to Professor F. W. Clarke, Chief Chemist of the Geological Survey, for affording me the laboratory facilities for carrying on this work, and also to Dr. Carl Barus for the use of the fine Bunge balance belonging to the physical laboratory of the Survey, on which all the weighings were made.

Washington, D.C. ROMYN HITCHCOCK.

Foreign Notes and News.

AN article which originally appeared in the *Moniteur*, from the pen of Camille Flammarion, is going the rounds of the Continental journals in either the form of translation or review. Those who are acquainted with the scientific works of that well-known astronomer and aeronaut will not be surprised to hear that the article in question (entitled *Photography a New Eye*) is rather of an imaginative and fantastic nature. The writer compares his photographic telescope, with its object glass of 1 m. diameter, and 15 m. focal length, to the human eye. The lens of the eye is represented by the objective—the retina by the photographic plate. A man furnished with such an eye would, if made in proportion, be about 100 m. in height, and could, if he bent double, just manage to get under the arch of the Eiffel Tower. This giant eye sees further and longer than the human one, and possesses the priceless faculty of retaining what it sees. It sees further, since it has discovered stars in the depths of space which our eyes, even when aided by the most powerful telescopes, would never have been able to perceive. It sees quicker, since it can photograph the sun in less than the one thousandth part of a second. It sees longer, since the photographic plate never grows tired, as do our eyes. And, lastly, the photographic retina preserves a record of its images for generations yet unborn. Here we may join with Molière's *Bourgeois Gentilhomme* in remarking "What a lot of things which we never thought of before!"

AN interesting proof of the permanency of platinum compounds is afforded by an experiment made by Dr. Bannow, and mentioned at the last meeting of the Berlin Photographic Society. He found, namely, that year-old platinum paper contained exactly as much of the salt as new.

A RECENT number of the *Revue Suisse* contains a pleasant article by M. Esternod, Professor of Histology, &c., in the University of Geneva, written in the pellucid style which it would almost seem is the monopoly of French *savants*. The article, which is mostly in form of an imaginary dialogue, deals with the misadventures of an ingenious amateur who thought he could manage (*sancta simplicitus!*) to regulate exposure by the photometer; and the general drift of it is to show that photometry is useless, because photometers are arranged for luminous rays only, and take no count of the invisible chemical rays. This is, doubtless, all very true; but how about exposures with orthochromatic plates? Perhaps photometry might be ultimately of more use there; but before it can become so, as M. Esternod points out, photometers will have to be made quicker in their action, more portable, and cheaper.

IT is interesting to learn from the same article that a number of photographs of embryos, taken in the University laboratory at Geneva, showed a number of details with great delicacy and distinctness on the negatives which escaped the eye altogether in direct observation.

HERR L. SCHRANK has been devoting some space in the *Photographische Correspondenz* to the subject (*semper viridens*) of dark chamber glass. He agrees with most other people in saying that greenish yellow lets through the least amount of actinic light. He adds, however, the interesting information that glasses of this shade obtained with uranium colours have the property of transforming chemical rays into luminous non-actinic rays. We suppose he means that this glass lowers the refrangibility of certain rays, in which case Herr Schrank may lay claim to having discovered a new case of fluorescence.

IF Herr Schrank has real grounds for this opinion the subject is well worth further experiment and examination, for besides its general scientific interest it has a distinct practical bearing. Suppose, for instance, one were employing an orthochromatic plate of maximum yellow sensibility behind a plate of such fluorescent glass, the light that passed through such plate, acting as a screen, might be of the same refrangibility as if another kind of non-fluorescent glass were used; but it is quite plain that it would be greater in amount, for besides the yellow and green rays originally present we should, after the light had passed the screen, have these augmented by a lot of violet and ultra-violet rays which had been lowered in refrangibility so as to become yellow or green. This would obviously have the effect of making the illumination of the image more intense than where non-fluorescent glass was employed, and the time of exposure would consequently have to be lessened. We wonder whether Herr Schrank has found this to be the case with his uranium glass?

THE peregrinations of a paragraph are sometimes amusing to follow. Some months back the experiments of Professor Fulcher on the movements of air issuing under pressure from a ton, and the means he employed to render those movements visible on the photographic plate, formed the subject of a paragraph in the foreign column of the JOURNAL. This month a translation of that paragraph appears in the *Moniteur*—we hope it will appeal to French readers as *news*. Another of the BRITISH JOURNAL foreign paragraphs also appears in the *Moniteur*, attributed, however, to the *Photographic Times*, which thus shines for once at least in borrowed plumage. What *would* some editors do if Government suddenly laid a heavy tax on that useful article—the *scissors*?

Our Editorial Table.

LANTERN TRANSPARENCIES.

By F. YORK & SON.

IT is very evident that Mr. York will never rest satisfied until he has conquered the whole world and got it within the pages of his voluminous catalogue of lantern slides. It was only on the morning of Thursday last week that we bade him and Mr. A. L. Henderson goodbye at Waterloo Station as they were both starting for a trip to the West Indies, the former having among his *impedimenta* a camera, and ever so many gross of plates on which to bring these "isles of the sea" home to our very doors. Only a brief period has elapsed since Mr. York, as the result of a visit to the United States of America, brought home with him and gave to the world an extensive collection of views in the New World; while it is but as yesterday when he laid the French Exhibition under similar contribution. We have now before us a large selection from those two trips.

In the Boston department of the lecture series, "New York to the White Mountains," we have a general view of the City of Culture, taken from the top of an elevated building; the State House; the Quincy Market, taken instantaneously; the beautiful Commonwealth Avenue; Tremont-street and the Mall; with others. The New York lecture series is most capital, all the salients points of the empire city being well selected, and every phase of architectural and social life, from the Oyster Market to the aristocratic Fifth Avenue, being depicted. Here we have the elaborate granite Post-office; the fairy marble structure, St. Patrick's Cathedral; the Broadway; the Cooper Institute—one of the most invaluable educational establishments in the world for the working classes; the Brooklyn Bridge—taken just as a bark is passing underneath; with others possessing like interest.

In the Paris Exhibition series we have, *inter alia*, many nationalities represented. Brazil; Annam and Tonkin; Cochin China; Australia—which, by the way, is so sharp as to enable us by the aid of a strong magnifier to read all the names and examine the details of the photographs exhibited in that Court; Italy, with its marble statues; the Machinery Department; the Dome and Fountains; the Statuary Court; and, of course, the Eiffel Tower, without which no set of views of the Paris Exhibition would be considered complete.

THE AMERICAN ANNUAL OF PHOTOGRAPHY FOR 1890.

New York: The Scovill & Adams Company.

A HIGH compliment to this Annual is to say that it is quite as good as those of previous years, with a greater number of nicely printed illustrations, most of which are executed by one or other of the now numerous processes suited for book illustration. The editor has secured contributions from a large number of writers, and these embrace the usual variety of topics treated in annuals. Mr. James Hall, who makes a recent suggestion to one of the contributors relative to counting the seconds by means of a pendulum, consisting of a string

of suitable length with a small leaden ball at the end, and who has abstained from patenting it, is without doubt unaware that this system of timing exposures has been in use in many studios, both in America and Europe, for nearly half a century, and that provision is made in some of the screws in the head of the camera stand for fastening a string for this purpose. But those who have entered only recently the field of photography are not supposed to be acquainted with all that is known or has been written about it, even in their own country. We mention this to say that in these days of quick exposures a string ten inches long which oscillates to half seconds will be found more useful than one four times that length which beats full seconds. The contributed articles are prefaced by a judiciously compiled summary of the leading progressive features of the past year by the editor, Mr. Canfield, and at their termination there are the usual formulæ and tables. The Annual is beautifully printed in large type on a good bodied paper. The price in paper covers is fifty cents, which equals about two shillings of English money. Our copy was received through the Eastman Company.

The Photographic Quarterly.

London: Hazell, Watson, & Viney.

The present (the second) number maintains the high promise of the former one. Mr. Robinson, in the opening article *On the Use of Nature and Idealism in Art*, scores one against the "Naturalistics" by reproducing the portrait of Philip IV. of Spain by Velasquez, of whom he says, he is "the old master who is, perhaps, held in the highest esteem by the naturalistics," concerning which he writes: "There stands the man in his habit as he lived—stiff, awkward, and ungainly, an enlargement of a fifth-rate *carte de visite*. He is so placed on the canvas that you feel sure he must have been seven or eight feet in height, was accommodated with a head-rest, and was asked, 'Are you ready?' and was told to 'keep quite still.' Of course he stares into the camera, and looks as though he resented the operation." The figure certainly warrants Mr Robinson's strictures. Mr. W. Jerome Harrison's historical article on *Wedgwood and Davy* evinces much research. In his article, *Common Mistakes and Needless Precautions*, the Rev. T. Perkins speaks of the unnecessary precautions taken by photographers against the access of light to the plate, both while it is in the dark slide and also during development, and contends, very justly, that if properly made no light could get to the plate even if the slide were exposed to bright sunshine, and hence that the muffling up the camera, or wrapping up the slide in the focussing cloth, are needless precautions if camera and slide are light-tight, while, if they are not so, it is better to have a plate fogged and the weak point discovered and corrected.

The number is embellished with an excellent portrait of Mr. J. W. Swan, a photogravure from a negative by H. P. Robinson, and a frontispiece, *Harmony*, by J. B. Austin, representing a girl playing a guitar from which two of the strings are absent, and her fingers interwoven with the remaining ones in a manner fatal to the bringing out of the instrument either "harmony" or discord. And yet the picture is a pretty one, although far from being naturalistic in the sense of warranting its title.

ALUMINIUM IN LENSES AND CAMERAS.

We have been shown, by Messrs. Beck, opticians, Cornhill, a lens of their "Autographic" rapid rectilinear class, in which the usual brass has been wholly supplanted by aluminium; and as there was exhibited side by side with it a *facsimile* of the lens mounted in brass, we were enabled to judge of the great gain as regards lightness.

The softness of this metal, not to speak of its greater cost and difficulty of working, stands much in the way of its general adoption for mounting optical instruments other than such as small telescopes and binoculars, which have to be held in the hands, and in a somewhat straining position, while being used. In photographic lenses the case is somewhat different, but we hail with pleasure every effort made to reduce their often considerable weight—an appreciation of which we fully experienced when poising in juxtaposition, as it were, the two lenses above mentioned.

We have several times suggested the employment of ebonite, and even *papier maché*, for mounting the larger class of lenses; but now that aluminium is becoming so much reduced in price, it is not unreasonable to look forward to it, or its alloys, as an aid in lens mounting.

Messrs. Beck are also introducing a camera, the "Peerops," which contains several useful features, especially its very small bulk, the erection of the focussing front by means of two wires, its rigidity, great expansion and the ability to employ lenses of the shortest focus and widest angle without the baseboard interfering to cut off the foreground. They are now considering the propriety of utilising aluminium in the construction of this elegant camera.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,202.—"An Improved Method of Focussing Achromatic Condensers and other Illuminating Under-stage Apparatus." J. Swift.—*Dated December* 16, 1889.

No. 20,526.—"Improvements in the Production by Photography of Lined Images in the Preparation of Surfaces to be Etched." O. Levens.—*Dated December* 20, 1889.

SPECIFICATIONS PUBLISHED.

1888.

No. 17,198.—"Photographic Shutters." Perken and others.—Price 8*d*.

No. 18,909.—"Cameras." Watson.—Price 8*d*.

No. 18,542.—"Adjusting Cameras, &c." Perken and others.—Price 8*d*.

1889.

No. 741.—"Photographic Films." Schwartz and Mercklin.—Price 6*d*.

PATENTS COMPLETED.

Improvements in Photographic Shutters.

No. 17,198. Edmond Perken, Frederic Louis Perken, and Arthur Rayment, 99, Hatton Garden, London, and William Pead, 99, High-street, Ramsgate, Kent.—*November* 26, 1889.

This invention relates to improvements in photographic shutters, and consists of the following arrangement of parts:—

The shutter slide is made very thin, of any suitable materials (advantageously thin sheet metal), which travels loosely in guides advantageously formed in and by the frame of the shutter.

On the upper end of this slide is a projecting pin or stud under which a spring-actuated lever secured to the said frame is placed, and the end of the said lever is held by a catch which may be actuated by a pneumatic releasing apparatus, as is well understood, or otherwise as desired; the said lever on being released by said catch throws up the shutter slide (and so gives the exposure), the slide falling again by its own weight, or, for a very short exposure, assisted by a spring.

A lever actuated by the pneumatic release makes contact with the slide when open and regulates the length of exposure, or by any other convenient arrangement.

A trunk arrangement may also be provided so as to hold the shutter open for the purpose of focussing.

Improvements in Photographic Cameras.

No. 18,099. Thomas Parsons Watson, 313, High Holborn, London, W.C.—*November* 30, 1889.

My invention relates to improvements in photographic cameras of the Kinnear or other collapsible type, particularly those which are collapsed and folded by laying the front face downwards upon the baseboard.

The improvements have for their object generally to render the camera lighter, more compact when folded for carrying, and more easily erected and closed than existing cameras of similar types, and they consist, first, in pivoting the frame in which the rising front is fitted to slide to the travelling frame of the baseboard by means of gudgeons, and in providing means whereby the said gudgeons will be securely retained in their bearings when the camera is in use, but may be readily removed therefrom when required. For this purpose spring latches are fitted in such position as to close the entrance to the bearings, but which yield under pressure to permit the entrance of the gudgeons in their bearings. These latches oppose the removal of the gudgeons, and are operated to release them by abutments on the front supporting frame, which when the latter is rearwardly inclined beyond a certain angle bear on projections attached to the spring latches and forcibly remove the latter out of the way, so as to permit the removal of the gudgeons from their bearings.

The improvements have, secondly, for their object to provide means whereby the rising front will be retained at any height at which it may be set, whilst the free motion of the front in its guides is permitted when the front is laid down upon the baseboard, so that when the bellows body is being collapsed the front may be free to adjust itself accordingly and so as to avoid undue strains on the bellows body. For the purpose the edges of the front are fitted to slide in half-round grooves in the standards of the front supporting frame, and have a rack at one side engaging with a spring pawl mounted on the front supporting frame, and which when the latter is laid down on the baseboard becomes forcibly disengaged from the rack, leaving the front free to adjust itself to suit the bellows body.

The improvements have, thirdly, for their object to enable the back of the camera body to be advanced along the baseboard, so that the front and back may be brought close together when a wide-angle lens is employed, and also to enable side swing of the back to be obtained. For this purpose the brackets to which the back is pivoted are fitted to slide in guide slots in the edge of the baseboard, and are clamped in position therein, there being sufficient freedom of independent motion of the two brackets to permit of the desired amount of side swing.

The invention relates, lastly, to an improved self-engaging catch for locking the baseboard and back together in the folded position. This catch is pivoted on the one part, and its hooked end engages with a stud on the other part. It is provided with a lug on the under side received in a recess containing a spring whereby its motion is limited, and it is normally held in position to engage with the stud, which it does automatically. Upon the stud striking the rounded end of the catch and forcing it back, the catch yields and then engages with the stud, the spring tending to keep it in position of engagement.

The claims are:—1. The combination with the lateral gudgeons of the front supporting frame, and with L-shaped bearing notches therefor, of spring latches

adapted to lock the gudgeons in their notches as described, and of abutments on the front frame adapted to act on the spring latches by a backward tilting motion of the front frame, substantially as and for the purpose specified. 2. The combination with a notched edge of the rising front of a spring bolt mounted on the front supporting frame, and adapted to engage with the front for the purpose of supporting it at the desired height, and of means, substantially as described, whereby when the front is laid down on the baseboard the bolt will be disengaged, and the front free, to slide and adjust itself in the supporting frame, as specified. 3. Fitting the front to slide in its supporting frame by the convex edges of the former being received in corresponding concave grooves in the latter, and notching the convex edge of the front for engagement with a spring bolt, substantially as specified. 4. The self-engaging spring catch for locking the baseboard and back together, the catch being constructed and operating in the manner specified.

IMPROVEMENTS IN ADJUSTING PHOTOGRAPHIC CAMERAS AND OTHER LIKE APPARATUS OR INSTRUMENTS.

No. 18,542. EDMOND PERKEN, FREDERIC LOUIS PERKEN, and ARTHUR RAYMENT, 99, Hatton Garden, London, and CHARLES GEORGE NORTH, 41, Hamfrith-road, Stratford, Essex.—*November* 30, 1889.

THIS invention relates to improvements in the rack and pinion adjusting gear used for drawing in and out the bellows or other part of a photographic camera, or as used with other scientific instruments, such as enlarging and copying lanterns, microscopes, and the like instruments and apparatus which require adjustment for focussing or other purposes, and is designed to expedite such adjustment.

For this purpose we use a pinion which gears with a rack in the ordinary or any suitable way, and we make a part or parts of such pinion of a smaller diameter than the rest (and advantageously smooth), and also the pinion is made to move laterally, so that it may be pushed in or drawn out a little, so as to bring the smaller part or parts over the rack or racks (or *vice versâ*), and thus throw the same in or out of gear, and the part of the instrument or apparatus to which the rack (or the pinion) is attached may then be moved out or in freely by hand, and then the pinion is thrown into gear again and the exact and usually slow adjustment proceeded with in the usual manner.

It will be obvious that this pinion, with the recessed part or parts thereon and moving laterally into or out of gear with a rack or racks, can be applied in a variety of ways in actuating certain parts of the hereinbefore-mentioned apparatus; for instance, the pinion, while always actuating one or more racks is out of gear with another rack or racks, with which latter it is thrown into gear as before described at any desired time, or the smaller parts on the pinion are arranged so that when the latter is moved laterally, as before described, it will throw out of gear with one or more racks, and at the same time be thrown into gear with another rack or racks attached to different working parts of the apparatus or instrument, and in such arrangements either gearing or ceasing to gear all at once with the racks, or being thrown in or out of gear with one or more racks consecutively as desired.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 7	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 7	North London	MyddeltonHall,Upper-st.,Islington
,, 7	Holmfirth	
,, 7	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 7	Paisley	Paisley Museum.
,, 7	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 9	Birkenhead	Hamilton Rooms, Birkenhead.
,, 9	Cheltenham	
,, 9	Manchester Photo. Society	36, George-street.
,, 9	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 10	Ireland	Royal College of Science, Dublin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

DECEMBER 31,—Technical meeting.—Mr. Atkinson in the chair.

Mr. F. DOWNER, of Watford, showed some groups of amateur theatricals, photographed with the magnesium flash. In one of these groups there was a whitish streak on either side of the print, extending some two or three inches inwards. He requested suggestions as to the probable cause of these markings.

Mr. W. E. DEBENHAM suggested that they were markings of the "ghost" character, produced by the flashes used shining upon the lens, and said that for such work an extending hood should be used with the camera, cutting off all light but that proceeding from the subject included on the plate.

Mr. CHAPMAN JONES concurred in this view.

The CHAIRMAN then showed a group taken in a private room with a magnesium flash. The picture was somewhat flat and weak, a fault which Mr. L. Warnerke attributed to too much magnesium having been used. With a large quantity there was, he added, no means of turning it quickly enough to be secure against the picture being injured by the movement of the sitters.

Mr. FRIESE GREENE had tried the magnesium flash for about three months, but had abandoned it, as the portraits were not approved by the sitters.

Mr. JONES inquired whether there was any lamp that burned the magnesium quickly enough.

Mr. WARNERKE replied that there was, but only on condition that a small quantity was used in it.

Mr. JONES inquired whether Mr. Warnerke dried the magnesium powder before use.

Mr. WARNERKE replied that he did so; that is, he dried it when purchased, and then stored it away in a bottle for use.

Mr. JONES said that a mixture of seven grains each of magnesium powder and chlorate of potash, dried separately and mixed and used immediately, burned with such rapidity as to shake the windows, but if left for an hour or so it attracted so much moisture that the explosion was no longer of the same character.

Mr. WARNERKE then showed a magnesium ribbon lamp by Ney, of Berlin, which he had mentioned at previous meetings, and which he used for copying purposes. The lamp was furnished with mechanism for winding out, but at a slower rate than with the older forms of ribbon lamps. The principal novelty in it was that there was a second clockwork motion, which acted every two or three seconds—as often, indeed, as a little more than an inch of ribbon was burned—and which caused the burned ribbon to fall down, instead of projecting for an indefinite length. The motion also gave a clicking sound, by listening to which the operator could tell the amount of ribbon being consumed, and so could stop it at the amount desired. The lamp was also furnished with a chimney, a paper tube from which could be led to any outlet, and with a hood in front fitted with a groove, in which a ground glass could be inserted for ordinary work, and a tinted glass for orthochromatic work. Mr. Warnerke had come to the conclusion that for copying it was folly to use daylight, especially in this country. Using a Ross' portable symmetrical lens, and copying an engraving half natural size, he had found that with a slow commercial plate, giving 15 on the sensitometer, an exposure of seven clicks on each side of the picture, so as to equalise the illumination, was sufficient. This would represent 15 or 16 inches of ribbon, the expense of which quantity, compared with the certainty of the exposure, was quite insignificant. As to condensing the fumes by passing them over a moist acid surface, he had tried it without success.

Mr. DEBENHAM inquired whether Mr. Warnerke had tried the condensing chimney of Meydenbauer, described in the German papers of about a year or rather more ago. That system of condensation depended upon quite a different principle.

Mr. WARNERKE had not done so. He then spoke of the eikonogen developer, which he said was, in his opinion, much better than any that he had tried. For a whole week he had worked the same solution over and over again with good results. The mixed solution, when not used, would keep for a very long time. The formula he adopted was with caustic potash, which he considered better than the carbonate. He used—

Boiling distilled water	100 parts.
Eikonogen	10 ,,
Sulphite of soda	40 ,,
Caustic potash	10 ,,

The sulphite of soda was first dissolved, then the eikonogen, and, lastly, the alkali. He filtered whilst still hot, and stored away for use. This was a concentrated developer, and he diluted with from two to nine parts of water for use; the stronger solution when more vigour was required, and the weaker for softer effects. Over exposure was restrained with bromide. When in Paris he brought the eikonogen developer to the notice of M. Maret, who was working on physiological subjects requiring extreme rapidity of exposure, and who consequently wanted the utmost developing power available. M. Maret was then using hydroquinone, but they found a marked increase in the amount of detail obtained when using eikonogen instead.

Mr. Friese Greene then showed some photographs of scenery in America, taken directly by Jackson on plates over twenty inches in length.

WEST LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 27, Mr. C. Garner Richardson, M.A., in the chair.

Messrs. St. Clair Buxton, F.R.C.S., W. H. Whitear, and Miller were elected members.

Acting upon a suggestion from the Chairman, the discussion upon Mr. Stein's paper on *Detective Cameras* was adjourned till the second meeting in January.

The SECRETARY (Mr. J. A. Hodges) informed the meeting that the annual exhibition would be held on January 10, at half-past seven, and would remain open on Saturday, the 11th, from three to half-past nine. In addition to the pictures a musical programme had been arranged, and light refreshments would be provided.

Mr. MIALL, the inventor of the Facile detective camera, attended and explained its construction to the members.

In reply to the following question,—"Would the addition of sulphurous acid to the fixing bath have an injurious effect on negatives?" Mr. STEIN said the effect would be to liberate sulphur, which would be prejudicial to the permanency of the negatives.

Mr. HODGES thought it not advisable to add any acid to the fixing bath, and least of all the particular acid suggested.

Mr. W. RICKFORD desired to know the proper quantity of magnesium ribbon to burn when reducing half-plate negatives to lantern size in the camera.

Mr. L. C. BENNETT had produced many slides in that way, and had found from three to five feet necessary, burnt a short distance in front of the negative.

Mr. C. WINTER thought the quantity excessive, and wished to know what plates had been used.

Mr. BENNETT: Mawson & Swan's (laughter) and Thomas's, but the latter required more ribbon than the former, being slower.

Mr. Cobb showed some bromide prints which had been bleached by immersion in a solution of bichromate of potassium acidulated with hydrochloric acid, and, after exposure to light, redeveloped with ferrous oxalate. The tones produced were warm brown.

Mr. HODGES said the degree of warmth obtained would depend upon the amount of re-exposure given. Bromide prints would tone to a good brown with the uranium intensifier.

Mr. LESLIE SELBY recommended bleaching with mercury and subsequent treatment with sulphite of soda, as advocated by Mr. A. R. Dresser.

The proceedings then terminated.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

DECEMBER 10, 1889.—Vice-President David Williams in the chair.

Mr. A. PEEBLES SMITH read a short paper on *The History of Flash Light Photography*, illustrating his remarks with a few interesting lantern slides of out-door flash-light pictures and interiors of theatres. He had invented a safe powder, which was especially effective in bringing out the greens and reds.

Mr. G. D. MILBURN made a flash-light picture of the audience, using the new No. 2 Kodak camera, which he explained. After an hour the picture was thrown on the screen.

Miss CATHERINE WEED BARNES read a very interesting paper on *Photography from a Woman's Standpoint*, which was received with loud applause. She has the honour of being the first lady who has ever read a paper before a photographic society in the United States, and it is hoped more will follow.

Mr. JAMES H. STEBBINS, jun., showed photographs of a pinhole sensitometer device he had used in testing sensitive plates. He also gave the result of his experiments on the solubility of eikonogen in distilled water at different temperatures.

Mr. F. C. Beach exhibited Eastman's transparent film negatives (instantaneous exposures), developed with the "ultimate single-solution eikonogen" developer sent by Queen & Co., of Philadelphia, and by the ordinary eikonogen two-solution developer. The latter gave more density and worked quicker.

Mr. HENRY J. NEWTON made a few remarks on a mixed hydroquinone and eikonogen developer. The eikonogen, he contended, was slower than hydroquinone when a caustic alkali was used with the latter. His formula was the same as that given at the recent meeting of the Photographic Section of the American Institute.

The VICE PRESIDENT announced that F. C. Beach, A. L. Simpson, and C. C. Rommage were appointed as a committee of arrangements on the joint exhibition to be held next year in New York.

A lantern-slide exhibition, illustrating New York and the Paris Exposition, is to be given by the Society at Chickering Hall, New York, February 5.

RECENTLY ELECTED OFFICERS OF SOCIETIES.

BIRKENHEAD PHOTOGRAPHIC ASSOCIATION.—*President*: P. H. Phillips.—*Vice-Presidents*: H. H. Williams.—*Council*: H. Lupton, H. Wilkinson, T. S. Mayne, F. Eaton, F. Hope-Jones, William Faltin, J. L. Mackrell, Paul Lange.—*Auditors*: G. A. Carruthers and A. Bradbury.—*Librarian*: J. A. Forrest.—*Treasurer*: E. M. Tunstall.—*Hon. Secretary*: C. B. Reader, 5, Cook-street, Liverpool.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—The meetings are held at the Club Rooms, Grand Hotel, Colmore-row, on the second and fourth Thursday of each month, excepting May, June, July, August, and September, when the meetings are held on the fourth Thursday only. *President*: J. B. Stone, J.P., F.L.S.—*Vice-Presidents*: W. J. Harrison, F.G.S., E. H. Jaques, B. Kardeese.—*Council*: A. A. Bonshill, J. J. Button, W. S. Horton, S. G. Mason, R. C. Middleton, W. J. J. Neal, D.Sc., William Rooke, G. A. Thomason.—*Librarian*: S. J. Holliday.—*Treasurer*: T. Taylor.—*Hon. Secretaries*: J. H. Pickard, 361, Moseley-road, and A. J. Leeson, Perry Barr.

BURTON-ON-TRENT NATURAL HISTORY AND ARCHÆOLOGICAL SOCIETY (PHOTOGRAPHIC SECTION).—Meetings are held on the first Wednesday of the winter months in the Society's Room, 47, High-street, Burton-on-Trent, at Eight o'clock.—*President*: C. O'Sullivan, F.R.S.—*Hon. Secretary and Treasurer*: A. L. Stern, B.Sc., F.C.S., &c.

ELIZABETHAN PHOTOGRAPHIC SOCIETY, BARNET.—Established 1887. Meetings, according to programme, held in the Hall of Queen Elizabeth's Grammar School. Excursions are arranged for the summer months and practical demonstrations given in the Science and Art Room of the School. *President*: Rev. J. Bond Lee, M.A. (Head Master of the School). *Vice Presidents*: T. Samuels, L. Matthews, A. McKenzie. *Council*: L. Medland, G. W. N. Harrison, M.A., E. Brittain, W. Stevens.—*Treasurer*: H. E. Kingsford. *Secretary*: J. Brittain, Eastcote Lodge, Richmond-road, New Barnet, Herts.

GLASGOW PHOTOGRAPHIC ASSOCIATION.—*President*: William Lang, jun., F.C.S.—*Vice-Presidents*: William Brown and William McLennan.—*Council*: John Annan, William Jemmill, W. J. McIlwrick, A. Maclear, George Mason, A. Watson.—*Treasurer*: George Bell.—*Secretary*: J. Craig Annan.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—*President*: Paul Lange.—*Vice-Presidents*: William Tomkinson and W. D. Mead.—*Auditor*: A. Bradbury.—*Librarian*: J. McDonald Bell.—*Treasurer*: Joseph Earp.—*Secretary*: Walter Hughes.

PHOTOGRAPHIC SOCIETY OF IRELAND.—Established 1879. Meetings held at the Royal College of Science, Stephen's Green, Dublin. Ordinary Meetings, second Friday, Technical Meetings, fourth Thursday, in each month from October to May inclusive, at Eight p.m. Annual Meeting, second Friday in February, at Eight p.m. *President*: George Mansfield, J.P.—*Vice-President and Treasurer*: J. Alfred Scott, M.B., F.R.C.S.I.—*Council*: T. Carson, C.E., J. J. Dowling, J. H. Hargrave, B.A., C.E., T. Mayne, M.P., F.R.G.S.I., Louis Meldon, C. H. Meldon, Q.C., LL.D., D.L., G. Pim, M.A., F.L.S., J. Huston Stewart, B.A., B.Sc., L. R. Strangways, M.A., J. White.—*Secretary*: M. Hedley, F.R.C.S.I., 6, Royal Terrace West, Kingstown, Co. Dublin, Ireland.

TORONTO AMATEUR PHOTOGRAPHIC ASSOCIATION.—*President*: W. Barclay McMurrich.—*Vice-President*: F. D. Manchee.—*Executive Committee*: Dr. Ellis, G. S. C. Bethune, T. Langton, Rupert Muntz, Hugh Neilson, George McMurrich, D. W. Cameron, A. E. Trow.—*Secretary and Treasurer*: E. Havelock Walsh, 219, Beverley-street.

UNION COUNTY (N. J.) CAMERA CLUB.—Organised November 25, 1889. *President*: R. M. Fuller, of Cranford, N. J.—*Secretary and Treasurer*: J. L. Warner, of Roselle, N. J.

WALLASEY PHOTOGRAPHIC ASSOCIATION.—*President*: Colonel E. T. D. Cotton, M.P.—*Vice-Presidents*: Edwin Kite and J. W. Gregg.—*Hon. Auditor*: J. Bardsley.—*Hon. Treasurer*: J. Fullerton.—*Hon. Secretary*: G. Breading, Church-street, Egremont. With a Council of six members.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITOR.

SIR,—The Photographers' Benevolent Association is now so well and favourably known to most of your readers that I feel emboldened to ask space for this short communication. The Association has, after a long struggle with the apathy of those whom it wished to benefit, at last become the recognised charitable centre of the profession. Its objects are already widely known, and during the sixteen years of its existence there has not been a single charge against the Committee of unfairness or injustice in their awards. This, the Committee freely acknowledge, is in a great measure due to the careful investigation which each case has received at the hands of the Secretary, Mr. H. Harland. Owing to the pressure of other business this gentleman is compelled to resign his position in February next, and the Committee have, in consequence, to seek for a successor to him. This affords a favourable opportunity to replace a paid Secretary by an honorary one, provided that a gentleman (either amateur or professional) can be found able and willing to devote a small portion of his time to the duties. It has been several times pointed out that the Secretary's salary, small though it is, forms a serious item in the yearly balance sheet, and it is with the hope of being able to still further benefit their poorer brethren that the Committee now appeal to the photographic community for a volunteer in this capacity. It may be mentioned that the duties are simple, and can easily be performed by any one who has had any business experience.

The Chairman of Committee, Mr. W. Bedford, 326, Camden-road, N., will be pleased to furnish further particulars, list of Committee, &c.—I am, yours, &c., (*pro* Committee, P.B.A.), E. CLIFTON.

December 30, 1889.

HOME-MADE CAMERAS.

To the EDITOR.

SIR,—The Rev. B. Holland in two former ALMANACS gave your readers a description of a home-made tourist's camera, one which he himself used.

In the ALMANAC for 1890 I read that the reverend gentleman has had during the past summer a hand camera for his companion, and of which he writes highly. As he has not given a description of his favourite, might I ask, through your columns, the rev. gentleman for the favour of one?

The plain description he gave of his former camera proved a great boon to a friend of mine and to myself, and I am sure that your readers generally will esteem the description of his hand camera a favour; I know I shall.—I am, yours, &c., JOHN WILSON.

December 14, 1889.

To the EDITOR.

SIR,—I regret to think that through, perhaps, taking too roseate a view of the capabilities of the single lens in question, I have caused so much inconvenience to Mr. Wray, and so much annoyance to his numerous customers in their scramble for what proves to be but an *ignis fatuus*.

Allow me to say, in explanation, that the article was the outcome of my efforts to construct a cheap hand camera suitable to the limited means of some photographic members of a working men's club with which I am connected.

My only object was to show the possibility of using a cheap single lens. I should have qualified "capable of excellent work" by "at the price." I never imagined that intelligent amateur readers of the ALMANAC, with the most elementary knowledge of optics, would for a moment take my statement literally, nor did I say that the lens in question covered a quarter-plate sharply to the edge.

The lens in question gives fair definition over a certain area with a *f*-12 stop, that is all I claim.

Mr. Wray's letter shows a truly humorous vein, and were it not for the thousand-and-one desperate and vindictive amateurs who are waiting for me with a shot gun, as the American fashion is, I should have enjoyed his good-tempered protest against any more orders for the little wonder.—I am, yours, &c., LOCKE MACDONA.

Putney, December 26, 1889.

A PHOTOGRAPHIC UNION.

To the EDITOR.

SIR,—In reply to Mr. *Field re* British Photographic Union, I should like to say that it is the very thing I have been seriously thinking about, as a thing that would have to come, and the sooner the better. There are many things which such a Union could accomplish with advantage to its members which are quite impossible at present. Union is strength, and in the multitude of counsel there is safety, and I think much could be done that would be greatly advantageous to the profession generally. The question of specimens could be discussed and definitely arranged. I consider the operator is entitled to enough of them to represent his ability fairly and fully from any and every place he fills.

Then there should be some tribunal or authority duly elected and *fully competent* to judge, in the form of a committee, for the purpose of examining the work of every member of the Union, that is, of every operator or workman who is not a master himself. Thus, by so doing, every man's ability could be fairly tested, proved, and verified, and should receive a certificate certifying his competency and to what degree of competency he belongs. This should carry with it a standard salary within certain bounds, which might embrace first, second, and third class, each class having its standard salary, so that if masters wanted the first-class man—his ability being proved by the above-named certificate—then he would have to pay the first-class salary. Some master photographers know little or nothing of the real practical working of photography themselves, and for a clever, practical man to be under this class of master is very often positive cruelty. The Union would secure fair play, I think, both to master and operator, giving a solid basis for action, for they would both know the terms beforehand. The master being certified by competent judges of the man's ability, would be less inclined to be doubtful and suspicious, and would treat his man with the respect due to him. The operator, knowing his specimens and character had been submitted to a competent authority, who had adjudged him to be first, second, or third class, as the case might be, would either be better satisfied with the salary to which his class of work entitled him, or he would study and strive to rise so as to be able to claim higher remuneration.

Of course there is very much to be said which would be the duty of the Union to deal with, one of which I may mention, and that is the number and size of heads, or thereabouts, for one day's retouching. Eight or nine large heads, *first-class work*, is impossible, as mentioned by your correspondent "Fair Play," unless he means cabinet, three-quarter, or a bit larger. Of *large cabinet vignettes*, I should judge *six* quite plenty, and one of the best photographers I know told me four was as much as could be done *well*, and he would have to work hard, too, and that was the statement of a master and a real competent man.

Let me just add one word with reference to the photographic survey of Warwickshire. I was greatly pleased with the idea, and if other communities tackled other counties the whole country would be gleaned, and a rich reward would be the result.

With regard to prices charged by amateur professionals, or cheap John professionals, I have observed during my twenty-six years' practice that they soon ruin themselves whatever they do for others. The best thing is to turn out good work and charge a remunerative price and stick to it. Respect yourself, and the public will respect you and patronise you, too.—I am, yours, &c.,

THOMAS TOMLINSON.

Christmas, 1889.

AMATEURISM.

To the EDITOR.

SIR,—I presume again to write on this vexed question of amateurism, notwithstanding "An Amateur's" supercilious disregard of the claims I set forth, as he said without covert meaning. To call a statement absurd would settle any controversy, or even Mr. Barnes's contemptuous refrain. I must confess I should have been much disappointed had I found that the profession had taken my letter as a text, as "An Amateur" suggested; they have proved by their indifference to this controversy that they are more sensible and practical in their views than many amateurs are who are striving all they can to create a grievance. I am of the same opinion as Mr. Storey, that much of the "pother" has arisen from a few croakers amongst so-called "gentlemen amateurs" who are chagrined at finding that their less favoured brothers are able also to fly to this delightful hobby as a means of filling in the recreative part of their time. In my first letter I stated that I believed the so-called unfair competition was a myth, and that the lowering of prices has come from the workers themselves, and not from the amateur or "cheap set man," as one of your correspondents styles them; and in proof of this I will give you a few facts which have come under my own observation.

First, as to lowering of prices. Surely there is not an amateur or even a "cheap set man" to be found who would consider 6*d.* per copy for a half-plate group containing thirty portraits worth his while to compete against; and yet I will find a professional in Manchester who will supply a dozen copies to any one at the price, and would give attendance at a convenient time. Nor would he care to supply a fair portrait, cabinet size, with a dozen well-mounted *cartes* for 6*s.*; and yet a fairly good professional of this town advertises to do this, a sample of which can be seen in his window.

Competition from amateurs at this price need not be feared.

I made a further statement in my letter which I can justify by two further facts. It was to the effect that really good work was as well paid for as it had ever been; in proof of this I will instance two cases, and in judging this the relative price of material must be considered.

A wedding group was recently taken by a professional in one of our suburbs, the size of which was 12 × 10, for which he asked, and I believed obtained, 10*s.* per copy for thirty-six copies. The other case is that of a well-known worker, who produces what appears to me to be a platinotype cabinet portrait, mounted nicely in a sunk mount, for which he charges 30*s.* per dozen; and I am informed by one of his workers that up to a month ago, when I was told, they were so busy as not to be able to turn out sufficient to meet the demand. I am fortunate in knowing many professionals in this business, and from whom I have always received the greatest courtesy; and I feel sure that none of these are smarting under the injustice of the fancied cheap competition of amateurs.

I am glad to find that the controversy has caused Mr. Barnes, who I may describe as almost the only professional who has taken part in this controversy, to "climb down" very considerably. Any one who read his first letter will be pleased to read his second, in which he attempts to fasten upon his opponents the principle faults in his first. I may offer him the assurance that after four years' experience as an amateur, and by no means an unsuccessful one, I have found nothing amongst my numerous photographic acquaintances which is likely to injure him or his fellow professionals; and although I have worked this time, and claim my right to give or sell, I have not robbed him, had he taken all my gross earnings, of what would have found him in tobacco.

I must repudiate Mr. Barnes's definition of what is an amateur, and accept the common sense one, which includes all who practise photography from a love of it, and who do not make it a means of livelihood; there need be no hair-splitting distinctions, the two classes will readily single themselves out to disinterested minds.

Surely Mr. Page cannot be earnest in his suggestions? if so, he was born too late. I could almost have fancied him a modern Rip Van Winkle who had been sleeping since the time of the corn laws, and had never heard of the slaughter of the demon "Protection."

I need only ask him to consider the enormous impulse which this "photographic craze" has given to business, and the skill which it has brought into play to improve and develop it, to settle his mind as to what is best to do—let it alone, or trammel it with impolitic and unjust restrictions.

As to the claim of some, that photography owes all its advancement to amateurs, I cannot agree; but it is clear that anything a professional may discover becomes with him a trade secret, which he uses for his own profit, whilst the research and discovery of the amateur almost invariably becomes public property.

If photography is to rank, as many of us describe and believe it to be, as an art-science, let us by all means keep it free and untrammelled by trade restrictions.

I will conclude by protesting against the vulgar and cadish abuse of the "cheap set man," who has as much right to indulge himself in this manner as any who are able to provide themselves with more expensive instruments. I have been able to do as good outside work with a Lancaster Instanto as I have done with my McKellan camera and Ross and Dallmeyer lenses. I have known a good photograph taken with a cigar box with a pinhole in it.

Apologising for the trespass I have made upon your valuable space.—I am, yours, &c.,

ANTI-MONOPOLY.

To the EDITOR.

SIR,—I had no intention of taking part in this controversy, but one can hardly pass over the abusive language some of the *gentlemen* amateurs have used towards us greedy and ignorant professionals.

I have been over thirty years in the business, twenty in a large manufacturing town, and the rest in a seaside resort, and up to the present time no amateur has called on me who has not had his wishes gratified as far as it was in my power to do it. By far the majority of them I have found to be "decent sort of folk," with whom it was a pleasure to chat, and who seemed very grateful for kindnesses done for them.

Nevertheless, there is a black side to this amateur business which a bit of fact will prove. Before I left the town it had become a common practice when a fashionable wedding was about to take place for the pater to receive a note, of which the following is a copy:—"Should Mr. —— like to have a photograph of the wedding group taken, I shall be very pleased to take one and make you a present of the first copy, if you will kindly let me know a couple of days before the time fixed for the wedding. I am, &c."

A similar letter was sent when a picnic was known to be coming off for which I was asked to send in a tender for 150 mounted photographs, 12 × 10, and four gross of cabinets for a bazaar. An amateur waited on the Chairman of the Committee (who was the giver of the church) and asked to be allowed to supply them and he would charge only cost price, with the result that he got the job; when the settling day came the cost price of the amateur was 48*s.* more than my tender—result, a jolly row at the Committee meeting.

Some two years after I came to reside at the seaside I had a letter from an amateur friend asking me to lend him some 15 × 12 negatives of old historical buildings, so that he might print some for himself to make an album for his own use. I lent him six. Sometime afterwards I was on a visit to the old town and saw exhibited for sale in the window of an art repository some copies from my negatives. On inquiry I found there had been a bazaar at the parish church and the amateur had been selling them to the Committee to the tune of seven dozen, at 3*s.* 6*d.* each; another jolly row.

But if any one wants to know what amateurs are, let him go and live at the seaside and he will find the following not uncommon:—Would you kindly allow me to change my plates in your dark room? seven amateurs in one day, and that day, perhaps, the busiest day of the very short sea-

side season. Can you let me have six plates 7½ × 4½? Not having that size, I say, well, I will cut them out of full plates for you. Oh, thank you! and when you ask him 2*s.* 3*d.* for the six he says they are much dearer here than in Manchester; won't 2*s.* do" Will you please develop me a plate just to see if I am giving the right time" and when one has developed the plate, amateur says I wish you would develop the six; it will be such a favour, for I can then start clear with another six. When you have done this he calls in the morning for them, and in beautiful language thanks you very much for your kindness and departs, forgetting even to give the errand boy sixpence who has taken to his hotel a parcel he left behind.

Yet my most serious experience happened early in September this year. An amateur asked permission to change his plates. He had a beautiful quarter plate fit-up, and seemed every inch a gentleman. Some days after he had been in the dark room some water burst through the ceiling into the printing room. As was my wont I had left some negatives washing in the dark room; my assistant ran upstairs and found the cistern full and overflowing; to shut the tap and plunge his hand to find the hole where the water should go out was the work of a moment; but in doing that he ran a piece of glass under the nail of his forefinger. The amateur had left two broken quarter-plates and some pieces of tissue paper in the cistern, and they had choked the outlet. No notice was taken of the finger wound, until a few days after it became inflamed, with the result that the young man has now a deformed forefinger, and I have felt bound to keep him engaged till he could take another place.

Perhaps some of your readers will say, serve him right. Well, I am beginning to think I have been rather soft, and fancy I have learnt a lesson.

Now, if some of the clever amateurs who have written to your paper will not "gas" so much about their status and their cleverness—will do as much for professionals in the shape of little acts of kindness that professionals have done for amateurs—it would look much better of them than calling us greedy and ignorant.—I am, yours, &c.,

LIVE AND LET LIVE.

"PROFESSIONALS."

To the EDITOR.

SIR,—I write, of course, of the *photographic* professional. We have heard a great deal about "amateurs" lately. I don't remember to have seen much written about "professionals," hence my desire to fill the vacancy. I have met, and seen, and conversed with a large number of professional photographers, and I have come to the conclusion that nine out of ten know very little indeed of photography. They certainly know and understand in a degree how to expose, and develop, print, tone, and mount, &c.; but ask a question relative to the why and the wherefore of any of these operations, and where are they? How many of them know why the pyro is used with ammonia, and why an alkali is generally used with gold in toning silver prints? How many know anything at all about the chemistry of development or toning? I verily believe that the average amateur knows more about these matters than the average professional.

The professional, as a rule, shows an amazing amount of ignorance with respect, say, to new developers and new processes. Many know nothing whatever about bromide and other artificial light printing processes, and as for platinotype, carbon, and transparencies, would not one in twenty be about the number of "competents"? This ignorance is really only exceeded by the bumptious and assertive disposition they display when they *are* conversant with these matters.

The professional is undoubtedly considerably under educated, and this is really surprising, considering that the past few years have shown such great progress in matters photographic. When a chemist takes an apprentice it is considered a *sine qua non* that the youth understands some Latin, in the same way the photographic pupil should have some knowledge of chemistry. It seems strange that he is never taught, except in rare cases, anything but the mere routine of the studio, whereas a knowledge of the principles of art, lighting, drawing, &c., is very necessary—even retouching is not always taught. The wet collodion process is almost universally ignored; and here I may say that I do not consider any photographer's education complete unless he has mastered this beautiful process. The youth is allowed to print and tone, and fix without having explained to him the principles which underlie these processes, the master, as a rule, referring him to books in the event of awkward questions. This is all wrong, surely. Intelligent, well-instructed pupils will make good masters. The prospects of photography in the hands of large numbers of intelligent, well informed and educated men, instead of the small number at present, would certainly be of the brightest.

I imagine in no other profession is the amateur element so strong in theory and intellect. As has been pointed out, all the notable discoveries have been the result of amateur workers, the discovery of Dr Maddox crowning, so to speak, the edifice raised by Herschel, Hunt, Archer, and others.

It is evident that the remedy is not exactly in the hands o photographers themselves, as, of course, they cannot teach what they themselves do not understand; but there appears to me to be a field open for much work in the direction of proper photographic tuition. London, apparently, is the only place where a system of proper instruction is in vogue, but even there the results are not at all proportionate to the area covered.

The country is overrun with small societies. I would like to see all these merely branches of one powerful Central Society, and all more or less educational. Let this Central Body have its Examining Board, and let it appoint in various towns its authorised and qualified teachers, somewhat in the same manner as the City and Guilds of London Institute, paying by results, and giving prizes to successful students. A compulsory curriculum or examination would not be, I should say, ever existent with regard to photography; but once provide the means for instruction throughout the country, and I believe that the effort would be quickly recognised, the diplomas would be eagerly sought for, and photography, art, and science would benefit.—I am, yours, &c.,

A PHOTOGRAPHIC CHEMIST.

ROBINSON AT THE CAMERA CLUB.

To the EDITOR.

SIR,—The splendid show of photographic productions lent by Mr. Robinson to the Camera Club, wherein is his life's work of the last thirty years, showing that photography is capable of doing something in pictorial art, appears to have called forth a drastic criticism from Mr. Bart Rous, denying that the works exhibited possess any claim to art as pictures. Now, in my opinion, the same spirit of criticism, if applied to the numerous canvases exhibited annually at Burlington House, would condemn three-fourths of them at once, and possibly not more than you could count on the fingers of both hands would fulfil the conditions given by Du Fresnoy:—

"Thy greatest art as yet remains untold:
Passion to paint and sentiment unfold."

Now a picture to be worthy of the name should have an intention and tell its tale, whether the subject be historical, idealistic, ruralistic, or comic; and I venture to assert that Mr. Robinson has fairly grappled with these conditions, under the difficulties of an art which is anything but plastic, in enabling one to infuse life, sentiment, and expression into models appropriate to the subject on hand. Mr. Bart Rous says he is a very poor hand at photography. Well, that is surprising, seeing how simple and easy photography has now become. Mr. Robinson's best work was done, I believe, in wet collodion days. Mr. Bart Rous says: "Would an artist paint sun shadows from objects thrown in different directions?" Well, I have known them do worse than that; for instance, looking through the Royal Academy Exhibition some four or five years ago, I stood opposite a large picture by a noted R.A. representing a bull looking over a five or six-barred gate. For the moment I could not make out what the dickens was the matter with it, when a gentlemen behind me ejaculated: "Why, that bull must be fifteen feet high!" Now I defy any photographer to make such a distortion as that bull, even working as near as eight feet, and using a wide-angle lens, unless the gate was a miniature one for a circus; yet this picture was by a great artist, whose productions are popular and fetch hundreds of pounds.

I have been a frequent perpetrator of studies combining more than one negative, and shall be so again, when it is requisite (to carry out any particular design) to make a picture and the subject needs the utilisation of more than one negative, despite the dictum of Mr. Bart Rous and the Emerson school.—I am, yours, &c.,

B. SLINGSBY.

Lincoln, December 26, 1889.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

WILL exchange Dallmeyer rectilinear lens, also 12×10 Horne & Thornthwaite lens, for Rose No. 1 Universal lens or whole-plate camera.—Address, J. W. COURT, 145, Durham-street, Hartlepool East.

CAMERA CLUB NOTICES.—Thursday, January 2, eight p.m., Lantern evening. Monday, January 6, half-past eight p.m., Smoking concert. Thursday, January 9, eight p.m., Mr. W. H. Walker: *The New Rollable Celluloid Film.* Thursday, January 16, eight p.m., Mr. R. Tindall: *Plane Polarisation of Light.* Monday, January 20, eight to half-past nine p.m., Mr. J. F. Roberts will be prepared with the lantern if any member or members send him advice to the Club that they would like to try slides. Thursday, January 23, eight p.m., Rev. T. Perkins: *English Church Architecture as a Subject for Photography.* Thursday, January 30, eight p.m., Mr. T. R. Dallmeyer: *On some Practical Deductions from the Law of Conjugate Foci.* Monday, February 3, half-past eight p.m., Smoking concert. Thursday, February 6, eight p.m. Lantern evening. Thursday, February 13, eight p.m., Mr. Graham Balfour: *Landscape.*

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2 *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

R. G. Rettie, Weymsfield, Kirkcaldy.—*Two photographs of the late Provost Swan.*

A. L. Squibb, Bridgwater.—*Photograph of F. C. Foster, Mayor of Bridgwater.*

C. Duval, Manchester.—*Photograph of Mr. W. Hampson.*

S. O. J.—Paper suitable for binding the slide may be obtained from Spalding & Hodge, Drury-lane.

MERCURY.—Get either Burton's *Photographic Printing Processes* (Marion & Co.), or Wilkinson's work (England Brothers).

Z. A. B.—Your friend's criticism is right, as there is too much foreground. Cut an inch off the bottom of the picture, and the composition will then be far better.

N. W.—There *is* a small difference in the chemical constitution of the two salts; but in practice it is disregarded, and the terms are considered as synonymous.

POET.—The lens mentioned will be sufficiently rapid for taking dogs and horses. Two or three weeks ago we reviewed a shutter which will answer your purpose.

VULCAN LAMPS.—In reply to "J. L.," these can be obtained of various candle powers from S. P. Catterson, Globe Lamp Works, Newington Causeway, S.E. —F. H. BURR.

R. COOMBES.—In England a pound of water means sixteen ounces, and a pint twenty ounces. A pint of water weighs one pound and a quarter, and a gallon ten pounds.

J. S. B.—1. Try from five to ten grains of magnesium.—2. Let the magnesium lamp be held a little higher than the camera, and take care that no light from it is allowed to enter the lens. Arrange the background to suit your own taste.

H. NEWMAN.—The yellowness of the bromide prints is due to the presence of iron. The clearing solution after development has been omitted. From the details furnished, you appear to have worked exactly according to the directions except in this particular.

S. PEGLER (Retford).—The markings are probably images of the gas lights, impressed while the lens was uncapped during the brief period before and after igniting the magnesium, the camera having been moved during such period. We cannot otherwise account for them.

BROMIDE.—The blurring of the figures proceeds from the shutter not working quick enough; but as the pictures are all very much under-exposed it is clear that, in order to get good results, more rapid plates are necessary, or that the work must be done in a better light than hitherto.

S. THURTON.—It is impossible to say, by merely looking at a mount, whether or not it is safe for mounting a photograph upon. This can only be ascertained by a thorough chemical examination. If the makers guarantee its quality for the purpose, you must be content with that unless you have the boards examined chemically.

MOUNT CUTTER.—The only "apparatus" necessary in mount cutting is a cutting board, a mount cutter's knife, a pair of compasses, a T-square, and a straightedge. Your best plan will be to get a practical mount cutter to give you instructions. In this column we cannot spare sufficient space to give such information as would be of any actual value in practice.

D. MCMURRAY.—Are you sure that the whole affair is not a hoax or a swindle? Even if the alleged wonderful process is patented—which, by the way, we very much doubt—it is no guarantee that it is of any practical value. We need scarcely caution you to be careful about parting with your money. Photography in natural colours is not yet an accomplished fact.

WARWICK.—The object of the restrictions as to photographing in the public parks and gardens without a permit is to prevent itinerant photographers following their calling in such places, to the (often) inconvenience and annoyance of the public. Also in the case of damage or injury, as sometimes occurred with careless workers of the wet process, the authorities have some knowledge as to who is the cause.

A. SQUIBS.—The paragraph is perfectly clear. For the sizes quoted that particular form of lens is recommended, but for larger sizes the other form is to be preferred, because, in practice, it gives better results. Lenses of small sizes may be constructed to work and yield good results with such an aperture as would be quite impracticable when dealing with large diameters. This is a case in point. You may always take it, if a maker recommends one form of lens for a particular purpose in preference to another, that he is right.

F. H. B.—A paraffin lamp with a circular wick of small diameter will be found superior for photo-micrography to the other forms you name.

C. A. S.—1. The paper has evidently been permanently injured by moisture. Platinotype paper must be preserved absolutely dry, and this can only be successfully done by keeping it in the cases sold for the purpose.—2. We do not see why you, a consumer of the plates, should be allowed the same discount as the wholesale dealer, who has to keep a large stock always on hand. We are not at all surprised that the makers refuse to allow it. Even if you were a professional photographer you could not expect the same terms as a dealer.

ALBERT TOWERS, referring to his patent printing frame, says that our correspondent, "Kakabekka," is evidently either prejudiced or mistaken in saying that the principle was given to the public by Mr. Kingdon in 1887. He sends one of his frames for the inspection of those interested. "The invention does not add to the cost; it can be put on at the same price as the old spring. The quantity already ordered refutes that statement. If there is any other direct pressure spring like mine I have not seen it, and until I do I shall continue to state there is none other made like it."

NORTH writes: "I have been using ordinary commercial black varnish for stopping out the margins of negatives to make them print white; but I find it is not opaque enough to effect the purpose if the negative be a very dense one, as then the lines caused by the brush with which it is applied print through. Can you suggest a remedy?"—The opacity of the varnish can be increased by the addition of fine lampblack. This must, of course, be intimately mixed. Or the varnish may be rendered more opaque by allowing some of the solvent to evaporate by exposing it to the air in a shallow vessel.

QUANDARY.—Any of the plates mentioned should, from their reputation, answer for giving vigorous negatives from prints. Restrain the developer well with bromide and force the development, and sufficient density ought to result. Also try pyrogallol instead of quinol. For your purpose the slowest plates ought to answer best. In the matter of the lantern lighting, it seems, from your description, as if an insufficient supply of air reached the central flames. A Pamphengos in our possession answers well enough in this respect, and we cannot understand why yours should not answer equally well.

AN INQUIRER.—The print in question is a collotype, though under a different name. A great deal on the process has from time to time appeared in these pages. The most expensive item in the necessary plant is the printing press. This will cost from about 20*l.* to 40*l.*, according to size and make. The other appliances are not so costly. For beginning on a small scale, from about 50*l.* will cover the cost for plant. Those who work any of the photo-mechanical processes treat the practical details of their methods as trade secrets. These, unless you get practical instruction from an expert, you will have to work out for yourself.

PODGE writes: "I find that a kind of mildewy growth makes its appearance in saturated alum solution after keeping for a short time, also that solutions of the bromides of ammonium and potassium go bad in a similar manner. Can you suggest a remedy? I have somewhere seen it stated that a drop or two of carbolic acid added to the alum solution will keep it clear and good. Can you confirm this? and, if so, what is the proper strength of the carbolic acid solution? Can it be added to all the solutions named above with equally good results and without deleterious effects?"—In reply: When a fungoid growth is found on any solution of the nature mentioned, it implies the presence of organic matter. Commercial alum is seldom, if ever, pure, and we can readily conceive of its becoming mildewed when in solution. But with regard to the other solutions, the cause of the mildew is to be found in the impurity of the water in which the bromide has been dissolved. Even boiled and filtered rain water will often cause this, although to a less extent than ordinary tap water. The best remedy or preventative lies in the employment of distilled water. If thymol be sparingly added to solutions made with plain water, it will not exercise a deleterious action, and would in all probability entirely prevent the formation of mildew.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, January 8, *The Best Way of Storing Negatives;* January 15, *Intensifying and Reducing Negatives.*

KIDDERMINSTER PHOTOGRAPHIC EXHIBITION.—March, 1890.—Several intending exhibitors having misunderstood Rule 1 of the prospectus of the Worcestershire Camera Club Photographic Exhibition, the Secretary wishes to announce that the entrance fee in each class is 2*s.*, covering any number of frames. Also, in accordance with the request of many inquirers, the date for sending in application for space will be extended to February 1, 1890.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1549. Vol. XXXVII.—JANUARY 10, 1890.

ADVANCES IN PELLICULAR NEGATIVES.

We are gratified at being able to record the fact of an exceedingly flexible, thin, and transparent substitute for glass having become a commercial fact, and it becomes so at a fitting time—the commencement of a new year.

For some time past the invention has been in the experimental stage, and at least two months have elapsed since we obtained small samples. But with the dawn of the year 1890 it has passed from the experimental into the commercial domain. We are, of course, referring to the lately much-talked-of Eastman new film. Flexible as collodion, it is as thin as paper and as transparent as glass. It is specially adapted for roller slides on account of its flexibility and the great lengths in which it can be manufactured. In this respect it possesses certain advantages over celluloid, which, although an admirable substitute for glass plates in negative processes, cannot easily be wound upon a spool of limited diameter, and as yet is not supplied in great lengths. But these two pellicular supports are not antagonistic, as each has or will speedily find its own special application.

What the new claimant for public favour will in all probability do, will be to kill the "stripping film," at least in its application to small-size roll holders, because of the immunity it confers in stripping the negative from off its supports after the development and fixing have been completed. Not that the operation of stripping a gelatine pellicle from a paper support is either difficult or uncertain, but still it involves a certain amount of trouble.

Pellicular negatives possess so many advantages over those upon glass that one can readily understand how, from the earliest days of photography, endeavours have been made at various periods to perfect this system. Even the very first collodion negatives partook of this character; and Archer in his original manual of the collodion process, now nearly forty years ago, gave directions how to strip the collodion negative film from the glass and use it as a pellicle. And he afterwards, in 1855, obtained a patent for combining guttapercha with the collodion film on the glass so as to enable it to be stripped and used in pellicular form. And from these early days up to the present time ingenuity has been on the rack to obtain this *desideratum*.

As contrasted with glass, pellicular negatives or surfaces possess certain advantages. They are portable, as any one will discover before long who has to carry a camera with one to two dozen 12 × 10 glass plates up hill and down dale during a hot summer's day. They are thin, and can yield either a direct or a reverse print, according to which side is placed next to the sensitive paper. They are flexible, and hence no fear of fracture, either during transit or when in the printing frame; and, lastly, a not very bulky album suffices for their storage.

It is not, perhaps, altogether to our national credit that the application of celluloid in both its flexible and extremely pliant forms to photography should have emanated from the new world; but if our sons there are sharper-sighted than we as to effective ways of carrying out ideas, we, at any rate, are large-hearted enough to wish them "God Speed," and to aid them by becoming consumers of their produce, for this giving and taking of ideas is reciprocal.

OIL LANTERNS FOR ENLARGING OR PROJECTION.

The very high state of efficiency to which oxyhydrogen illumination has been brought, and the compactness and portability of the gas holders which the method of compression has permitted, have so drawn attention away from the petroleum-oil lighted lantern, that there is danger of unmerited neglect being the fate of a valuable little instrument of real usefulness. If only the operator will not attempt too much with it, an oil lantern will throw photographic transparencies on the screen with clearness and brilliancy almost equal to what is obtainable with the oxyhydrogen light. The brilliancy of the disc of light on the screen varies inversely as the squares of the diameters of the various-sized discs a given radiant in a lantern is made to exhibit. A twenty-foot disc is an ordinary size for a first-class lantern to project with oxyhydrogen, and to get a disc of that size with oil would merely be ludicrous; but, on the other hand, many cases arise where to attempt to obtain a disc of that diameter would not be less absurd than to aim at obtaining it by petroleum. Here oil lanterns come in with advantage. A ten-foot disc would be four times more brilliant than a twenty, and a five-foot disc sixteen times. In small rooms, such as are at the command of village schools and clubs, not to say private houses, the demand for lantern exhibition is very great, and would be well satisfied by the use of a five-foot disc, which would show any good photographic transparency with great brilliancy. We are not to be understood as fixing five feet as a limit, far from it. We should be afraid to say how large a circle we have, in the hands of an expert, seen an oil lamp used for (and with excellent results), lest we might be accused of exaggeration.

When we speak of an expert, it might be thought that there is not much room for skill in the use of an oil lantern, but this would be entirely an error; it needs but a few visits to lantern exhibitions where oil illumination is employed to discover very great differences in the brilliancy of the light shown, and still

more striking contrasts in the purity or the reverse of the atmosphere of the room where the petroleum lamp has been burning in the lantern for an hour or so.

Every student of our correspondence columns will have noted replies to the frequent complaints of, and inquiries for, cures for the smell from paraffin lighted lanterns. It is true few smells are so offensive as those connected with the burning of paraffin oil; but they are preventable. Gas is so widespread in its adoption that it is comparatively few people (though they form a large body in the aggregate) who are familiar with the manipulation of the burning apparatus of a simple paraffin lamp for indoor illumination. In large houses in the country where gas is not obtainable, or made on the premises, the lamps are attended to by one or other of the staff of servants; the master of the house would as soon think of soiling his fingers by trimming a lamp as he would of entrusting his valuable slides produced by his own hands in his own dark room to the tender mercies of his most trusted servant. Slides, lantern, and light he will look after, and perhaps exhibit at some remote penny readings, entirely himself, with the consequence of the light at least, that simplest of affairs, as would appear, being far from what it might be.

Any one who has had experience, as we have, in the use of ordinary "paraffin lamps" for almost every conceivable purpose, for rooms large and rooms small, for microscope work in our own practice, and for arranging them in quantities for demonstration to audiences, and a thousand other purposes, and has gone to the trouble of setting the lamps in order with his own hands to get to know all about them, soon finds that he has something to learn—simple, but necessary.

First, his lamps must be clean.

Second, his wicks must be well trimmed and even, and no hard crusts left from last using.

Third, petroleum lamps are not gas burners, and cannot be turned down and up, like the latter, whenever required.

As to cleanliness, that has been dwelt upon by us frequently. If there be oil smearing on the outside of a lamp or burner, of course it will, when the lamp is lighted, evaporate and cause annoyance; that is the smallest danger. In nineteen out of twenty cases the smell is caused by ignorance of the fact that, to avoid such a nuisance occurring, an ordinary paraffin lamp must be kept burning to the full; it will not turn down without smelling. Then, again, if the wick be not fairly regular and even, the combustion will be imperfect, and again will smells arise. Many lanterns have collapsible chimneys; if these are not properly adjusted, once more the penetrating nauseous odour will be perceived. Let these points be attended to, and paraffin lighting is infinitely superior in every way to coal gas as an illuminant.

Let any one enter from the open air a room in which gas has been burning for five minutes, and he is able to perceive the smell; but paraffin may burn for hours in a room, and yet any odour from its combustion be imperceptible if the lamp be in perfect order.

As to the kind of lamp to select, it is not our province to decide among the large number described in these pages and in the advertisement sheets of the ALMANAC. There are large numbers, all good, each with points of excellence, from the original two-wick Sciopticon (to this day a most excellent instrument) to the three and four-wick lamps of elaborate design and adjustments. Let the purchaser select for himself, get thoroughly used to trimming it, and start always with his lamp dry, the wick perfectly trimmed and clean, and the lights never turned down from the start, and he will have a first-rate exhibition, with air utterly untainted with the too familiar fumes of half-burnt petroleum oil.

EACH year, since the Patent Law was amended in 1883, the number of patents applied for has continually increased. During the year just ended the number reached nearly twenty-one thousand, the actual figures being twenty thousand, nine hundred and ninety-three. This is an increase of nearly two thousand upon the previous year, when the applications were a little over nineteen thousand, and this was hitherto the highest number reached. Of the number of patents which have been applied for during the past year, photography, and its applications, has contributed its due proportion, as our columns have week by week testified. It will be interesting to see how many out of the twenty-one thousand patents applied for will be completed, and still more so to note upon what proportion of them the fourth year's premium will be paid. It is curious to compare the weekly returns of the number of patents applied for with those upon which the fourth and succeeding years' fees are paid.

IT appears to be an impression with many that, as the specifications are to some extent examined before the patents are granted, they must necessarily be valid. Such is, however, far from being the case. The mere fact that a patent has been sealed must not be taken as a proof of its validity. Even if the granting of a patent were opposed, and after argument before the Comptroller it is afterwards sealed, it is no guarantee that the patent would be valid if contested in a court of law. Very many patents there are in connexion with photography which "would not hold water" if submitted to this, the only decisive test.

IT may be well to apprise our readers of an important alteration in the arrangements with regard to the forthcoming International Exhibition at Edinburgh. According to the first prospectus space was to be charged for. The Council, however, have modified this and have decided that it shall be free, unless the receipts fall short of what is necessary to cover the expenses. Exhibitors will, however, have to deposit two and sixpence per square foot of space applied for, which will be returned wholly or in part, according to the pecuniary success of the show. Awards are also to be granted, but it will be optional with exhibitors whether they compete or not. In the latter event the exhibits can be marked "Not for competition." The time for applying for space is also extended. The last time for application now is the 15th instant. We are pleased to note that in this Exhibition photography is classed among the "Fine Arts."

PHOTOGRAPHERS are always interested in the weather. The annual report of the Meteorological Office for last year has just been issued, and it shows that, on the whole, the weather was about the average. From the report we learn that the average of bright sunshine was small. Although it was one per cent. above the average of 1888—which it will be remembered was an exceptionally gloomy year—it was five per cent. below that of 1887. It appears that the total sunshine for the year at Greenwich was but 1050 hours, while Hastings was favoured with 1560 hours. Our Continental friends will doubtless sympathise with English photographers when they are told that the average of sunshine here, for the year, was but twenty-two per cent. of its possible duration. The report fully confirms the remark we made two or three weeks ago: namely, that, as a rule, we get more fogs and worse light in January than we do in the month so proverbial for its fogs—November. It shows that during January last year the average was but six per cent., while in November it amounted to fifteen per cent. December also shows but six per cent. of its possible duration.

LONDON is now in possession of a daily illustrated paper. It is a bold stroke on the part of the *Graphic* to issue a daily edition at a

penny; but for photography such a thing would be next to impossible. In the first number of the paper some of the illustrations are excellent, while others bear unmistakable evidence of hurried execution. But, no doubt, when more experience has been gained in working at high pressure this will be obviated. In the copy now before us, no half-tone process blocks from nature have been employed. Many of the pictures are, however, from photographs, but they have been reproduced by drawing or tracing, zinc blocks then being made from the reproduction. The character of the paper is admirably adapted for process block printing. It is surprising that such a paper can be issued for so small a sum.

Now that electric lighting is being so largely adopted, we from time to time hear some extraordinary accounts of accidents, though chiefly from America. The correspondent of a daily contemporary, hailing from St. Louis, relates quite a sensational chapter of accidents. According to his account, it would appear that during a storm the other evening an "electric wire" fell into the street. A little dog trod upon it and was instantly killed. "Mrs. Smith," the owner of the little dog, ran to its aid, and she, too, stepped upon the wire and was "thrown some distance" and fell unconscious. Then Mr. Smith went to Mrs. Smith's assistance, and he, also, received a severe shock. Next a crowd collected, and a man was knocked insensible; then a fireman rushed to his rescue, and he, as well, received "a very severe shock." Those familiar with electrical science will, no doubt, wonder how such a series of accidents could possibly happen under the circumstances detailed.

There is no question that a considerable amount of danger is involved with very high tension currents, particularly with overhead leads when the insulation is imperfect. In some cases the EMF of the current being sent out, or to be sent out, amounts to ten thousand volts, and that an alternating one, therefore the greatest precaution should be taken by photographers and others who use the light and obtain their current from the mains, notwithstanding it passes through a transformer. If they are not themselves conversant with electrical matters, they will do well to entrust the internal installation of their plant to a competent electrician, so that accidents may be avoided.

THE LATE REV. S. J. PERRY, S.J., D.Sc., F.R.S.

With much grief have we to announce the death of the Rev. "Father" Perry, F.R.S., Professor and Astronomical Director of the well-known Roman Catholic College, Stonyhurst, Blackburn.

As the Rev. Father had all along taken a great interest in the Photographic Convention of the United Kingdom, we had last summer written to him asking for a paper for the London meeting of that body, but he had excused himself on the grounds of his then being actively employed in preparation for the observation of the forthcoming eclipse of the sun, he being about to leave England as the head of an expedition for observing that phenomenon. He subsequently sent us, just before leaving this country, an article for the then forthcoming Almanac—the last, we believe, he ever wrote—in which he described the instruments that were to be made use of in recording the event in which he was so greatly interested. This article we here reproduce, and direct special notice to the fact that the modesty of this truly great man does not allow him even to obtrude his own name in it.

THE INSTRUMENTS OF 1889 FOR CELESTIAL PHOTOGRAPHY.

In reckoning up the gains for any given period, astronomers, differing little in this from most other persons, are very apt to give more weight to actual discoveries than to the perfecting of the means by which these discoveries are brought to light. But at the present time, when astronomy owes so much of its rapid growth to the aid afforded by photography, the perfection of the photographic lens or mirror, the accuracy of the driving clock of the equatorial mounting, and the improvement in plates and in methods of developing, have often as great an influence on the advancement of science as the skill or ingenuity of the astronomical photographer. If we estimate the progress of the last twelve months by the actual additions made to our past knowledge, we may find, perhaps, that less has been done in astronomy than in the years immediately preceding; but if we look more to the improvement of instruments, we may then truly say that celestial photography is still advancing with giant strides.

The work done by the Permanent Committee for charting the heavens must, from its great importance, hold the first place in any account of the progress of astronomy in 1889. To the list of observatories already published as co-operating in the work must now be added the names of Vienna, Catania, the Vatican, and Manilla. The Henrys in Paris, and Sir Howard Grubb in Dublin, have been hard at work completing the thirteen-inch photographic lenses to be employed at the twenty observatories now engaged in this gigantic undertaking. In less than six months many of these observatories will already be at work, recording their star positions by hundreds of thousands, and with a precision hitherto unattainable, except in the case of a few standard stars.

On the other side of the Atlantic, Professor E. C. Pickering is taxing severely his marvellous energy in attempting single-handed, with a photographic doublet of twenty-four inches aperture, to construct a stellar chart as vast as the international one of which we have just been speaking, and nobly has he been seconded in his bold attempt by the princely generosity of Miss M. Bruce.

The addition of a third lens to the enormous telescope of the Lick Observatory has enabled Professor Holden to produce pictures of the moon far surpassing in excellence any previous photographs of our satellite.

In England, Mr. Common has succeeded in rendering still more perfect the reflecting surface of his magnificent five-foot glass mirror; and the pictures of the moon and of the nebula of Orion, obtained on trial plates before the polishing was completed, show what splendid results we may confidently expect from such an instrument in the hands of so accomplished an operator.

At Maghull, near Liverpool, few opportunities have been missed of adding to our knowledge of the construction of the nebulæ, the spiral forms and the wondrous rings of Andromeda presenting a striking confirmation of Laplace's nebular hypothesis. But the fewness of good nights in the neighbourhood of Liverpool has induced Mr. Roberts to construct a new observatory at Crowbridge, and to transfer thither his now famous twenty-inch reflector, as Lassell, in past years, removed from Liverpool to Malta with his four-foot mirror.

Other instruments might be mentioned, such as that lately constructed by Sir H. Grubb for the Vizagapatam Observatory, or the large mirror presented by Mr. Roberts to Dunsink; and in our enumeration of the centres of photo-astronomical activity we must not omit to mention the Halifax Observatory, where Mr. Crossley has been erecting the fine three-foot reflector with which Mr. Common produced at Ealing such grand results, and from which we may expect a rich harvest in coming years.

In spectrum photography, Professor C. E. Pickering has completed his rapid survey of the spectra of the starry heavens; Professor Rowland has published his new chart of the solar spectrum; Mr. Maclean has mapped most accurately a considerable portion of the less refrangible end of the same spectrum; and Mr. Higgs, whose prismatic maps compared so favourably with the best results of other observers, has been engaged most successfully in a similar research with a large metallic grating.

Of the photographic work at Greenwich and Oxford, and at the Cape, Melbourne, and Sydney, a few words will suffice, as preparation for the star charts is well deserving of any time that can be expended upon it. The zones assigned to these observatories at the late Congress at Paris are from 40° to 58° N. latitude, and from 34° to 52° S. latitude, as well as from 70° to the Southern Pole.

The above list of instruments, constructed during the past year for celestial photography, would be defective indeed were mention omitted of the latest triumph of speculum grinding, which has resulted in producing a telescope whose light-grasping power far surpasses, for its aperture, anything hitherto attempted. In preparation for the coming solar eclipse, Mr. Common has just ground two glass mirrors of twenty-inch aperture and only forty-five inches of focal length, and these are to be used on December 22nd to photograph the solar corona—one in Cayenne, and the other near Loanda. With such instruments at their disposal, we may confidently hope that the observers will obtain on their sensitised plates a large extent of the outer corona, and also detect any slight change, should such take place, in the coronal streamers. For the realisation of these hopes we must await news from South Africa and South America; but longer patience will be needed if we are anxious to witness the completion of the forty-inch refractor that the Clarks have undertaken to grind for the new observatory of South California.

In our issue of December 27, 1889, we mentioned that the first of two small expeditions which had been sent from England to observe the total eclipse of December 22 was under the direction of Mr. Perry, and had been stationed at Barbados in the West Indies, a reflecting telescope of twenty inches diameter forming part of the outfit. The objects were: (*a*) To detect any possible changes in the corona during the two hours and a half that elapsed between totality at Loanda, in South Africa (where Mr. A. Taylor was established), and

at Barbados; (*b*) to photograph the coronal extension as far as possible from the sun; and (*c*) to determine the photometric intensity of the corona.

Mr. Perry was in excellent, nay robust, health when he left England, and he was one of the last we could imagine succumbing to any climatic influence.

His last appearance in a public capacity was when, previous to the passing of an unwise law that the President must on all occasions preside, the then President of the Birmingham Convention applied a little friendly pressure upon Mr. Perry, and induced him to preside at one of the evening meetings, and give an off-hand address, which will ever be remembered by those present for its profundity, eloquence, and brilliance, Mr. Perry being actually on his feet to speak when the President whispered to him the topic on which he would like him to descant. In what manner he did so may be ascertained from the following extract from a leading article in this JOURNAL of August 3, 1888:—

"Professor Perry, by request, gave an impromtu address on the present state of the application of photography to astronomy in general, and to recording the position of the less visible stars in particular. The evident mastery of his subject, the grace and fluency of his diction, the appositeness of his metaphors, and the practical relation of the subject given to photographers, charmed beyond measure; and when the increasing darkness brought his eloquent discourse to a close, many could have wished that the sun had delayed for a time his descent below the horizon."

At present we have no definite report concerning the death of Professor Perry other than that given in a London morning paper of Monday last, which notice we subjoin:—

"A telegram has been received at Stonyhurst from Demerara announcing the death of the Rev. Father Perry, F.R.S., Astronomical Director at the well-known Roman Catholic College. He went out some months ago as the head of an expedition for observing the eclipse of the sun, and was in excellent health when he left England. The unexpected news of his death has come as a painful surprise to a large circle of scientific acquaintances."

Ignorant as we are as yet as to the immediate cause of his death we have only now to say that Professor Perry was in the strength of his manhood a few weeks ago.

THE NEW BENZOLINE LIMELIGHT.

II.

DURING the past year I have been engaged in experimental work having for its object the production of a more powerful limelight than was previously known. I was instigated thereto in the first place by a letter received from a gentleman whose name and skill in certain branches of science are, doubtless, familiar to the readers of this JOURNAL. This scientist, having read articles written by me for these columns in former years on limelight matters, applied to me for the loan of my best mixed gas jet, with the view of comparing it with the best jet in his possession. I was informed of the results of the tests applied to these jets, which showed no perceptible difference in illuminating power—a result I fully anticipated, as they were constructed on the same principle, though differing in design.

The correspondence so begun has continued up to the present period; I devising and carrying out experiments, and he, on his part, criticising these as reported, and suggesting a few ideas of his own.

At first the construction of the nipple was discussed. It was found possible, with oxygen and coal gas, to get a noisy light of 800 candles with an extreme pressure of gas; but, on the whole, little or no advance was made in this direction.

The correspondence then ceased for some weeks. In the interval I designed certain complicated machines for *boiling* benzoline, with the view of replacing coal gas by the *steam* of benzoline, the theory being that benzoline would allow a larger bore of the mixed gas jet to be used, and, by consuming more gas, enable a better light to be obtained. An apparatus, constructed of brass tubes brazed together, was made for this purpose, but was never actually tried. I did not like the principle on which it worked; it seemed dangerous, as there was a possibility of the liquid *boiling over* and causing a conflagration, so the apparatus was eventually destroyed.

From a consideration of the cheap benzoline lamps sold by ironmongers, which are always stuffed with cotton wool, the idea occurred to me of making a boiler stuffed with wool and introducing air tubes in the stuffing to allow the steam to escape. Such a vessel was soon made in tin. In order to apply the heat in an equable and safe manner, a hot-water bath was adopted; the stuffed benzoline vessel was placed within it after being filled with benzoline, the surplus fluid not absorbed by the stuffing being drained off. A spirit lamp was placed under the water bath, which was made on the glue-kettle plan.

The apparatus being in readiness, the spirit lamp was lit, and the water raised gradually to the boiling point. Having been the victim of an explosion with an ether saturator some years previous, I took the precaution of placing a substantial shield between this apparatus and my body, the security of the latter article being considered of great importance. With some degree of trepidation I applied a light from time to time to the open tubes from which the benzoline steam was expected to issue forth in torrents.

The steam, however, was very slow in making its appearance, so the heat was increased until the water was in brisk ebullition. At last a tiny benzoline flame was burning at the tip of the tubes, a flame half an inch high, and which any little candle could put to shame, so far as illuminating power was concerned. It was quite clear that the apparatus, regarded as a *boiler*, was a failure.

It remained now to try it as a *saturator*. Before warming the vessel containing the benzoline, it was found, on blowing through the air tubes, that the air picked up sufficient vapour on its journey through the stuffing to become inflammable, and to give a blue flame a foot long when lit as it issued from the vessel.

On repeating the experiment with the vessel placed in warm water, it was found that as the temperature rose the amount of vapour imparted to the air increased very rapidly, so that at a heat of 100° Fahr. a flame thick and smoky, and three, four, or five feet in height, was easily obtainable, simply by blowing through the tubes with the breath. Clearly the vessel, regarded as a *saturator*, had qualities worthy of trial. The mixture of air and vapour could not be exploded inside the saturator: the proximity of the moist stuffing seemed a complete flame check. So far there was no "pop" of any kind.

The next experiment was to pass *oxygen* through the vessel instead of air. As the mixture of benzoline vapour with oxygen is five times as explosive as with air, it became desirable to know what would be the result of applying a light to the mixture as it issued from the saturator. The effect was a loud but harmless "pop," due to the explosion of gas contained in the air tubes inside the saturator, amounting to several cubic inches in volume. There was a much larger quantity of vapour interspersed throughout the moist stuffing, but it seemed evident that this was not ignited, owing to the stuffing acting as a flame extinguisher; if it had been ignited the vessel would have been burst with the violence customary when accidents occur with *unstuffed* saturators.

When a length of rubber tube was attached to the exit gas tube of the saturator, and a light applied to the end of this tube, the "pop" was louder, owing to the larger quantity of gas exploded; but still no damage whatever was done to either saturator or flexible tube. It appeared desirable to use a very short tube between saturator and jet—six inches is sufficient.

These experiments appeared conclusive in proving the *safety* of the benzoline saturator. I discarded the shield before mentioned, and lost all timidity in the use of the apparatus. Pops are easily avoided when a jet is used, and, as a matter of fact, I have given some thirty exhibitions with the warm-bath saturator, both outdoors and in public halls, without pop or hitch of any kind.

The apparatus was connected to a mixed gas jet, having a nipple of one-fourteenth of an inch bore, fixed in a single lantern, the rubber tubing being arranged in the manner customary with ether saturators. Oxygen was supplied from a gas bag compressed by two hundredweight. On first lighting at the jet nipple, the oxygen which had passed through the saturator, and was loaded with vapour, a large flame similar to coal gas was produced. After allowing a minute or two to allow the jet to become warm, which was necessary to check condensation, the oxygen tap was turned on slowly till the light was at its best. It was instantly apparent that the benzoline light was more powerful than the coal-gas light; it appeared to be of double brilliancy, but subsequent tests showed that the improvement was about forty or fifty per cent. From that time forth I discarded coal gas in favour of benzoline in my own practice.

Having contrived this practicable though crude apparatus, I reopened the correspondence with my distant friend by describing it. It was not received with enthusiasm; on the contrary, it was attacked by keen criticism, numerous theoretical objections were started, and the improvement in light was doubted. I refuted some of his arguments, others I met by modifying my claims, and others again I endeavoured to cope with by altering the apparatus. I have tested the light many times by various methods, while my correspondent

so far as I know, has not yet seen the warm-bath saturator in action. When he does see the light in its full power, I have no doubt he will be convinced of its superiority over coal gas. The critic drew my attention to the fact that benzoline was not a simple liquid, but was a mixture of several liquids of the same nature, but of different degrees of volatility. He suggested that a fluid which consisted wholly of the lighter constituents of benzoline should be tested. The last hint proved of service.

This correspondence has been very helpful to me by rendering me sensible of the weak points in the new system. The warm-bath saturator (for which provisional protection has been obtained) has been greatly improved since the first one was made; the water bath is replaced by an air bath; the spirit lamp by a nightlight; and common benzoline by a more volatile benzine. The oxygen, after passing through the saturator, is so heavily loaded with vapour that in the lantern it burns precisely like coal gas: it is practically non-explosive, and is less liable to pop than with any other saturator in the market. Hence the warm-bath system is the *safest*, and probably will be found suitable for dissolving lanterns, as there is now no condensation of benzine in the tubing. ALBERT W. SCOTT.

A NEW KODAK.

When that funnily named little camera, the Kodak, was first introduced we thought that the very whimsicality of its name, aided possibly by a recognition of and appeal to the inherent laziness of some likely purchasers, would cause a few, at any rate, to become the possessors of the pretty little instrument. The simple formula given to the non-photographic public was something like this: "Pull the string, point the camera, and press the button. That is all; we do the rest." This formula is one which is very far from being conducive to making scientific photographers of the multitude. However, it starts them on the lowest rung of the ladder and makes plate exposers of them. No saying how from this ultimate atom in the photographic cosmos may evolve by slow degrees the future beau-ideal of all that is profound in photographic metaphysics and lovely in its art. My Lord Tomnoddy is not quite a fool. He can listen to and seemingly appropriate the applause given to *his* pictures, executed on the "we do the rest" principle, but at heart he feels he occupies unsound ground, reflects that what man has done man can do, and, like a brave Briton, resolves that he will not wear borrowed plumes in future, but will produce his own pictures throughout, becoming, as a consequence, a photographer instead of an exposer of plates.

But to return to the Kodak. When we consider the fact, of which we have assurance, that no fewer than fifteen thousand were sold last year, we can, by careful thought, realise the addition that may reasonably be expected to accrue to the army of real scientific hard workers eventually.

The new or No. 2 Kodak seems destined to supplant the initiator Kodak. Its pictures were and still are very pretty and very nice, but their area is very circumscribed, the circular field of delineation being only two and a quarter inches in diameter. The Kodak of 1890 is quite another matter as regards dimension of picture, for its area has now extended to three and a half inches. And here we stand on sound ground, because we now have all that is required in (*a*) an album view, or (*b*) in a lantern view—the diameter of a standard lantern condenser of high class being assumed as four inches.

The one which we have received possesses several features in advance of the original one, in addition to the greater size of the negative and the fact that, as will be seen from our leading article, the stripping film in it is quite superseded by the direct transparent film, necessitating no stripping. In size, the three and a half inches diameter proves an immense gain upon the two and a quarter inches of the former one. Then, again, the exposure system has been reconstructed, and time exposures are as easy as instantaneous ones. The system provides for the light being automatically cut off from the film while the change is being made on the shutter; that is, the bringing it from the discharged to the ready for firing point. In the original Kodak there was only one fixed stop or diaphragm; in the new one the educational idea has advanced, and several stops are now available.

In a little manual (American edition only, the English one not yet being ready) which we received with our No. 2 Kodak, we find the developer that is recommended is the following:—

Pyrogallic acid	10 grains.
Carbonate of soda	75 ,,
Sulphite of soda	110 ,,
Water	4 ounces.

And in a note it is said that four ounces of developer will develop about sixteen exposures (eight strips of two each) if they are developed one after the other in quick succession.

The Kodak, starting with being a pretty toy, seems now to have developed into a really good, useful instrument, which even the most advanced photographer may take with him when on a tour in the certainty of bringing home with him five dozen of negatives without having to effect any change on the camera.

Other advances in size are in contemplation; we have already seen one for quarter-plates, and are aware of arrangements for 5 × 4 negatives, but the carrying out of these into commercialism is still in the future.

PLATINOTYPE PRINTING.

[A Communication to the Cheltenham Photographic Society.]

BEFORE proceeding to give you a practical demonstration of the platinotype processes, I think it will be advisable, for the sake of those present who may not have worked either of them, to make a few remarks respecting the mode of procedure in each of the two processes, the hot bath and the cold bath.

We will take the hot bath process first, as being the one most in use at the present time, and which, I believe, gives the best results if the negatives are really good ones.

To get the best results with platinotype, the negative must be fully exposed, so as to get detail and delicate gradation in every part, the deepest shadows being represented by perfectly clear glass, and the high lights fairly dense. It is hopeless to try to obtain a good platinum print from an under-exposed and hard negative. A fair silver print may be often made from a negative which would not yield one worth looking at if printed in platinotype. With a good negative to print from there is no other process which will yield such beautiful and artistic results as platinotype.

The paper is sent out in sealed tins containing two dozen sheets, cut to the various sizes of photographic plates; or it may be obtained in large sheets 20 × 20, and cut up as required. It is most convenient to buy it ready cut up, as it saves trouble, prevents soiling the paper by fingering it too often, and a smaller calcium tube for storing it will suffice. The Platinotype Company, in their directions, recommend you to place it at once in the calcium tube, as soon as you open the tin, but I have generally left it in the tin as received, and placed an indiarubber band round the edge of the lid so as to exclude all air, and I have found it to answer perfectly, having kept paper in good condition for four months in that way. The greatest care must be taken with platinotype paper to guard it from the slightest dampness, as if the least damp it will not yield bright, "juicy" prints. You will get nothing but dull, mealy pictures, showing a very granular deposit of platinum.

The sensitised paper before exposure is of a lemon-yellow colour. During exposure, the parts affected by light become of a pale, greyish brown, and finally, if the negative be fairly vigorous, of a dull, orange tint under those parts of the negative which present clear glass. When this last change has taken place, it indicates that the iron salt has been almost completely reduced, and then further action of the light produces no more visible effect on such parts. The correct exposure (about one-third of that required for a silver print) is ascertained by the inspection of the paper in a weak white light in the usual manner. Judging the correct exposure is, for the beginner, the most difficult part of platinotype printing. Nothing but practice in this case can make perfect. As a rule, printing should be continued until nearly all the details are *just* visible. The appearance of the undeveloped print, however, varies very much with the different kinds of negatives used.

Development should be conducted in a feeble white light, or by gas-light. It may be proceeded with immediately after the print is exposed, or, more conveniently, at the end of the day's printing, when the various prints may be sorted and treated as their appearance may dictate. The developer is made by dissolving 180 grains of oxalate of potash in one ounce of water. One pound of oxalate of potash to fifty-four ounces of water is sufficiently accurate. For general work, a weaker solution must not be used. The bath must not be acid. If it is found to be acid, add a very little carbonate of potash until neutral to test paper. The bath can be used over and over again, so long as it yields good results. The solution used to-night has been in use for the last three months, a little fresh solution being added occasionally to make up the bulk. A temperature varying between 140° and 160° Fahr. may be considered the best standard temperature for the developer, though higher and lower temperatures may be used to correct slight under or over-exposure. There is, however, with the hot bath process, very slight latitude allowable in the exposure. For under-exposure, the temperature may be raised up to 180°, and an over-exposed print may sometimes be saved by using a weak bath at about 80° to 100° Fahr. It is much more satisfactory to make another print of correct exposure than to attempt to "doctor" a wrongly exposed one; the over-exposed ones especially are always coarse and granular, and will never give satisfaction when finished.

The print is usually floated on the top of the developing solution, but I

prefer to immerse it by quickly sliding it under the surface of the developer, as in that way air bubbles are more easily prevented. In floating the paper quickly it is very difficult to prevent the formation of a few air bubbles underneath it, and although, if the print be raised from the solution and again floated on it, they do not show very much, still there is generally a slight difference of tint where the air bubbles have been, which, if it happens in the delicate half-tones of a face, is very annoying. They very rarely happen when the paper is immersed, and the resulting print is quite as good. Let the print stay under for five or six seconds, then raise it and see if it be developed enough; if not, immerse it again for a few seconds, until the complete reduction of the platinum salt has taken place. Take the print direct from the developer and place it face downwards in the acid bath, which is made by adding one ounce hydrochloric acid to sixty ounces of water. The object of this acid bath is to dissolve out of the paper all the iron salts, which, if they remained in, would cause the print to assume a yellow tint. The prints must have, at least, three changes (of five to ten minutes each) of the acid bath, so as to remove every trace of iron. They should not communicate to the last acid bath the slightest tinge of colour. After the prints have passed through the acid baths they must be well washed in three or four changes of water for about fifteen minutes. They are then finished, and as soon as dry are ready for mounting. The prints may be dried either between clean blotting paper, or may be hung up by clips in a warm place. For mounting, I find a good thick starch paste answers perfectly.

Cold Bath Process.

In this process the paper contains only iron salts, the platinum being in the developing solution, which is applied cold, either by floating the print on it, as in the hot bath process, or by applying it with a broad camel-hair brush.

There is undoubtedly more latitude of exposure in the cold than in the hot bath process, and also the results are more under control, and may be modified to a greater extent. For instance, with it a very thin negative may be made to give a brilliant print by giving only the minimum of exposure and using a developer strong in the platinum salts; whereas, with the hot bath process, only a very soft, delicate print could be obtained. And, again, a dense negative inclined to hardness may be made to give a much softer print with the cold than with the hot bath process. The paper must be fully printed, and developed in a solution weak in platinum, so as to allow the half-tones to come up more equally with the shadows than they would with the hot bath process.

In the divided picture I now show you, you will see the effect of using the developer with different proportions of the platinum salt. The picture was printed in the usual manner, and the print cut in two. One piece was then brushed over with the developer as recommended by the Platinotype Company, viz., one part platinum solution to five parts Dilute D. The other piece was developed with only half the quantity of the platinum solution.

The deep shadows of the first half of the picture you will notice are blacker and more brilliant than those of the second half, the second half being much softer and the gradations more gradual than in the first. The effect could have been made much more pronounced if the development of the first piece had not been continued so long, as the deep shadows had attained their present density some time before the half-tones had arrived at their present tint. By stopping the development sooner, as I will show you presently, a much more brilliant effect could have been obtained.

The cold bath paper must be damped either before printing or just before development; before printing is said to give the best results. To damp the paper, spread the pieces on a clean sheet of paper in a darkened room until they have lost their crispness, but not long enough to make them *limp*; fifteen minutes is usually sufficient.

Light produces a more visible image on dry paper than on damp. It is therefore easier to expose dry and damp afterwards. The exposure required is rather less than in the hot bath process, and is conducted in the same manner.

Developing Formula.

Dissolve half "developing salts" in fifty ounces of water and label "D."

Take Solution D ...	3	parts.	Label this sol. "Diluted D."
„ Water	2	„	

Dissolve sixty grains "platinum salt" in two ounces of water and label "P."

The normal developer given in the instructions is made by adding one part P to five parts Diluted D; but for ordinary work I prefer to use it with one part P to eight or ten parts of Diluted D, the development being much more under control with this than with the stronger solution. To develop by floating, put enough solution into a clean porcelain dish to well cover the bottom. Float the print on the developer for one or two seconds with its printed surface downwards; then raise it, again float it and raise it. Now hold it in the hands, face upwards, and watch the progress of development. Immediately the right strength and effect are gained, immerse the print in the acid bath as in the hot bath process. Prints with strong shadows may require to be floated and raised several times in order to supply sufficient platinum from the developer.

Development by Brush.

If only a few prints are to be developed, it is more economical to mix a small quantity of developer and apply with a broad camel-hair brush. The brush must be well wetted with developer, and used with a rapid motion, and it must be redipped after every second stroke. Commence the strokes at one edge of the print and let each overlap the previous one. Immediately the print is covered, give another series of strokes at right angles to the first. The treatment with the acid baths and the subsequent washing is exactly the same as described in the hot bath process. For more minute details in the working I must refer you to the instructions sent out with the different papers.

In conclusion, I would strongly advise all amateurs who aim at producing really artistic results to try platinotype. The practical working of it is much more simple and more quickly accomplished than any other method of printing. There is no toning bath to get out of order and obstinately refuse to impart to your prints any other tone than a nasty brick red; no hypo to be eliminated only by long, continuous washing; and last, but not least in value, is the knowledge that your pictures, when made, will not be liable to fade and do you discredit, but will be things of beauty, practically, for ever.

W. C. Beetham.

PHOTOGRAPHIC THEORISING.

It has not been a very long time since we devoted a little space in our columns to the matter of scientific *versus* photographic education, and spoke of the different ways in which our art was studied by the practical photographic operator and the theoretical man of science.

The gist of what we then said was that the photographer, as a general rule, trained himself to the producing of certain results with his chemicals, and did not stop to theorise upon the matter, while the scientifically educated amateur was too apt to neglect the practical parts of the art for the sake of visionary speculations.

The old conflict of theory *versus* practice is seen every day in an art like photography. We constantly meet with photographers who make excellent work, and yet are so ignorant of the principles involved in the production of the said work, that it seems wonderful they should be favoured with so fair a share of success. And it is no less wonderful, on the other hand, that men who have been blessed with every opportunity of acquiring a fine scientific education should so often be wanting when they take up an art as practical in its nature as photography.

Our attention has been recalled to this matter by some curious assertions made by an English traveller upon the subject of exposure. The man was highly educated, as his whole style as an author proves. He undertook a voyage around the world for the purpose of making meteorological and photographic observations, and in numerous instances has succeeded well in the photographic portion of the work. We cannot speak of the other part. But on reading over his experiences, which are always interesting and well told, we see that he has fallen into just such an error as we might expect from one who had busied himself with the exactitudes of meteorological science rather than with the every-day routine of photography.

Let us relate this error in his own words. He says: "At Yokohama I at last found time to have the photographs developed, and the result brought forcibly home the well-known fact that photography is very slow in the tropics, although the light is strong and bright. Few, of which the exposure had been so long that a cap could be used, were underdone, as I had taken care to give plenty of time; but all attempts at instantaneous photography with a snap shutter failed, with one exception, from under-exposure. The reason is undoubtedly to be found in the enormous absorption of the sun's chemical rays by the large amount of vapour ever present in tropical air. The spectroscope shows this partly by the thickness and darkness of the rain lines near D, and of the alpha and *a* lines, all in the yellow and red; but curiously enough, there is very little apparent difference in the appearance of the blue end of the spectrum. In cloud photography the best results are not got either near the equator or the pole, but in middle latitudes; and the greatest rapidity is certainly found in the same countries as those in which the best clouds are taken. In northern climates there is the weak power of a low sun to contend against, as well as the effects of haze and fog; while near the equator the absorbent power of water vapour often makes the expoure too long for successful instantaneous photography. A cubic foot of air in Colorado will often contain twelve grains of water vapour, while the same volume of air in Italy will not hold more than two or three grains of the same water stuff."

How true the facts above quoted are, in all except the photographic sense!

It used to be said of a man starting to circumnavigate the globe that he

was a bold man; but to our minds he is a much bolder one who will attempt thus roughly to reduce photographic exposure to a fixed unit, so to speak, and overlook the allowances that have to be made for the variations in character of subject and in behaviour of chemicals at different times. This alone would be enough; we say nothing of the variations that would have to be expected in the sensitive plates.

Again, it is undoubtedly true that the light of tropical regions is very strong—crude, indeed. But did it ever occur to those who photograph in these regions that such intense direct sunlight casts shadows which are correspondingly dark and crude? Did it ever occur to them that fearing over-exposure from the brilliancy of the high lights, they were in reality *underexposing* the shadows? The old photographic maxim, "Expose for the shadows, and the lights will take care of themselves," is quite as true at the present day as it ever was.

But this is not all. The complaint is made that it was instantaneous exposures, or "snap-shots," that failed. Can it really be possible for a man to suppose his exposure properly regulated in point of chemical effect when he "snaps" indiscriminately at any and every kind of subject? Whether it be a view made from the vessel's deck close in shore on dark buildings and forests, or a view of a ship with her sails brilliantly lighted in the sun in mid ocean, and suppose the same lens, same stop, same drop, and same plate would be used, and then instead of ascribing the failures to their true causes, we should have spectroscopic and meteorological reasons pleaded in behalf of this or that theory as to why the failures occurred.

The old saw, "practice makes perfect," if laid to heart by those who try to reduce the exposures of photographic plates to a scientific system, would be worth a vast deal of theorising.

Before the introduction of dry-plates, when the whole paraphernalia for wet collodion had to be carried to the field and the plates developed on the spot, it was much easier to tell exactly whether the plate had been accurately timed or not. Taking an average, commonplace subject, such, let us say, as a light-coloured stone house, with trees pretty close to it, a good operator used to find that the exposures would be fairly constant, whether the said house was in Philadelphia, Cochin China, or Iceland. The amount of watery vapour present in the air was not taken into consideration, neither were the Fraunhofer lines of the spectroscope. The operator of these days knew that he must be perfectly familiar with his lens, and be able to reckon what time to give the plate with a certain stop. He also had to know the sensitiveness of his collodion and silver bath, and reckon from these known quantities how strong the developer should be. Complicated as these points may seem to the modern amateur, it was possible to go about one's work on the average subject quoted above with great certainty. Many operators of the present day, like the one we have been speaking about, seem to think more of spectroscope and meteorological charts than of the known sensitiveness of their chemicals and plates.

The training of the eye, or the acquiring of photographic vision, to put it in other words, could not have claimed any great share of attention in the case we have quoted. To return for a moment to our example of the wet collodion operator: an important part of his business was to so train his sight that he could *estimate exposures*; and to make any progress in this direction, he had to study the colour and light and shadow existing in his subjects; this being done, the right use of the chemicals was a comparatively easy matter. But the amateur of to-day begins by disregarding everything like a consideration of dark or light subjects—of average ones like the house with trees, or of unusual ones like white buildings in a glaring sun, with dark cypress trees in the foreground, or, on the other hand, like cottages in parks in northern climates, where the foliage is dark and heavy, and casts a non-actinic gloom over the objects below, which are often brown and green in colour, and require exceedingly long exposures.

We might go on *ad nauseam* to give examples of subjects differing in their chemical actinism. But we hope that we have said enough to set those of our readers to thinking a little who might suppose that photographic exposures could be reduced to a fixed rule. An assertion that instantaneous exposures in tropical regions fail from undertiming, and that the cause is to be looked for in the large quantity of water in the atmosphere, as proved by the spectroscope, is very misleading to the practical photographer, and, let us add, highly unscientific. As we have been saying, if photographic timing could be made a fixed or mechanical matter, there might be an opportunity for a consideration of these other branches of enquiry.

A trip around the world with the photographic camera, and with or without spectroscope and charts to a very delightful thing. We hope that a good number of our readers may be fortunate enough to make such an one; those who cannot will find much entertainment in reading the Hon. Ralph Abercromby's book, entitled *Seas and Skies in Many Latitudes*, which is the work we refer to. There are many things said in it well worthy of being remembered, but we advise all who read it to forget the ideas advanced by the author on photographic exposures.

—*American Journal of Photography.* ELLERSLIE WALLACE.

REMARKS ON THE AUTOGLYPHIC OR HALF-TONE ENGRAVING PROCESS.

YESTERDAY, as I sat in a restaurant, in company with some friends at our midday meal, a peddler entered the room, and, catching the crowd in a spirit of unusual hilarity, he was permitted to display his wares. From a paper-covered bundle that was swung over his arm he slipped out a number of prints, which he vaunted as "steel-engraving photographs," a term that naturally very much amused me, posted as I supposed myself to be in the ins and outs of the graphic arts, and particularly in the mysteries of photographic processes.

The prints were lithographic reproductions of steel engravings, including a number of well-known pictures by German and French artists, reproduced by what was probably some modification of the anastatic process, and printed in all likelihood from zinc. Five cents apiece was the price for the pictures on 18 × 22 paper of good weight and quality, and out of that five cents the "fakir" and the jobber, the printer and the paper manufacturer, had each to make a profit.

One of our party, having in mere sport bought a pair representing Rideaux's "Fishing" and "Hunting" scenes, presented the prints to me, and on my saying laughingly that I would find it embarrassing to throw them away, and doubly so to carry them home, he remarked more soberly that their cheapness didn't detract from their beauty, and that twenty-five years ago they would have been worth five dollars each, and would have found a place on the parlour walls of men richer than any of our party. That was true, and its significance, while well calculated to "point a moral and adorn a tale," may yet more signally serve as an index of the marvellous advances latterly accomplished in this field of combined industry and art. Great as has been the development of every feature of our modern life, it is impossible to revert to any single direction of human effort which has done so much towards raising the masses to the culture-level of the classes as the achievements of science in the domain of the graphic arts.

Just fifty years ago Daguerre's discovery was published to the world, and in the same year Mungo Ponton recorded the first notice of the light-sensitive properties of chromic compounds. Twenty-five years later the germs of the collotypic processes were just being hatched out, and to-day the brood of photographic, collotypic, and chemi-glyphic processes has become so numerous that only a special committee of some future pan-graphic convention will ever manage to get their very names untangled.

Latest, and perhaps the greatest, amidst this fast increasing legion of accomplished facts is the "half-tone," the "cross-line," or, as I proposed some years ago to term it, the "autoglyphic" process. Autographs of the original subjects in engraved form these pictures are—"autoglyphs" in the fullest sense of the word, and hence the name. Numerous other methods produce "half-tones;" these autoglyphs can be made with grain or stipple as well as "cross-line." To term them the "Jonestype," the "Browntype," or the "Smithtype" process would be absurd in view of their history, and, therefore, it is desirable that some sensible generic term be chosen by which to designate this new achievement in the graphic arts. I am not unaware of Meissenbach's deserts in connexion with the development of these newest methods of graphic reproduction, and am cognisant of much, at least, of what has been accomplished in the same direction by others on both sides of the Atlantic. It is, however, too early in point of time and too late in point of my allotted space to permit an historical disquisition of the subject.

To those practically interested in its application, a few words regarding its technics may be of moment. The screen of alternate opaque and transparent lines may be used over the picture to be copied outside the camera, or in the plate holder, close to the sensitive plate. The picture may be copied directly by reflected light, or a diapositive of it can be prepared and the lined negative produced from it by transmitted light. The latter procedure is preferable for quality of result, the former for rapidity of execution and saving of labour. The important prerequisite to quality in either case is a perfect line screen. A photographic copy of a line "tint" reduced from a coarse ruled original to such a degree that the lines of the screen number from 110 to 140 to the inch is the simplest screen that can be devised; but simple as this

procedure appears, the process is very difficult in practice, by reason of the fact that the slightest variations from perfect regularity of the alternate lines and spaces become accentuated in the copy, and increasingly so in proportion to the degree of reduction. Hence, in advanced practice, a line screen ruled with the requisite number of lines directly in a ruling machine of proper construction is found to be necessary. The first requisite of such a ruling machine is a perfect, or rather a "perfected" screw. A *perfect* screw is almost an ideality; there have been constructed a few that approached pretty nearly complete perfection, to be used for ruling micrometric scales, and more especially for ruling diffraction gratings; but the screw for ruling an autoglyphic screen-plate will be sufficiently accurate when ordinarily perfected. This is accomplished by grinding a lathe-cut screw with a long segmented nut until all variations of pitch have been practically eliminated.

The most perfect line screens that I have thus far devised are made by ruling a tint on a piece of thin mirror-glass through a film of wax, and then etching the glass with hydrofluoric acid. Printing ink is then rubbed into the etched lines, and the result is a screen of perfectly opaque and transparent lines, clearly and sharply defined. The screens produce by far the most satisfactory results as compared with any obtained photographically. I have projected the making of an optically perfect sieve of cross-lines by making an electrolytic deposit on the etched depressions of a cross-lined plate, prepared as above noted, which would give the opaque lines without the diffracting or reflecting effects of the glass screens, but have thus far not had the time to carry this design into execution, and am not altogether assured that the gain in result would compensate the effort.

The development of the autoglyphic process is manifestly destined to mark a more important era in the progress of the graphic arts than any other method of graphic reproduction since the inception of photography itself. Its influence in the dissemination of intelligence is already making itself felt in the pages of standard and current publications everywhere, and its value as an adjunct in raising the standard of art culture and of artistic appreciation is commensurate with its almost limitless possibilities. It is the graphic method of the future, combining, as it does, in a higher degree than any other, the illustrative and the æsthetic elements of art.

LOUIS EDWARD LEVY.

—*American Annual of Photography.*

LITHO-HELIOGRAVURE.

RECENTLY, writes Ottomar Volkmer in the *American Annual*, I have had an opportunity to see in the offices of the Dutch general-staff at the Hague a peculiar method of lithography, upon which is based a process of litho-heliogravure, invented by Director Charles Eckstein. With it half-tone reproductions from original photographs are printed in monochrome, or if desired in colour by one process of printing.

A very carefully and accurately made line or ruled stone is the basis of the method. In the first place, a lithographic stone of superior quality is polished with oxalic acid and water, and then coated uniformly with a very thin asphaltum solution, composed of five parts asphaltum, six parts of white wax, and six parts of stearic acid to which, while boiling, is added two parts of soda solution. This tolerably hard compound is then dissolved in spirits of turpentine, filtered, and kept in well-stoppered bottles. By pouring a sufficient amount of the solution upon the centre of the stone, and by distributing it evenly all over by means of a lithographic ink roller, a very thin film of light-brown colour is produced With the ruling machine and the very fine point of a diamond very fine, parallel lines are then so closely drawn over the whole surface that the stone's surface will apparently present one single tone. Eight of these lines occupy the space of one millimetre. A border of wax half a cm. in height is then fastened around the edges of the stone preparatory to etching. To do so the stone is placed in a tray of sufficient dimensions, set horizontally with the aid of a spirit level and fastened down with screws. The first etching solution, previously prepared, consists of 0·10 parts of chemically pure nitric acid, six parts of 36 deg. alcohol, and 35 parts of distilled water. It must be poured over the stone with one sweep, and allowed to act for just one half of a minute, after which the stone is washed rapidly, dried, oiled, and the asphaltum washed away with spirits of turpentine. The stone, when rolled in with colour, is then ready for making transfers and forms the so-called mother-stone (*Mutter Rasterstein.*)

Transfers can now be made, according as the character of the original photograph to be reproduced may demand, either in parallel lines direct from the original stone, or by repeated transferring and crossing of the original lines, once, twice, three, or four times. The latter produces a star-like grain, well adapted for litho-heliogravure work. To transfer the line-work, a well-polished stone is prepared with asphaltum solution and work continued in the following manner:—In the first place a print of the mother-stone must be made upon transfer paper, then slightly moistened on its reverse side, squeegeed upon the surface of the polished stone, and when partly dry, be subjected to the action of warm water, when the paper will come off and leave the line transfer upon the plate. After washing well with water, a second transfer, with its lines crossing those of the first in right angles can then be made, forming thus the so-called hatching of lines, or the manipulation be repeated, each additional transfer crossing the lines of the first in more or less acute angles. Finally the transfer is dusted in with fine collophonium powder, any surplus of it removed with a camel-hair brush, and the collophonium melted on to the transfer with ether.

The next step in producing a litho-heliogravure is to make from a clear and well-defined photographic negative a diapositive on pigment paper, sensitised with potassium bichromate, and with an exposure to light of from ten to thirty minutes. The positive print is then slightly moistened with cold water, and with the pigment side down squeegeed upon the lined stone; then in a suitable trough treated with warm water, of from 40 to 45 deg. C., when after the expiration of about five minutes the paper begins to loosen, and can then be lifted off. By constantly rocking the stone, and allowing warm water to run over it to and fro, the carbon print develops and stands out clear and bright. It is a negative copy. The stone must then be dried spontaneously with great care, which requires from five to six hours, at the expiration of which time it is ready for etching.

The etching fluid is ferric chloride of different concentration, 40, 37, 33, and 30 deg. Beaumé, respectively. Etching is commenced with the 40 deg. solution. The ferric chloride attacks first the portions of the thin but hard pigment film still remaining, dissolves it, and finds way to the openings between the lines, eats into the stone and produces the deepest parts of the gravure. The action upon the thicker portions of the pigment film is slower, but that also yields, and the etching continues for awhile, but with less force and rapidity.

Practice and a well-educated eye determines when and in what succession the etching fluid in different strengths should be employed. The 30 deg. solution naturally is used last of all, and the large amount of water is capable of dissolving the whole of the pigment film still remaining. As soon as the required depth of etching and the desired character is attained, the stone is removed to a trough and thoroughly washed under a spray of water. The surface is then flowed with spirits of turpentine to wash away the asphaltum, washed again in water several times, and dried finally either in the sun or by the ordinary temperature of a room. The lines are now deeply etched on the stone.

The etching is then oiled, inked, and treated otherwise as required by lithogravure methods. If it is desired to print from a heliographic stone proofs in more than one colour, the whole of it is first tamponed with a local or general tone, grey, violet, or brown, as the character of the picture may demand, and by marking out the respective portions of its single colours tamponed upon the ground tone. A very slight touch with a tampon will deposit a sufficient amount of pigment. If all the different colours have been applied a print can at once be made.

The results are really very fine, and the colour effect is astonishing.

Herr Director Eckstein exhibited such prints in Paris, and earned universal approbation and the acknowledgments of connoisseurs.

NOTES FROM NEWCASTLE.

WE are having most miserable weather here, about one fine day in fourteen, and, strange to say, the sale of demon and other "detectives" is almost as brisk as in the summer season, so I am informed by a photographer dealer in town, and I have no reason to doubt the statement. This seems to me one of those things "no fellow can understand," but I suppose it's all right for the traders.

Mr. W. D. Welford, of Birmingham, has been visiting Newcastle during this late festive season. Mr. Welford, himself *un littérateur*, is a member of a well-known literary family resident at Gosforth, near Newcastle. Mr. Welford, who delivered a couple of lectures during his stay with limelight illustrations, is a capital lecturer. One of these lectures, entitled a *Day with a Detective Camera*, was a great success; but I am afraid the pictures shown would not be much encouragement for any one to "go in" for a detective.

Mr. Auty, of Tynemouth, the well-known landscape and marine photographer, whose name has appeared with more or less success at every exhibition of importance in recent years, has taken a partner, with the new year, in the person of Mr. Richard E. Ruddock, formerly with Messrs. W. & D. Downey, of London, and who has been Mr. Auty's chief

operator and retoucher during the past five years. Mr. Auty's studio is one of the best in or out of London, and is one of the few "built entirely for the purpose," not a converted attic, barn, or outhouse. A fine show and reception room opens out into a conservatory, thence to the studio a well-lighted room, having a length of over forty feet; two dressing rooms are provided, and there are a couple of dark rooms also—all on the ground floor. Above, there are office, work, and store rooms, retoucher's *atelier*, &c., and also above, occupying nearly all the remaining space, is the printer's domain, with ample room for a large and increasing output and enlarging and sensitising rooms.

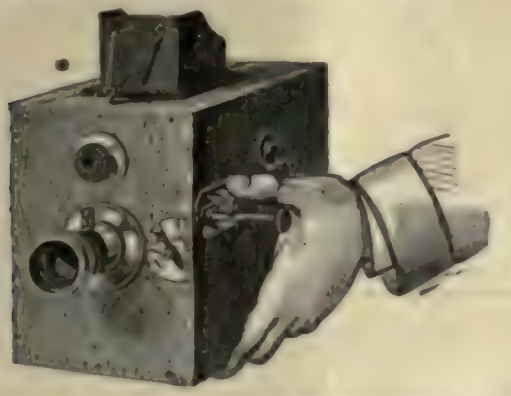
The Newcastle Society's Exhibition is, I hear, making satisfactory progress, and in a few days prospectuses will be in the hands of exhibitors. There will be the usual inducements in the form of medals and well-arranged classes, and the Judges chosen will, I am sure, give every satisfaction. I believe Messrs. Barkas & Son are anxious to have a show at the same time of apparatus and photo-mechanical productions. I hope they will be successful, as we have hitherto had no exhibition of this kind that I am aware of; at the same time I think the Society did well not to touch this branch.

From a prospectus of the Chemists' and Assistants' Association, I see Mr. Pike's name down for a paper on *Photo-Micrographs with Limelight Illustrations*, in February. D. D.

NOVELTIES IN APPARATUS FOR 1890.

Some of our London manufacturers and supply firms are already bestirring themselves in the way of preparing novelties to introduce and push during the forthcoming season, which it is anticipated will be one of unusual prosperity.

Among these the London Stereoscopic and Photographic Company, Limited, has just completed a camera; the chief features have been secured by patent in a series of styles and sizes deserving special notice. It is designated the "Artist's" hand camera, the external appearance of which, when about to be discharged, is shown in the cut.



On examining this camera we discover that compactness is a primary feature, that for quarter plates measuring five inches in breadth, five and three-quarter inches in depth, and six and a half inches in height. Inside of these dimensions are contained three double dark slides, the lens, and a rather large finder. The dark shutter slide draws downwards, which is, we think, a valuable feature, because if there does happen to be a leakage of light, that radiated from the ground is so feeble as not to do much harm. The slides of this camera are adapted for either glass plates or films. The lens shutter is cleverly constructed, and is suitable for either time or instantaneous exposures. The Artist's camera is made in three sizes, viz., quarter plate, five by four, and half-plate.

We were shown a finely finished camera of the class described, a facsimile of one which had been made as a species of Christmas gift (for some admirer either of the camera or the lady) to H.R.H. the Princess of Wales, a lady the very mention of whose name warms the heart of every one connected with photography. It was in Russia leather, and no brass was left uncoated with gold.

In the finders of these cameras we observed that the cap plate of the ground glass on the top was protected by a cover, which folded flat down to protect the ground glass, but which, when liberated by a touch upon a button, instantly rose up, being impelled thereto by a spring. The Artist camera is made in several sizes and various forms, the same general idea of construction pervading them all.

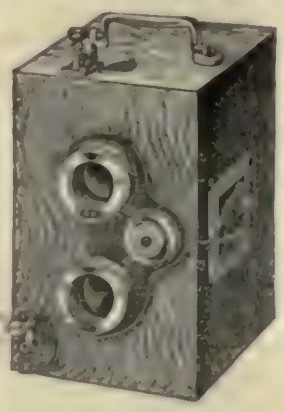
The "Twin" Artist is made for 5×4 plates, and has two lenses exactly alike. Both are actuated by one rack and pinion, and the images on the finder and on the sensitive plate are identical. The artist has merely to keep his eyes on the ground glass, a thumb and finger on the focussing arrangement, and a spare thumb on the trigger, and when the auspicious moment arrives, and he sees that everything is composed aright and as sharp as he desires it to be, he presses the trigger, and all is over.

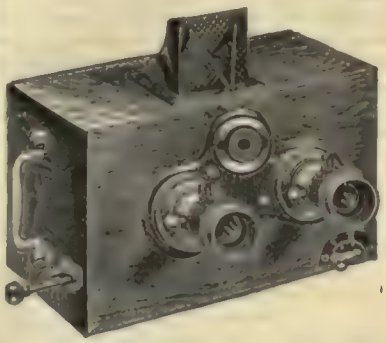
The "Dispatch" detective is either a Detective or a Dispatch. We show it both closed and opened. Objection has frequently been taken to the so-called Detective cameras being so palpably a camera to even an ordinary observer that the word "Detective" was a misnomer. The Company, knowing this, have carefully striven to make the "Dispatch" Detective Camera as much like a dispatch case and as little like a camera as possible. Lens, shutters, and slides are all inside and *hidden from view*, as will be seen in the diagram the shutter being set and released by the pressure of a small button on the outside. The camera is fitted with two capital finders for vertical and horizontal pictures, and the dark slides are so arranged that with ordinary care it is impossible to expose the same plate twice. The box containing the camera is most neatly covered with dark green Russia leather, and opens and shuts with an automatic lock, so that it is quite safe. The shutter is easily regulated for various speeds, from one second to one-one-hundredth of a second, by means of turning a small screw at the top, and the focus is regulated for various distances in the same manner by a button at the side.





We have a very strong regard for binocular cameras, and hence we have a sympathetic affection for an "Artist" stereoscopic hand camera introduced by the Company, of which we give two views, one when the instrument is being carried in the hand and the other when set up for action. It is worked in the same way as the others; indeed, the same leading idea pervades all the cameras here noticed. Efficiency and portability combined are their characteristics.





STEREOSCOPIC PHOTOGRAPHY.

Perhaps it may not be generally known among photographers of the present day that a camera with two lenses, or a twin-lens camera, as the proper technical phrase goes, is not absolutely necessary for the making of stereoscopic photographs. Two pictures must indeed be made, and the two, moreover, must not be made from the same standpoint. It might be asked, then, whether a single lens could do the work by throwing the image on the right and the left sides of an oblong plate in succession. We should answer that this is not only possible, but that in many cases results superior to anything that the twin-lens camera could perform would be obtained. This is because the single-lens apparatus admits of any required interval of separation for the two halves of the picture;

while in the twin-lens camera, as usually seen, the interval (represented, of course, by the centres of the lenses) is fixed, thereby necessitating that all subjects indiscriminately, whether distant or near, be photographed with the lenses standing at the same fixed distance from each other.

Before proceeding farther, let us say that a single-lens camera can never be used for making instantaneous views of moving bodies, inasmuch as the very nature of the work requires that the exposures of the twin pictures be made at the same moment of time.

It is true that single lens stereoscopic cameras are now almost obsolete, but it is also true that views where much distance is included have not been improved by the use of the twin-lens camera, because the separation between the centres of the lenses is not sufficient to give effective relief in the finished picture. Just as the perception of solid objects and distances depends upon the conjoined action of our two eyes, which are separated by an interval of, say, two and a half inches, so the apparent relief in the stereoscopic slide depends upon a proper interval of separation between the lenses. And practice has proven that the greater the distance at which the subject stands from the camera the greater must be the distance between the lenses.

Ingenious theories have been advanced to prove that the lenses of a stereoscopic camera should be separated by the same distance as the human eyes, but the practical proof that these ideas are false will soon be seen by the following experiment:—Photograph a large ball, say a foot in size, with a twin lens camera, at a distance of four feet, with the lenses separated two and a half inches, which is a fair average for the separation of the eyes. Now photograph a range of mountains twelve or fifteen miles away with the same outfit, taking care not to include objects very close in the foreground. It will at once be seen, when the views are placed in the stereoscope, that the ball is distorted so as to look like a cylinder with its end towards the observer, while the mountain view presents so little of the characteristic relief of the stereoscope that it might almost as well have been made with a single lens on a single plate.

In other words, then, the amount of stereoscopic relief in the stereoscopic picture depends partly upon the distance of the subject from the camera, and partly upon the separation distance of the lenses. The greater the distance of the subject from the camera, the greater ought to be the interval of separation between the lenses, or what amounts to the same thing, between the points from which the twin views are taken.

In the earlier days of landscape photography, views were taken almost exclusively with the single-lens camera. An oblong plate holder was used, and the camera was shifted from side to side between the two exposures. The top of the tripod was arranged like a small table, with a scale of inches marked off from left to right, and a thumbscrew attachment for clamping the camera firmly at any desired point of the table. The manipulations were quickly and easily done. The plate being prepared and the view focussed, the holder was set in the camera so that the *right* side of the plate was exposed, the camera being at the *left-hand* side of the table. The exposure being finished, the camera was shifted over to the right side, and the left side of the plate exposed by shifting the holder also. This gave a negative that needed no cutting apart and transposition of the two sides, but which, when finished, was ready for the printer.

In the course of our articles written in this journal for the improvement and entertainment of our readers, we have frequently mentioned the albumen transparencies made by the late M. Ferrier, of Paris. We have always stated that their quality was unsurpassed; indeed, that they might be called classical models of the photographer's art. We refer to them again, in order to say that the collection included a large number of stereoscopic transparencies of distant landscapes, which were made with the wide interval of separation just spoken of. No other arrangement of the apparatus could have given the fine relief and beautiful succession of receding planes of distance.

A point in favour of this single-lens apparatus is its cheapness and simplicity. The most modest 5×4 inch camera, with a cheap single meniscus view-lens, could be made to do good work, and if an oblong plate holder for the 8×5 inch plate could not be had, the two 5×4 inch plates, in an ordinary double holder, could be exposed in succession. In selecting the view, the position of some prominent object at or near the centre of the plate should be noted, so that, when the camera is shifted to the other side, the same object shall come upon the same point of the plate.

Everybody who has worked stereoscopic photography knows that the print from the negative made by a twin-lens camera must be cut through the middle and the sides transposed in mounting. If this were not done, the picture would present the paradoxical appearance of the distant objects being nearer at hand than the near ones themselves. This curious effect has been called pseudoscopic.

The labour involved in trimming and mounting stereoscopic prints is considerable, and if the work be done commercially, adds a good deal to the cost. It can be avoided by cutting the original negative and transposing the two halves, but great care must be taken to bring the centres of the twin pictures at the proper distance from each other laterally, as well as precisely equidistant from the bottom or base line. For instance, if the centre point of one of the twin negatives were a quarter or three-eighths of an inch higher than the other, the pictures could not be made to combine well when viewed in the stereoscope. Complaints would then be made that it was a strain upon the eyes to look at them.

Now, supposing the negatives to be made on paper or on films, the accurate adjustment spoken of will be an easy matter. But if made on glass plates, where the diamond has to be used for cutting, the risk of damage to the negative is very great indeed. Not only is this true on account of the skill required in handling the diamond, but also because, when a finished negative is cut through the back, the gelatine film is very apt to tear or lift itself up from the glass at the line of incision. A gentleman of much experience informs us that it is not his custom to cut original negatives in this manner, but to reproduce them on glass and cut the duplicates, if the number of prints desired makes it worth while. Amateurs would do well to observe the same caution with valuable negatives.

—*American Journal of Photography.* ELLERSLIE WALLACE.

Foreign Notes and News.

SOMETIME ago the French photographer, Nadar, supplemented an interview with the celebrated old Chevreul, then in his hundredth year, by the employment of the photographic camera, a number of photographs of the old *savant* being taken at short intervals during the conversation. The *Figaro* has recently adopted a similar plan in interviewing General Boulanger. An interviewer, reinforced by an instantaneous photographer, was despatched to Jersey to fix for posterity, not only the words of "the brave General," but also the varying gestures and expressions for which he appears to be famous. The result is to supply an article illustrated by a variety of views of the General in all possible poses—in profile, in full, now standing, now sitting, at times benevolently smiling, gazing enrapturingly towards heaven, or angry and threatening—presumably when alluding to his, for the present, successful enemies. One is thus presented with an accurate idea of exactly how he sits at his desk; how he smokes a cigar—a sight which those who were present at the Boulangist banquet last summer will remember only too well, and without the assistance of a photograph; how he shakes the reporter's hand—a ceremony which less magnanimous individuals when interviewed are often sorely tempted to omit: in fine, one beholds Boulanger exactly as he lives, moves, and has his being—when on show. Were English journalists and photographers to combine in a similar way, the dreary interviews with which especially the evening papers take a delight in reducing their unfortunate readers to the verge of despair might be rendered more lively, and as a new field would be opened to the professional photographer, his relations with his amateur colleague, which at present seem somewhat strained, would, perhaps, grow sweeter.

IT would seem from the German photographic journals that a scarcity of beechwood for engraving purposes is impending, at any rate in that country, Turkish beech being now almost unprocurable, and Persian having risen enormously in price. West Indian beech has been recommended as a substitute, and it is favourably characterised by the great girth of the trees in comparison with European wood of the same kind. The price seems to run about 12*s.* per cwt.

ANOTHER culling from Liesegang is the following developer recommended for flash-light negatives:—

A.	Pyro	30 grammes.
	Ammonium bromide	15 ,,
	Distilled water	240 c.cm.
	Nitric acid	3 drops.
B.	Ammonia solution	30 c.cm.
	Water	210 ,,

C. Dilute 30 c.cm. of solution A with 600 c.cm. of water.

D. Dilute 30 c.cm. of solution B with 450 c.cm. of water.

For developing, employ a mixture of equal parts of C and D, but first pour solution D alone over the plate.

A NEW YORK photographer has invented an amusing way of taking the change out of customers who, having been photographed, never reappear to pay for or claim their *cartes*. He advertises that all such photographs are to be sold at a low price to the trade for furnishing their windows as

sample pictures. It is well to know that such exhibition is regarded in America as a punishment. In this country there are, we fear, places where the result would be just the opposite of that intended. We know a seaside town—not Brighton, but near it—where the principal attraction of a leading photographer's window is the photograph of one of the *belles* of the place.

A recent number of the *Photographische Mittheilungen* contains a very interesting account of Herr Schirm's new flash-light studio. Some of the *points* of his arrangement are worth noting by persons thinking of making a similar departure. It is, of course, of importance not to place the lights too close to the *subject*. To facilitate a suitable arrangement of his lamps, of which at least three are always employed, Herr Schirm has them rigged up on rails, on which they travel backwards much after the fashion of overhead cranes, and they are at least four metres (about thirteen feet) above the floor. The lamps consist of Bunsen burners, through which magnesium powder is blown, the air required for blowing it through is brought from one large bellows by different tubes to the burners. Magnesium being rich in blue rays, ordinary plates are used, and an electro-mechanical arrangement regulates both the lamps and the exposure. The subject having been posed, the mechanism opens the shutter, then actuates the bellows which produces the light, and before the flash is over closes the shutter—a tenth of a second being the period of exposure usually employed.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,643.—"Improvements in Photographic and other Albums." L. Davis.—*Dated December 27, 1889.*

No. 20,662.—"Improvements in Sensitising and Developing Chloride of Silver for Photographic Purposes." W. H. Caldwell.—*Dated December 28, 1889.*

No. 20,669.—"Improvements in Miniature Photographs and in the Method of Producing the same." W. H. Bath.—*Dated December 24, 1889.*

No. 20,708.—"Automatic Coin-freed Apparatus for the Taking, Developing, and Delivering of Photographs." E. J. Ball.—*Dated December 24, 1889.*

No. 26.—"An Improved Focussing Appliance." R. W. Thomas and L. Isaac.—*Dated January 1, 1890.*

No. 52.—"Strangman's Camera Stand." L. G. Strangman.—*Dated January 2, 1890.*

No. 82.—"A New or Improved Carriery for Supporting Magnesium Flash Lamps used for Photographic Purposes." R. Slingsby.—*Dated January 2, 1890.*

No. 151.—"A New or Improved Appliance to be Used in connexion with the Developing of Photographic Negatives and certain other Photographic Operations." J. B. Brooks.—*Dated January 4, 1890.*

No. 166.—"An Improved Method of Having Rapidly Extended a Bellows-form Photographic Camera, Dispensing entirely with a Baseboard." A. L. Jones.—*Dated January 4, 1890.*

No. 173.—"Improvements in Apparatus for Holding and Exhibiting Photographs and other like Views." F. Kitto.—*Dated January 4, 1890.*

PATENTS COMPLETED.

Improvements in the Production of Films Sensitive to Light, and of Materials for Assisting or Continuing the Effect of Light on Photographic Films.

No. 741. Alexander Ferdinand York Schwartz and Dr. Friedrich Hermann Mecklin, Hanover, Germany.—*November 20, 1889.*

The energetic reducing action of the form-aldehyde may lead to the supposition that an alkaline solution of the same would be suitable for developing the latent image of a photographic film, or for promoting and continuing the decomposition of the chloride, bromide, and iodide molecules commenced by the effect of light; that is to say, for increasing the sensitiveness of a film treated with the solution, or for intensifying the effect of light after exposure, in such a manner that the subsequent development produces a larger reduction of silver than what would correspond to the quantity and intensity of the light that has acted on the film.

Experiments have confirmed this supposition, and have furthermore demonstrated that the compounds of the form-aldehyde, which may be considered as salts of an oxymethyl-sulphonic acid, that is, the compounds which are produced by the direct combination of the form-aldehyde with the acid sulphites of the alkalies, ammonium and other bases, possess similar properties.

These last-mentioned compounds of the acid sulphites of the alkalies and of ammonia with the form-aldehyde can easily be produced in a pure condition, but it is difficult, if not impossible, to produce by this method the compounds of oxymethyl-sulphonic acid with the other metals and with the organic bases, among which those of silver, of iron, and of the hydroxylamine, are likewise important from a photographic point of view.

We have found, however, that the oxymethyl-sulphonic acid itself can be obtained by submitting sulphurous acid to the so-called trioxymethylene or to some other condensed para-form-aldehyde in solution or in suspension.

The sulphurous acid is absorbed in large quantities, forming a strong developing agent if heat, and the liquid is a strongly acid liquid, which dissolves iron and zinc while energetically developing hydrogen. In the presence of metallic oxides and carbonates, organic bases and ammonia, this liquid acts like a strong mineral acid.

In the manner described, it is possible to produce all oxymethyl-sulphonates of the metals and of the organic bases by simply causing the acid to act on the metals and free organic bases, or upon those compounds of metals and of organic bases which are decomposable by the said acid, while forming the desired salts.

For photographic purposes, the following bodies have been found specially suitable:—

1. The form-aldehyde and the para-form-aldehyde.
2. The oxymethyl-sulphonates of the alkalies.
3. The ferrous oxymethyl-sulphonate and its double salts with the salts named under (2).
4. The silver oxymethyl-sulphonate and its combinations with the salts mentioned under (2).
5. The hydroxylamine-oxymethyl-sulphonate.

The discoveries described above are utilised for photographic purposes in the following manner:—

I. If in the preparation of a photographic film by the emulsion method silver-oxymethyl-sulphonate (which is also soluble in alcohol), or a compound of the silver-oxymethyl-sulphonate with the oxymethyl-sulphonate of an alkali or of ammonia, or the oxymethyl-sulphonate of an alkali or of ammonia, or a mixture of the said bodies, is added to the finished emulsion in the proportion of one to two parts of the said oxymethyl-sulphonate or mixture to one hundred parts of the halogen silver contained in the emulsion; or if the said addition is made before the ripening of the emulsion; or if in the preparation of photographic films by the processes in which the film impregnated with metallic chloride, bromide, or iodide, is dipped into a silver bath, we add silver-oxymethyl-sulphonate, or a double compound of the silver-oxymethyl-sulphonate with the oxymethyl-sulphonate of an alkali or of ammonia, we obtain photographic films which are more sensitive to light (even to weak light) than the films prepared by the ordinary methods.

II. If an ordinary dry plate is bathed before exposure in a neutral aqueous solution containing from 0·1 to 0·2 per cent. of the silver compounds mentioned under I. for a period of half to three minutes, according to its sensitiveness, or in an equally diluted aqueous and slightly alkaline solution of the form-aldehyde or of the para-form-aldehyde, or of the oxymethyl-sulphonate of an alkali or of ammonia, or of a mixture of these salts, and if the plate is then slightly rinsed and again dried, the photographic results are similar to those obtained if the films have been treated by method I.

Instead of bathing the dry plate before exposure, it may be bathed after exposure. Or, instead of applying the said compounds in the shape of a special bath, a few drops of a neutral one per cent. solution of the alkali, or of the ammonia-oxymethyl-sulphonate, or of their mixtures, may be added to one of the usual developing mixtures.

III. If the ferrous oxalate developer is prepared by means of the ferrous-oxymethyl-sulphonate, or, better still, by means of the combination of the same with the oxymethyl-sulphonate of an alkali or of ammonia, only about a quarter of the usual quantity of iron is necessary, in order to obtain equally good results as with the ordinary iron developer; whereby the durability or stability of the developer is increased.

IV. The oxymethyl-sulphonate of hydroxylamine in alkaline solution gives excellent results when used as a developer.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—The use of form-aldehyde, or of para-form-aldehyde, or of the compounds of form-aldehyde (which must be considered as salts of the oxymethyl-sulphonic acid), with an alkali, ammonia, iron, silver, or of a mixture or combination of the said salts either alone or in combination with other suitable substances, for the preparation of highly sensitive photographic films, and for the production of chemicals or solutions which assist or continue the effect of light on photographic films.

Improvements in Apparatus for use in Taking Photographic Pictures.

No. 494. Charles Winter, London, Middlesex.—*December 7, 1889.*

The principal object of this invention is to provide a photographic apparatus in which a number of plates or sensitised surfaces are placed in succession in position for receiving the photographic image, and are afterwards returned to a receptacle in which they are retained without opening the camera or exposing the plates or surfaces to light otherwise than in taking the picture.

According to my invention as applied to photographic purposes, I provide a suitable closed box or camera in which there is a lens provided with a shutter. Inside this camera opposite the lens is a rotary device, into which the sensitised plates or surfaces are introduced one after the other from a box, and from which rotary device they are liberated and received into another box after the picture has been taken thereon. This rotary device constitutes the "slide" of the camera, and is hereinafter referred to as the rotary slide.

The said rotary slide has one end of its axis projecting from the camera, and is provided with a milled head or other means for giving rotary movement to it. The box which contains the unexposed sensitised plates or surfaces, and the box into which the plates or surfaces are received after exposure, are situated inside the camera, preferably occupying the space above and below the lens.

The box from which the plates are supplied to the rotary slide is provided with means by which, when the rotary slide is operated, the undermost of the plates is moved from off a support and falls into a position before a slot in the box through which the plate can fall or be moved into grooves or guides for receiving it in the rotary slide. These means may consist of a piece which is operated by a projection or recess on the rotary slide, which projection or recess, when movement is given to the slide, causes the said piece to move inwards a pusher bar or the like, which dislodges the undermost plate, and causes it to take up a position in which it can leave the box and be received in the grooves or guides for it in the rotary slide. A rotary movement is then given to the slide, and thereby the sensitised side of the plate is presented in position

to receive the photographic image, and when the shutter is opened the plate or sensitised surface receives the said image, and when thereafter the shutter is closed the rotary slide has a further movement of rotation given to it, which brings the guides or grooves containing the plate into line with the box which is to receive the exposed plates. This preferably consists of a box with an opening in it to admit the plate, and provided with pushers which are operated by the rotary slide to press the plate into the box until it is received and retained under retainers, when the pushers return to their normal position. It is preferred to make the rotary slide with two sets of grooves or guides, so that when one is in line with the box from which the unexposed plates are to be discharged, the other is in line with the box into which the exposed plates are to be received. The plates may be moved from and into the boxes respectively by being caused to fall by gravity, or there may be an endless band or carrier or other device for the purpose operated by the rotary slide. The shutter may be arranged to be set either by hand or by a movement derived from the rotary slide, the movement liberating the shutter for the exposure or uncovering of the lens being actuated by hand. Thus, in the arrangement wherein there are two receptacles for plates in the rotary slide, the said slide is brought into a position to receive a plate from the box containing the unexposed plates, and in this movement a plate is brought into position for passing from the box into the rotary slide as aforesaid. When the plate is received into the rotary slide a quarter turn is given to the said slide, and the plate is then in position for exposure. After exposure a further quarter turn is given to the rotary slide when the plate which has been exposed is brought into line with the box for receiving the exposed plates, the other guides in the slide then being in position for receiving a fresh unexposed plate, and so on. The axis of the rotary slide or the head or handle by which it is operated may be provided with a catch or spring bolt engaging with retainers, so that the slide is kept in proper position, the positions being suitably marked outside the camera, so that the position of the rotary slide can be readily ascertained. The portion of the said slide upon which the plates rest when in position for exposure are made moveable, and are operated by a cam or other suitable device, so as to move free of the plate when it is to leave the rotary slide.

Although I have mentioned plates, the invention is, of course, not limited to the glass plates known as "plates" in photography, as other sensitised surfaces may be used.

A New or Improved Lamp for Photographic Work and for other Purposes.

No. 1365. William James Lancaster, Colmore-row, Birmingham.—*December* 14, 1889.

This invention relates to an improved construction and arrangement of lamps, principally for photographic work, although the same may be employed for other purposes.

The said invention consists, first, in a double reflector, viz., a primary inside reflector, and a secondary outside. Secondly, in a means of retaining or holding the said secondary reflector in an adjusted position. Thirdly, in double folding panes of ruby light, which open outwardly, and fold inwardly upon each other.

In making a lamp according to my invention, I mount a pyramidal-shaped body part upon a base or pierced support, and with the said body part surmounted by a perforated lantern or cowl, through the piercings of which the products of combustion of the lamp outwardly pass.

The open front of the lantern is enclosed by two ruby panes or lights, respectively of about the area of the said open front, and are so arranged that when in use they fold and lie flat, light-tight, one upon another.

Thus the No. 1 ruby light is hinged close to one side of the open front, and olds flat to its boundary edging, whilst the other or secondary ruby light is hinged crank-like to the other side of the said open front, and is arranged to fold over upon, and flat to the No. 1 light, as aforesaid.

To near the top of the open front, the combined reflector and lid is jointed, and moves vertically and flap-like over the ruby lights as aforesaid; so that light radiating from the lamp falls upon the reflector, which depends at an angle, and is from thence reflected downwards upon an object as may be required. This overhanging reflector is provided with a stiff joint, so that it may rest when adjusted at any angle.

The affixing after adjustment of the secondary reflector may be accomplished a forked or slotted arm, directed from the top of it, and embracing the stem a headed screw, which, when turned home, clamps the arm in the said reflector's adjusted position.

The secondary reflector also prevents the rays of light from passing upwards into the operator's eyes in developing or manipulating a photographic negative.

The purpose of the double ruby panes is that an operator can decrease or intensify the ruby light at pleasure.

The primary reflector is mounted upon and at the back of the oil tank or reservoir, which is preferably placed in position by a sliding movement; that the removal of the tank and burner, carried by it, takes away with them the said reflector.

The wick winder axis is connected to the outside by a detachable clutch arrangement, consisting of an outside milled head, whose neck passes inwardly to a clutch or fork, wherein a crutch end of the said winder axis passes when the tank is in position.

Thus, when the tank is removed, the crutch end of the winder axis is taken from the fork or clutch of the turn, and when the tank is placed in position, the winder axis and turn are as one, and rotate together.

The back of the lamp is preferably made to slope pyramidally more than the sides, and upon which said back a handle or handles is or are secured.

It may be further observed that the lid encloses the front when closed upon it, and that the primary reflector may be made detachable from the lamp, or from the tank, so as to admit of being readily cleaned.

The patentee claims:—1. Providing or enclosing the open fronts of lamps, for photographic work, with two or more ruby and orange-coloured panes or lights, which admit of being used independently, or collectively, for the purpose substantially as described and set forth. 2. Making the hinged sides of the carrying frames of ruby or orange lights, referred to in the preceding claim, stand away flange or crank-like from the sides of lamp to which they are hinged, so as to admit of the said lights folding upon each other when closed, and opening out, free of the open front of the lamp, or of the frame or frames of the inner light or lights, substantially as described and set forth. 3. Providing lamps employed in photographic work, as described, with a screen reflector jointed to the top of the lamp, and adapted to be employed as a reflector and screen when open, and as a lid for enclosing the front of the lamp and cognate parts of it when closed, substantially as described and set forth. 4. Affixing the combined screen reflector and lid in a screening and reflecting position, by means of a jointed and slotted arm and clamping screw, substantially as described and set forth. 5. Providing the interior or back inside of the lamp with an upright parabolic reflector, or an upright reflector of the figure of a parabola in cross section, substantially as described and set forth. 6. Providing lamps, as described, with open bottoms, or bottoms partially enclosed by the oil tank and a platform partition, whereby air for promoting combustion is admitted, and light from the lamp intercepted, substantially as described and set forth. 7. Operating the wick winder spindle from without by a clutch or connexion, substantially as described and set forth. 8. The construction and arrangement of the parts of lamps for photographic and other work, substantially as described and set forth.

Improvements in and in connexion with Magnesium Lamps.

No. 2727. Robert Joseph Hooper Rastrick, Southsea, Southampton.—*December* 14, 1889.

My invention relates to a type of lamps employed in the ignition of metallic magnesium, and has for its object to provide means whereby a more perfect combustion of the metal, whether in the form of powder or ribbon, is ensured than is possible with the means hitherto usually adopted.

A further object of my invention is to obtain such full control over the delivery of the magnesium to the flame as to allow of the prolongation of an intense light especially applicable for use in photographing darkened interiors of edifices and the like, as also for producing a momentary flash of short duration, such as might be employed in theatres, to represent lightning, for distant night signalling, and for other purposes.

Under one head or feature of my invention, relative to the employment of magnesium in a pulverised form, I employ a chamber for containing the powdered magnesium, which is preferably made airtight, and within which is arranged a fan or equivalent device for keeping the powder in a constant state of agitation. This chamber is connected by any convenient means with a tube, the nozzle of which passes upward through the centre of a suitable spirit, gas, or other lamp or stove, or equivalent, said nozzle occupying a position preferably exactly central with the base of the hollow cone of a flame. The object of having the nozzle of the tube disposed in the manner above described is, that air passing upwards through the centre of a flame tends to cause the flame to assume the form of an elongated cone, and any powder of a combustible nature which passes up with the air would become instantly ignited before any particles could escape beyond the influence of the flame.

To effect complete combustion of the magnesium powder, I force air, by any suitable means, into the chamber containing the powder, which latter, upon opening a tap, cock, or valve with which the chamber is provided, is forced therefrom through the hollow cone of flame, thereby producing a light of intense brilliancy, the prolongation of which is determined by the quantity of powder contained in the agitating chamber. The agitator, which may be actuated by hand, spring and train of wheels, electricity or other source of power, may have any desired motion imparted to it, such, for instance, as rotary or oscillatory.

Instead of one tube passing upwards through the lamp or equivalent, I may under some circumstances employ two or more tubes in one lamp, which may be connected with one chamber or with independent chambers, and may be used simultaneously in conjunction with each other, or independently of each other, as may be desired.

Under the second head or feature of my invention relative to the employment of magnesium ribbon, I employ a nozzle having an aperture just sufficiently large to allow of the passage therethrough of the band or ribbon of the metal, said band or ribbon being impelled from a continuous roll or coil through said nozzle by clockwork or other suitable means, the duration of said roll or coil being determined by the length or size thereof.

The claims are:—1. The improved lamp for the combustion of magnesium either in a pulverised state or in the form of a continuous band or ribbon, substantially as and for the purposes set forth. 2. In a magnesium lamp the injecting of a stream of magnesium in a pulverulent form into the interior of a flame, substantially as described. 3. The combination with a magnesium lamp of a chamber containing a fan, substantially as and for the purposes set forth and shown. 4. In combination with a magnesium lamp the employment of a blower for forcing a continuous stream of pulverised magnesium through a nozzle or jet, substantially as set forth.

Improvements in Heads for Camera Stands.

No. 18,796. James Heber Taylor, Little Trinity, Cambridge.—*December* 14, 1888.

The objects of this invention are primarily to provide a ready means, by movements of rotation only, of changing the position of a photographic camera constructed to take pictures on oblong plates from the position in which the long side is horizontal to that in which the long side is vertical, so that the camera in each position shall be in a position of stable equilibrium over, or nearly over, the centre of the tripod stand. Secondarily, to enable the camera to be directed upwards or downwards at any required angle.

The camera is attached to a block which is pivoted horizontally between the ends of two parallel bars, so as to turn freely round from one side of the bars to the other. The bars are pivoted towards their other extremities about a horizontal axis parallel to the axis of the block, these pivots being carried on a stage which is attached to or may form part of the tripod head. Short extensions of the bars beyond these last-named pivots are used for the purpose of

securing the bars when at right angles to the stage, *i.e.*, the stage being horizontal when the bars are vertical.

The bars may also be secured at any required angle or inclination by a strut jointed to the bars and made to engage with the side of the stage opposite to the pivots which connect the stage with the bars.

The stage forms a flat surface on which the camera may rest when the bars are either horizontal or vertical.

The camera when vertical or inclined can be held in a position overhanging the stage and a limiting of back focussing.

The camera may be attached to the block by a base screw of the ordinary type. By movement around the base screw the camera may be inclined upwards or downwards when the bars are vertical. A slot in the block at right angles to its axis makes the same apparatus available for different cameras not differing greatly in dimensions. Or with the same object the block may be pivoted not directly to the parallel bars, but to an inner frame which slides between the bars and is capable of being clamped at any desired point. Or sometimes I provide a dovetail projection upon the base of the camera, and parallel V guides are attached to the block at right angles to its axis of rotation, and suitable means of clamping the camera when in position are provided. The lengthening of these guides beyond the length of the side of the projection from the base of the camera makes the same piece of apparatus available for cameras differing somewhat in dimensions.

The block may have within it a turntable to which V guides are fixed.

The stage may be rigidly attached to a triangle head for the tripod stand, but by preference I attach it by a central pin which forms a vertical axis, about which the whole stage rotates as a turntable on the tripod head.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 13	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 14	Great Britain	54, Pall Mall East.
,, 14	Newcastle-on-Tyne & N. Counties	Madley at Café, Newcastle-on-Tyne.
,, 14	Derby	Society's Rooms, Derwent-buildings.
,, 14	Bradford	59, Godwin-street.
,, 14	Manchester Amateur	Manchester Athenæum.
,, 14	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 15	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 15	Bury	
,, 15	Hyde	
,, 15	Manchester Camera Club	Victoria Hotel.
,, 15	Edinburgh Photo. Club	5, St Andrew-square.
,, 15	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 16	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 2.—Mr. W. E. Debenham in the chair.

Mr A. COWAN showed samples of eikonogen which had been powdered and mixed with sulphite of soda dry. This it was thought would be a convenient way of keeping the substance ready for use at any time. It proved, however, that the mixture blackened in a few hours, although sulphite of soda was assumed to have a preservative effect in solution; and although the eikonogen powdered and kept separate was, as would be seen by the sample exhibited, still purely white, it might be that the particular sample of sulphite had something to do with it, and that another sample might not give the same result. On another occasion he had mixed eikonogen, alkali, sulphite, and sugar. This mixture did not go black like the sulphite and eikonogen alone, but it changed in a single day to a pasty condition. The solution afterwards made from the mixture worked well. The very different results recorded by different experimentalists when working with eikonogen might probably be accounted for by the difference in samples of sulphite used with it.

The CHAIRMAN said that a difference in the water might have something to do with it. He would advise that the water be thoroughly boiled before mixing the eikonogen solution, and then he did not think there would be any disadvantage in the ordinary water as compared with distilled water.

Mr A. HADDON said that he was sorry that it should have gone forth to the world, as the opinion of the members of the London and Provincial Photographic Association, that mercury was the cause of the disintegration of the cover glass of a lantern slide mentioned at a former meeting of the Association by Mr J. T. Taylor. Mercury does not attack glass at ordinary temperatures, a fact which is shown by the use in barometer and thermometer tubes, which, too, are generally made from lead glass. He had had experience of glass being attacked superficially with a kind of frosting; one of these—a retort—he now produced. A third case had been mentioned by Mr. Atkins, where some bottles dried in an oven showed frosting of the surface. In all these cases the effect was produced on the inside of the glass. It appeared to originate, not from any lead in the glass, which, indeed, did not contain any, but from too much alkali, used for the sake of economy of working. Watts says that under ordinary circumstances decomposition of the glass is scarcely visible, but it becomes apparent on warming. The retort now shown would be seen to be covered inside for the most part with frosting, but a certain part of the tube was clear. On warming that part in a flame it would probably show the frosting. The experiment was then made, with the result anticipated. As regards the cover glass which had been shown and discussed, he should like to know whether it did contain lead, as had been assumed. He was almost certain that it contained no lead. The probable explanation was that there was decomposition of glass of an inferior quality, accelerated by moisture contained in the paper and a layer of air enclosed, and determined by the warmth of the lantern.

Mr T. E. FRESHWATER had seen numbers of field glasses which had been attacked by a dulness due to decomposition, and it had always taken inside.

Mr. P. EVERETT asked if there was any mercury in the blacking used inside the tubes of the field glasses?

Mr. FRESHWATER said there was not.

A member suggested that the decomposition of the inside of the field glass, and not the outside, was due to the former surface being flint glass and the latter crown.

The CHAIRMAN inquired whether the inside of the eyepieces suffered in the same way?

Mr. FRESHWATER said they did not.

Mr. J. B. B. Wellington showed a cover glass which bore a faint image of the opening of the mask used with it. The transparency had not been toned with mercury.

Mr. HADDON suggested heating a piece of the glass strongly in a flame. This was done, and Mr. Haddon remarked that those who were in the habit of working glass would recognise that as there was no blackening, there was no lead in this sample. Lead glass, in fact, did not favour condensation upon the surface, which was the first step towards decomposition, so much as other glass did. On this account Sir William Thompson used lead glass to support his electrometers. Until he did that he was for a long time unable to work satisfactorily.

Mr. WELLINGTON observed that a statement made by Mr. Debenham that the colour of a developed image was due to a particular stage of development had been disputed at a recent meeting. He now produced plates showing its correctness. Each of the two plates had been exposed with four images for twenty, forty, sixty, and eighty seconds respectively. One of these plates had been cut, and the several images removed from the developer as soon as the proper depth was attained. These showed variations of colour from cool to warm, as the exposure had been short or long. The other plate had not been cut, but the whole four images had been kept in the developer until that with least exposure was sufficiently out. In this case the tone of all was alike cool.

Mr. G. W. ATKINS writes: "I am made to say that the lantern slides shown by me last week were developed with eikonogen. This is not the fact, they being developed with a normal pyro one, containing as alkali ammonia or carbonate of soda, two or three of the slides being on commercial negative plates, the remainder on commercial transparency plates, excepting the wet plate ones shown."

CAMERA CLUB.

THURSDAY, January 2, was a lantern evening at the Camera Club, and there was a large attendance of members.

The chief part of the exhibition consisted of a selection from a number of slides kindly lent by the Birmingham Photographic Society. After these, other slides were shown by Mr. T. Charters White (general landscape and microscopic); Mr. Frank Howard (landscape and landscape with figure); Mr. Reeper Leventhorpe (pictures taken in North Italy); Rev. C. F. Fison (English country scenes); Mr. F. Howlett (a series of views on the Thames); and, in conclusion, a set, by Mr. J. B. B. Wellington, of landscape and landscape with figure, &c. Some of Mr. Wellington's slides were especially effective, and attracted much attention.

The subject for Thursday, January 16, is *Plane Polarisation of Light*, when an address will be given by Mr. R. Tindall. The lecture will be illustrated. Meeting at eight p.m.

CHELTENHAM PHOTOGRAPHIC SOCIETY.

AT the December meeting held in the Lecture Room of the School of Science, the Hon. Secretary, W. C. Beetham, read a paper on *Platinotype Printing* [see page 21], and afterwards gave a practical demonstration of the hot and cold bath processes. He drew attention to the advantage of immersing the paper face downwards in the hot bath developer, as he had found great difficulty in preventing the formation of air bubbles under the print when the paper was rapidly floated on the solution. When, however, the print was immersed by quickly sliding it under the surface of the developer, he had found that air bubbles scarcely ever troubled him, and the results were in every way quite as good. In the cold bath process he stated that he preferred to use less of the platinum solution in the developer; one to eight instead of one to five, as recommended by the Platinotype Company, as then the results were more under control, and could be more modified than when the stronger solution was used. It depended a great deal on the class of negative used. For a hard, dense negative the weak solution was the best, but for a thin, weak one the stronger solution was preferable.

It was proposed and carried that in future the meetings of the Society should commence at eight instead of half-past seven p.m.

A cordial vote of thanks to the Hon. Secretary terminated the proceedings.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

JANUARY 7.—Mr. B. J. Taylor in the chair.

It was proposed that a lantern exhibition be held early in February for the benefit of the Public Hospital and Dispensary's contemplated alterations.

Mr. H. Staniforth presented the Society with one of his patent limelight regulators, which was acknowledged to be one of the best arrangements in the market.

Mr. PRESTON gave a practical demonstration showing the different lights for the optical lantern, viz., the three-wick lamp with Luxor oil, the oxyhydrogen, and the ethero-oxygen. The two latter were thought to be about equal in brilliancy, the oxyhydrogen the best for safety, and the ethero-oxygen the most convenient for giving exhibitions in country villages where the ordinary gas is not to be had.

DEVON AND CORNWALL CAMERA CLUB.

JANUARY 6.—Mr. R. Murray in the chair.

A numerous and varied assortment of lantern slides was shown in rapid succession, and on examination of the voting papers at the close, it was found

that Mrs. Carnell had been awarded first prize with sixty-one votes; Mr. R. Murray taking the second prize with forty votes. A large proportion of the lantern slides shown were heartily approved. Mrs. Carnell's *Breaking Waves* and Mr. Murray's *Snow Scenes* were especially worthy of mention. Messrs. Worth's *Colley*, Tweedy's *Old Boat*, Burnard's *Woodland Scene*, Micklewood's *Hookworth Bridge*, Dr. Aldridge's *Falls of Dun*, and a group by Miss Keen, also received commendation. A number of slides (not for competition) made by Mrs. Carnell, Messrs. Micklewood, Murray, and others, were afterwards shown, some being copies of Leech's Sketches in *Punch*, creating great amusement.

After the close of the competition the Hon. Treasurer, Mr. A. A. Carnell, was congratulated on being the winner of the gold medal, given by the Britannia Works Company, at the competition for the best six lantern slides on Alpha plates, in Class X., "Scientific Micro-photography," and for also winning a silver medal (equal first with Mr. F. H. Evans) at the same competition. This competition, held a few weeks back, was open to the world, and nearly eighteen thousand slides were sent in for competition.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

DECEMBER 4, 1889,—The President (Mr. Frederick Graff) in the chair.

The Committee on Lantern Slides reported that at the November Conversation Meeting the first set of slides from the American Interchange for 1889-90 was shown, being those of the Society of Amateur Photographers of New York. About seventy-five slides were shown, the general standard being high, and showing an improvement over last year.

The Executive Committee announced the opening of the exhibition of pictures contributed by members of the Society, from which the four "honour pictures" for the year would be selected. The pictures were hung on the walls of the meeting room, where they would remain until the annual meeting in January. During the month members would deposit votes designating their choice of the pictures in a box prepared for the purpose, and the result would be announced at the January meeting.

A paper was read by Mr. THEODORE H. LUDERS, *On Development with Pyrogallic Acid in connexion with Ammonia in Vapour.*

Mr. MORRIS EARLE showed some novelties in photographic apparatus, which he had collected during a trip to England and the Paris Exhibition. Among them were some trays, made of thick waterproof paper, for developing and other processes in photography. When not in use, by loosening metal clips at the corners the trays could be opened out into flat sheets, rendering them extremely portable. A small and exceedingly portable achromatic focussing glass, made by R. & J. Beck, was shown; also a neat leather case in which to keep or carry a lens with safety. Mr. Earle described a carrying case for film negatives to be attached to the back of a camera after the manner of a roll holder. The position of the films was changed by inserting the hand through a bag or sleeve. He also described a panoramic view camera which he had seen in Paris. A film or paper negative was used, being bent into a semi-circle with the lens in the centre. By a lever on top of the camera the lens could be revolved so as to cover different portions of the plate successfully. The light was admitted to the lens (which was of fixed focus) through a diaphragm in front in the form of a perpendicular slit, the opening revolving with the lens as it was turned. A unique feature possessed by the camera was the fact that if in one portion of the view dark objects predominated, requiring long exposure, the lens could be allowed to cover that portion of the view for a greater time, and less exposure be given to the brighter parts of the view, simply by properly manipulating the lever attached to the lens.

Mr. JOHN G. BULLOCK called attention to the late explosion of flash powder in this city, with its terrible result in the death of three persons. The details were no doubt familiar to the members present, but as the photographic world at large may not have heard of it, he thought it right that the published minutes of the Society should caution all to look with distrust upon flash powders of a yellow colour, and if they prove upon examination to contain picric acid along with powdered magnesium to consider them highly dangerous. Picric acid, upon standing in mixture with powdered magnesium for a length of time, is supposed to form picrate of magnesium, a highly unstable combination, more dangerous than dynamite. A person finding a vial of such flash powder in his possession had best dispose of it at once, but with great care. He is advised against pouring water upon it or burning it, but rather to throw the whole vial into a river or down some gorge, where it would be scattered without doing harm. The very act of removing the cork from the bottle might be attended with serious results. The danger of picric acid flash powders increases with age.

Dr. MITCHELL fully agreed with Mr. Bullock, and considered all flash powders, except those composed of pure magnesium, more or less dangerous, differing only in degree. Magnesium has a tendency to absorb moisture, in which state it readily combines with picric acid forming the dangerous picrate of magnesium. Even a single ounce of such powder would be exceedingly dangerous.

On the motion of Mr. WOOD, Mr. Bullock and Dr. Mitchell were requested to prepare a paper for the next meeting on the subject of flash-powders.

Mr. ROSENGARTEN called attention to a method of preparing ground glass for focussing screens by the use of hydrofluoric acid in combination with carbonate of soda.

Dr. WALLACE spoke of the use of a solution of plain boiled starch spread upon a plate of glass and allowed to dry, thus forming a very fine surface for a focussing screen.

Mr. WOOD described a method of focussing without the use of any screen. If the position to be occupied by the plate is determined by a metal strip located in the usual position of the ground glass, by placing a focussing glass against this strip it will show (over a limited area, of course) the image usually projected on the screen, and a proper focus can thus be readily obtained. A piece of plain glass can also be used in this manner as a support against which to place the focussing glass.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

JANUARY MEETING OF THE PHOTOGRAPHIC SOCIETY OF FRANCE.—PRESENTATION OF PROOFS OBTAINED ON SILVER CHLORIDE.—STUDY OF WOOD BY PHOTOGRAPHY.—A HAND APPARATUS.—MR. EDWARDS PRESENTS ISOCHROMATIC RESULTS.—A RESERVOIR TO HOLD SOLUTIONS.—AN APPARATUS FOR THE FLASH LIGHT.—YELLOW FOG.

THE Photographic Society of France held their monthly meeting on Friday evening last, the 3rd instant, M. Bardy in the chair.

M. Perron presented a number of positives on glass obtained by him on his silver chloride plates. The presentation was very interesting, in that different gradations of colour had been obtained, from a violet to a chocolate-brown. Any shade, said he, can be obtained, and that simply by regulating the exposure to a gas flame.

MM. Thil & Thouroude presented an album containing a collection of microscopic enlargements of the texture of the different woods used in building and furniture making. Le Ministre d'Agriculture created an establishment for this new branch of study, and M. Thil expressed the opinion that it will not only render service to France but also to the whole of Europe. Every kind of wood has its special texture, said he, and as soon as the photo-micrographic enlargement is seen of a piece of wood immediately the name of the tree is known. In commercial transactions service will be rendered to the buyer of wood, in that the seller can no longer pass off one wood for another. For instance, said he, pear-tree wood is much more valuable than the apple-tree, nevertheless, when stained the latter is spuriously passed off for pear-tree wood. At present the wood merchant only requires to have in his possession a photographic enlargement of the pear and apple-tree, and a small microscope. With a razor or sharp knife he cuts off a piece of wood he is about to purchase, and placing it under the optical arrangement of the microscope he can immediately see, by referring to the diagrams, if the wood be genuine or not. *Savants* will gain also by this new idea, for it has been proved beyond doubt that the remains of fossil wood found in the earth's crust can now be classed, and the species of the tree to which it once belonged can be named to a certainty. At the end of the meeting M. Thil demonstrated his system, and charmed the audience by a magic lantern, which gave an enlarged representation of all the principal woods which had been experimented upon.

M. Carette presented a pretty little hand camera, which, I think, is made in Switzerland. It is named "L'Escopette." A few yards of these little views (two inches square), pasted side by side, showed what could be obtained by that little instrument.

M. Pector, in the name of Mr. Edwards, of London, presented some reproductions and landscapes which had been obtained upon ordinary silver bromide plates, as well as upon isochromatic plates prepared by Mr. Edwards after the formula imparted to him by M. Attout Tailfer, of Paris. These proofs were very much criticised, some of the members being of opinion that they had not been photographed under the same condition of light, &c. M. Attout Tailfer, with some amount of acrimony, defended what he called the honesty of Mr. Edwards, and called upon M. Franck to bear witness to the same. This discussion was continued with some warmth, and the President, in a few choice words, ended the discussion. The proofs presented were very good, and showed palpably the advantage of the colouration dodge over the ordinary plate.

M. Boissonas, of Geneva, presented some equally good, if not better, and his exhibit at the last Exhibition of Paris was worthy of all praise. What surprises many here is that the colouration of the gelatine film is thought to be fettered in England. I myself manufactured coloured films, years before a patent was taken out, for M. Ducos du Hauron and another gentleman whose name I forget. Public opinion will soon revolt against this monopolising old ideas. I see that the leading photographic journal of France, *Le Moniteur de la Photographie*, speaks of this fettering in a leader on a new *Groupe Syndical*. It says, "They will study, no doubt, among other things why the orthochromatism on which depends the future of photography cannot be worked out in France, and their duty will be to disembarrass photographers of these fetters, which up to the present they dare not show up to public attention, because they desired above all to maintain perfect peace and confraternity among all the members." As a schism has taken place among the members of the Chambre Syndicale de la Photographie, these reasons will no longer predominate, and the public will be the gainers.

M. Thouroude presented a new kind of *cuve* or reservoir intended to hold coloured liquids, in order to monochromatise the rays of light. These *cuves* are made with two parallel glasses separated by a glass ring, in which is bored a small hole through which the liquid is poured in or out. No surface is thus left open for evaporation as in those made by the old system, as a cork can be placed in the hole, and thus a bottle is formed.

MM. Marillier & Robelet presented a new apparatus for the flash light. It consists of a small iron box about the size and form of the Swedish match-box. On one side, near the end, a hollow tube goes through; this hollow tube is made to hold a cylinder composed of pulverised magnesium about one inch long and three-eighths of an

inch thick. On the opposite end is attached an indiarubber tube and a pneumatic ball. Near the cylinder is a holder intended to hold a Vesuvian match. To set the apparatus at work, the chemical compound is placed in the tube and the Vesuvian match is lighted and placed between the magnesium cylinder and the air blower; at the proper moment the indiarubber ball is pressed, the air passing over the ignited Vesuvian match communicates its fire to the chemical compound, and a brilliant flash of light is the consequence. The inventors MM. Merville & Lecadieu) say that each cylinder has always the same photogenic power, and therefore the time of exposure is purely and simply mathematic. Photographic reproductions can now be obtained during the darkest night in a cavern or cellar, and that with the minimum of error as regards exposure. The apparatus is named "Tyson Eclair."

M. Hervé gave a very long discourse on the cause of the yellow stain in silver bromide plates developed by pyro or hydroquinone. He asserted that it is the gelatine alone which is the cause of the stain, and refused M. Balagny's theory of the formation of silver sulphate; in fact, nothing could be gleaned but that if a plate be covered with pure gelatine and allowed to remain a long time in the above mentioned developers, a yellow stain is the consequence. On this alone M. Hervé based his opinion as to the yellow fog. PIERRE E. STEINHEIL.

146, *Rue Lafayette, Paris.*

ROBINSON AT THE CAMERA CLUB.

To the Editor.

SIR,—I do not see that the exhibition at the Royal Academy of Arts of any potential strength whatever to the least disproves the statements I made of the shortcomings pictorially of Mr. H. P. Robinson's works.

If I contend that a man is blind, the fact that another man is lame does not prove that the blind man can see.

As to the "full fifteen feet high," I am not in a position to say if such bad was ever painted by a "retired R. A." though I have never seen such a picture. It would have lost some point of absurdity to Mr. Singerly's extraordinary statement if he had given the name of the "retired R. A.," and thereby have given true gentleman a chance to reply to it. As the statement stands it is simply an assumption of impudence on the part of the Secretary and Honorary Secretaries of the Royal Academy for that year. I have not the pleasure of Mr. Singerly's personal acquaintance, and do not belong to his or any other school.—I am, yours, &c.,

The Club. BLIND BOAZ.

Having inadvertently allowed Mr. Singerly's letter to be inserted, it is only fair that a parting word should be allowed Mr. Blind Boaz.—ED.]

AMATEURISM.

To the Editor.

SIR,—The photographic world owes a debt of gratitude to "A Photographic Chemist" for his recent examination of professional photographers into two great divisions—those who know what they are doing, and the hangers-on and sojourners, **who know something!**

Perhaps your correspondent has a class "Cheap Jacks" or second or third rate men abound. I refuse to suppose that being in the photographic profession does not insure the passing why for all true members of "A Photographic Chemist" understand. If he had not placed himself out of court by indulgence in slang, it might have been conceded that there are certainly a great number of unscientific amateurs to be found in the profession, and that there are others who assist but one solitary branch of it; but you must, as a [illegible] opinion upon the method of [illegible] which [illegible]. From what I have read of photography I [illegible] at the present moment it [illegible] that [illegible] to publish the [illegible] (the general public [illegible] were); besides the [illegible] foreigners into this country, to the [illegible] we [illegible] "Cheap Jacks" [illegible] the [illegible] the [illegible] the

F. M. D. (Redhill).—Communicate with Mr. Chapman, Albert-square, Manchester, who is the agent for the sale of the shutter, and he will inform you if it can be altered.

NOTTS.—Much of your admiration of the work will, no doubt, disappear when we tell you that the negatives were not made from the coins themselves, but from plaster of Paris casts of them, the plaster being tinted to take off its excessive whiteness.

B. H. J.—We have examined the lens, and find that the largest stop, which is marked *f*-8, is really between *f*-9 and *f*-10, hence its slowness as compared with the other lens. This erroneous marking is by no means uncommon with some of the cheap foreign lenses.

INQUIRER.—Whatever your friend has said to the contrary, there is no question that carbon pictures may, if they are kept in a damp place, become mouldy, and, usually, the mildew produces reddish or brown spots on the prints. We have seen many examples of mildew on carbon pictures.

UNDER FOG inquires: "What would be the required power in an engine to produce electric light for ordinary portraiture in studio?"—Six or eight horse-power will yield a very suitable light for portraiture. Gas engines of this power are what are generally used by those photographers who generate the electricity on their premises.

LEARNER.—Your best plan will be to take lessons from some one who is proficient in the work. If you have but a little knowledge of photography, and none of photo-lithography, you will have much to learn before you are competent to take a "good berth." Burton's *Printing Processes* and Wilkinson's book are the works you should get.

C. TURNER.—The design for the studio will answer very well, but there is no advantage in continuing the glass down to the floor. If the glass comes to within three to four feet of the floor, with that width of studio it will be ample. Thick dark green blinds on the south side, and white, or "unbleached," on the north, will answer quite well.

S. POLLOCK.—So far as cost is concerned, carbon prints on opal can be produced as cheaply as by the bromide process if the prints are made direct from a negative. But in the case of an enlargement it is different, as here an enlarged negative has first to be made for carbon, whereas for bromide the enlargement is made direct on the bromide plate.

W. HAMES.—The marks on the sides of the plates are caused by the strips of paper used in packing the plates. However, they should not be so broad as to cause the waste of half an inch of the picture on each side. There is no way of avoiding the marks in the development. If the plates were used while they were new, no doubt, the marks would not appear.

MOUNTER.—If the colour of the mounts comes through, and stains the whites of vignettes, it is clear that the colouring matter used for the enamel is soluble in water. The only way of avoiding the trouble is to mount the prints while they are dry, and employ a mountant that contains but a minimum of water. Or, better still, reject the mounts altogether.

GRAFTON writes: "Some time back I got some albumenised paper (ready sensitised) from a London house. It was very good when received, and I got some very fine prints on it at the time; but now it has, with only about a month's keeping, become discoloured and covered with minute black spots. How can I utilise the paper?"—If it has become so deteriorated as stated, the only way of turning it to a good account is to burn it and add the ashes to the residues. It is useless to attempt to print it.

IGNORANT.—Supposing the studio runs east and west, and the light comes in only at the north side, either light blue or unbleached blinds or curtains for the roof will answer all purposes. For the sides, curtains running on rods—either blue or white (unbleached)—should be employed. Supposing both ends of the studio are opaque, no special appliances are necessary for stopping out front light. We are here assuming that the curtains or blinds are arranged so as to cover up the whole of the glass were it necessary.

W. DORMER.—It is true that the insurance companies charge a high rate to photographers, although "they do not at the present time employ inflammable materials like collodion." The companies, in compiling their rates, have to take into consideration more than the hazardous character of the calling, namely, the probable value of the salvage in case of accident. In many cases, as in some businesses—hardware, for example—this is always considerable; but in photography it is usually next to *nil*. For instance, the heat that would not be sufficient to materially injure a piece of furniture might render a valuable lens absolutely worthless.

W. H. SIMPSON writes: "Can you, please, tell me the reason why the exposed tissue (carbon work) will not adhere to the temporary support (zinc)? The following is the way I used it. I bought the tissue off a local photographer, and sensitised it myself on the following bath:—Potassium bichromate, three ounces; liquid ammonia (·880), one-quarter of an ounce; water, eighty ounces; then dried it in an ordinary room in about ten hours (in the dark, of course); then in the morning I put it in the frames and printed. Then I put the zinc support in a bowl of clean water and then the tissue, brought them out together and squeegeed them together, and then put them between blotting paper for a quarter of an hour, then put them in water 100° Fahr. After being in for about three minutes, I tried to strip the paper off, but it came off altogether, leaving the zinc bare. I had put a safe edge on the negative, one-quarter of an inch broad. I had previously waxed the support with the following:—Pure beeswax, five grains; pure benzol, one ounce."—Our correspondent's experience, as detailed, would tend to show that so far as the sensitising and drying are concerned all appears to be satisfactory, but we suspect that the tissue had become insoluble. This would probably be the case if the fumes from gas or from burning coke were present in the drying room. The solubility of the tissue can easily be tested by placing a piece of it in warm water. If the sensitive coating dissolves freely all is right, if it does not it may at once be rejected as useless. The waxing solution used was that adapted for glass plates. For zinc, it is usual to add resin, and employ turpentine as a solvent. However, we do not think the failure is due to the waxing solution.

A. X. says: "I have been trying to recover the gold from the toning-bath residues, but cannot manage to make the gold to precipitate. On adding the sulphate of iron solution, it blackens the solution at first and then turns it a deep ruby to look through; adding more makes no difference. Can you tell me the cause of this? The solution is clear and gives hardly any precipitate. There is a good deal of sulphocyanide of ammonium in the solution. Has this anything to do with it? What would you advise me to do with it? I think there is plenty of gold in it."—If the bath contains a sulphocyanide, sulphate of iron is not the proper precipitant, as the fine precipitate would be redissolved. The gold must in this case be thrown down with sulphide of potassium (liver of sulphur).

H. N. B. writes: "I shall feel much obliged if you will favour me with your opinion as to the printing qualities of negatives developed respectively with pyro and eikonogen. I was discussing with several friends a short time ago the various merits of these two developing agents, and on comparing the results, those developed with eikonogen appeared to me to possess more brilliancy and contrast than those that had been treated with pyro. The exposure given in the first case was six seconds, and upon being developed with eikonogen the image came up very well, without showing the least signs of harshness or under exposure; another plate of the same brand and rapidity was given ten seconds and developed with pyro, with much the same result as the former, with the exception of the yellow tinge imparted by the pyro. I was assured, however, by one of my friends, that this was an advantage rather than a defect, and that the bluish cast produced by the eikonogen would seriously affect the printing quality and produce a weak and flat print. If this is so, why is it that so many Continental photographers prefer to use the iron developer, which produces much the same quality of negative as plates developed with eikonogen?"—The real test of the quality of a negative is the print it will yield. Why not put the two negatives to this simple test? Eikonogen will, if properly used, produce quite as good printing negatives as pyrogallic acid, but in the development it must be made visually more dense. The colour of a "pyro" developed negative is more non-actinic than that by either eikonogen, hydroquinone, or iron. Hence those by either of these developing agents must be made more intense, then they will give equally vigorous results in printing.

ANTIPODEAN (Napier, New Zealand) inquires: "1. Is it possible by any chemical process to restore a plate that has been exposed (of course not developed) so as to make it available for a second exposure?—2. What is the best method of preserving ferrous oxalate developer after it has been once used, so as to make it available for further use?—3. Some of the fine-art shops in the Colonies are selling photographs mounted in optical contact on glass, with nice bevelled edges and backs, with hinged struts, &c. Are these glasses articles of commerce, as I do not see them in any of the catalogues?—4. A large quantity of plates lately received from one of the best-reputed makers fog badly for half an inch all round the edges. Can you suggest the cause? They have not been imported six months.—5. Which of the various platinotype processes is likely to succeed best with imported paper? All that I have yet seen in the Colony is spotted or discoloured.—6. Last, but not least, What is the best form of consolation when, after a hard week's work scrambling over hill and dale carrying heavy apparatus, you find that all your plates are spotty, and that the imperfections are in the emulsion, and show when a plate is fixed without any exposure? Such has been my fate more than once."—1. We are at present experimenting on this subject.—2. Keep it from the atmosphere. This may be done in a variety of ways, among these being that of keeping it in a bottle with a layer of paraffin oil on the top, and drawing off the developer through a faucet at the bottom, and returning it to the bottle immediately when done with.—3. Immerse the glass and the picture in a dish containing a solution of gelatine; press both into contact and then raise up to dry.—4. Write to the makers.—5. We advise the cold development system.—6. Hurl a few hard thoughts across the ocean to the makers, then light your pipe and reflect that, after all, things might have been even worse.

WE are glad to see that Messrs. Mawson & Swan have commenced to reissue their monthly *Photographer's Pocket Diary*.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, January 15, *The Intensification and Reduction of Negatives*; January 22, *Naturalistic Photography*.

RECEIVED.—*The Magic Lantern: its Construction and Use*, published by Perken, Son, & Rayment. A handy manual, a useful feature in which is a priced catalogue of the numerous lanterns and fittings connected therewith sold by the publishers.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Tuesday, January 14, at eight p.m., at the Gallery, 5A, Pall Mall East, when the following papers will be read:—*On Control in the Density of Negatives*, By Chapman Jones, F.G.S., F.I.C.; *On the Distance beyond which all Objects are in Focus with any given Lens*, by Sir David Salomons; *Eikonogen as a Developer in Practice*, from W. K. Burton.

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THE BRITISH

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THE ACID FIXING BATH.

Since we wrote two or three weeks ago on the subject of the addition in various ways of sulphurous acid to the fixing bath, the matter has cropped up incidentally at a meeting of the West London Photographic Society. Here, in reply to a direct question as to the effect of such addition, one gentleman stated that the effect would be to precipitate sulphur; while another, while laying down the axiom that it is inadvisable to add any acid to the hypo solution, thought it least of all so in connexion with the particular acid in question.

With regard to the first reply, we think that, to say the least, it is misleading, if not absolutely inaccurate; while the "least of all" argument of the second speaker can only have been intended as a possible warning that may have been fully explained at the meeting, but which is not rendered particularly clearly in the report.

In our recent article we expressed the opinion that pure sulphurous acid has absolutely no action upon hypo, and up to the present time we have no reason to depart from that view. So far as reported at the West London Society, Mr. Stein is at direct variance with us in stating that it will precipitate sulphur, though, as we have already hinted, possibly the report does not convey fully the meaning of the speaker.

Since reading the report we have put the matter to the simple but direct test. A strong solution of hypo was made from a good sample of crystals prepared for pharmaceutical purposes—not such as is sent out at eight or nine shillings the hundredweight, cask included, though possibly the quality does not much affect the result. To a portion of this, which was perfectly clear and bright, a quantity of solution of sulphurous acid of the pharmacopœia was added. Result, absolutely no change of any kind.

Another portion placed in a bottle with perforated cork was connected with a generating apparatus, and a stream of sulphurous anhydride passed through it for some time, the gas being liberated by the action of sulphuric acid upon a quantity of the same sample of hypo. In this case, almost immediately upon commencing the current of gas a slight cloudiness appeared in the receiving bottle, and for a short time it became denser, until the liquid acquired a decidedly "milky" appearance, but beyond that it passed no further; no deposit of sulphur was thrown down, although sufficient sulphuric acid was expended to have reduced over and over again the whole of the hypo contained in the solution. The quantity of sulphur precipitated, after several days' settling, sufficed to form a thin white coating on the bottom of the bottle, and the result can only be set down to impurities—most probably spray of sulphuric acid carried over with the gas. Thus far, then, it seems we are perfectly correct in our original statement.

The first portion of hypo treated with liquid sulphurous acid, and which passed the ordeal safely, and also the portion charged with gas and cleared by settlement, both smelling strongly of sulphurous acid, were left standing exposed to the atmosphere in wide-mouthed bottles. In a very short time—not more than half-an-hour—both were found to have become cloudy, but though left alone for some forty-eight hours or more, they had not lost their transparency as viewed in bulk, and at that stage the smell of sulphurous acid had almost, if not entirely, disappeared.

Now though Mr. Stein was obviously not correct in saying—if he really did say so—that sulphurous acid would precipitate sulphur from hypo solution, he would be perfectly accurate in saying that it might *lead* to such precipitation, by virtue of its easy oxidation to the state of sulphuric acid. But in the last-quoted experiment we have evidence of the extent of injury likely to accrue from such oxidation. The oxidation of the sulphurous acid is so comparatively slow, and its evaporation so rapid, that the source of danger has disappeared before the danger itself is felt; in other words, the free acid volatilises before it has time to work any serious injury in the way of precipitating sulphur.

Perhaps Mr. Hodges had in view, theoretically, the unstable character of sulphurous acid when he expressed the opinion that it, least of all acids, should be added to hypo. In adding sulphuric or other strong acid, the effect would be instantaneous and palpable to the senses of both smell and sight; with sulphurous acid the effect is not immediate, but creeps on insidiously afterwards, and so, according to Mr. Hodges's view, is the more dangerous. But the extent of the danger has been shown.

Now, in the case of a fixing bath in actual use, and charged ever so strongly, even to saturation with SO_2, it is evident that, exposed as it is in a thin layer with a large surface in contact with the atmosphere, both oxidation and evaporation must proceed with great rapidity; and if in the comparative confinement of an open bottle the latter process goes on with greater rapidity, it is pretty certain to do so under still more favourable circumstances, with the result that the bath would lose its free acid before it had time to deposit any serious quantity of sulphur.

But even granting the precipitation of sulphur under the circumstances detailed, it yet remains to be proved that it would be seriously detrimental to the stability or other qualities of a negative fixed in the solution. The chemical change takes place in the solution itself, and is complete without any

assistance from the photographic film. If the change were set up by the immersion of a gelatine film saturated with an acid "clearing" solution, then we might expect not only a deposition of *sulphur* in the film, but also the formation of sulphide of silver and other complex compounds by the reaction of the various elements involved. But, as matters stand, it appears to us that the worst that can happen is the deposition of a minute trace of sulphur on the surface of the film, whence it is easily removeable by friction.

It is pretty clear, however, whatever the good or ill effects of the so-called acid fixing bath, that it cannot long retain its special qualities as recently proposed to be made, and consequently it does not seem to recommend itself on the score of uniformity of action. This, in fact, we recognised when we first tried it, over four years ago, and it was for that reason that we especially advised that the acid solution be kept separate, and added to the bath when the latter begins to show signs of losing its clearing action. In this manner not only is the sulphurous acid economised, but the discomfort of having an unlimited quantity of the gas evaporating into the atmosphere of the workroom is reduced to a minimum; but, above all, some degree of uniformity of action may be expected.

We have shown that the solution of hypo when charged with SO_2 and exposed to the atmosphere rapidly becomes cloudy from deposition of sulphur. This is not the case in our experience, nor have we seen or heard it mentioned by others, when the acid is added in the form of bisulphite, or of the mixture of the neutral sulphite with a strong acid. In either case the solution contains free SO_2 just as it does when the gas itself is passed through it, and yet no deposition of sulphur is apparent however long the solution may be exposed. A simple explanation of this fact suggests itself to us, namely, that in the presence of sulphite or bisulphite of soda, the sulphur disengaged by the formation of sulphuric acid is seized at the moment of its liberation, or while in the "nascent" state, by the excess of sulphite, and combining with the latter forms hypo. We know that many combinations are possible when the elements, or a portion of them, are in the nascent condition that cannot take place under other conditions; and there is every reason to believe that the above is the correct explanation of a seeming anomaly.

We can only say, in conclusion, that we see no reason to be unduly afraid of the acid fixing bath if it be used with common sense.

SECRETS IN PHOTO-MECHANICAL PROCESSES.

Now that so many of the photo-mechanical processes are coming as much to the front in this country as they have been steadily doing for several years past, both on the Continent and America, we are continually receiving letters from correspondents asking how such or such firms produce their results. Often the inquiry assumes a modest request in something like the following terms, as in a letter now before us:—"Will you, in your next issue, kindly tell me how to make relief blocks to print with ordinary type from landscape and portrait negatives, like those supplied by ——?" Sometimes the inquiry is for a method for producing photo-lithographs in half-tone, or, may be, for making intaglio plates. Not unfrequently the request is accompanied with an intimation that the writer, if he only knew how to do this, could get a valuable appointment on one of the illustrated papers, or could, otherwise, see the way to making a rapid fortune.

It is by no means unusual for a correspondent, after being referred to an article, or articles, to write, after the lapse of a few days, saying that he has tried the process referred to and that it has proved of no good whatever. It is not an uncommon circumstance for a seeker after information to say that he has tried all that has been published on the subject of inquiry, and that the writers either did not know what they were writing about or that they wilfully kept back the most useful details of the process. We have even known half-a-dozen different processes to be tried in about as many days, and then condemned as being worthless, and that, too, by persons who have had no previous knowledge whatever of them, or of any other process to which they are analogous.

It is an unfortunate propensity with many photographers to assume, because they may have had many years' experience in the art—so far as taking negatives and printing therefrom is concerned—that they are competent to pass judgment on every process to which it may be allied, notwithstanding that an entirely different principle may be involved. Notably is this the case with photo-mechanical processes, the majority of which are based upon the action of light upon the salts of chromium with gelatine, or on bitumen. These reactions are totally different in principle from those of light on silver compounds; in fact, they have nothing in common. Yet some photographers will, after a hasty trial, condemn a process as being worthless, while it may be an excellent one.

Few photographers have any practical knowledge of printing, either lithographic, typographic, or copperplate; yet such knowledge is essential, otherwise the experimentalist is considerably in the dark as to what is really required in a printing plate or block. Many a beginner in mechanical processes has failed quite as much through want of knowledge on this branch of the subject as he has through any of, what may be termed, the strictly photographic portion of the work. When these facts are considered, it will be seen that it is, frequently, unjust to those who may have written on this subject, and given really useful information, to be charged with withholding the most essential details, particularly by those whom it must be admitted are utterly incompetent to form any opinion in the matter.

We do not for a moment wish it to be inferred that every writer has always imparted all the knowledge in his possession, or that others have not committed themselves to paper on processes with which they have had no practical acquaintance; but we must protest against the often wholesale condemnation of writers, on the strength of a few experiments, by those who are absolutely ignorant of the very principles upon which the processes are based.

It may be very much questioned whether there is a single photographic process, mechanical or otherwise, now being worked commercially which has not at one time or another been published in these columns. Of course, those who employ them do not, as a matter of business, say which particular one they work, neither do they publish the minor details of the process which may, in their hands, be essential to success. They rather prefer to, and ostensibly do, treat the methods they adopt as "trade secrets."

There is, however, a "secret" in most of the successful photo-mechanical establishments—that of success. This success is what can only be gained by skill and experience, which in turn is acquired by diligent working and close observation, extending in many cases over years. It is not so much in a process itself—that is, so far as mere formulæ are concerned—as in skill in its working that success must be sought. If any

one expects, as some apparently do, to arrive at perfection after a few experiments, he will—so far, at least, as photo-mechanical processes are concerned—be grievously disappointed.

In a recent number of *La Nature*, M. Leon Vidal has an interesting article upon *Pinhole Photography*, or, as our neighbours have it, needle-hole, which has lately been rendered more easy through a large manufacturing firm laying themselves out for the production of metallic sheets with the necessary perforation—clean, smooth, and exact to measure. He properly places his subject in the subordinate position due to it, noting that the orthoslox means with a lens enables greater sharpness and rapidity to be obtained than pinholes will permit. The difficulty of ascertaining the exposure is great, as the image cannot usually be seen on the ground glass, and M. Vidal has calculated the following list:—With a pinhole three-tenths of a millimetre in diameter, the exposures are 5, 7, 10, 13, 16 and 20 seconds for foci of 5, 6, 7, 8, 9 and 10 centimetres respectively with the particular brand of plates he employs in full sunlight.

One great advantage of pinhole photography is the large angle of view possible: 120°, for example, being a practical angle, and no focussing is required. Further, the camera, with the sun immediately facing it, can be pointed at the view without the faintest fear of fog, though this would inevitably appear under these circumstances with the ordinary apparatus. There is no fear of distortion if the camera be placed horizontally, and the whole view is stated to present an unusually artistic effect. We think, perhaps, there might with advantage have been left out of the article two wood engravings (not process blocks) showing the relative effects produced when an engraving is copied by pinhole and by lens, for it is obvious that for a true comparison the prints themselves should be visible.

Some time ago considerable interest was caused in the chemical world by the alleged partial dissociation of iodine, and more recently at the British Association by the suggestion that as iodine kept in a sealed tube for many years had so changed that all the bright iodine lines of its spectrum had disappeared and given place to hydrogen lines of great brilliancy, it was possible that it was a part proof of the progress of all things in nature gradually to return to the form of hydrogen. Herr C. Lundeking presented a paper before the St. Louis Academy of Science detailing experiments of his own in a similar direction. He placed iodine in a sealed tube, heated it, and passed an electric current through it, having found no hydrogen lines at ordinary temperatures. He, too, found, after a lapse of a few weeks, that the iodine had gone. He experimented upon the glass itself and found out a complete explanation. The iodine originally placed in the tube contained hydriodic acid, and after the heating and passing of the electric current the iodine decomposed the glass, the products from which decomposed the acid and set free the hydrogen. Thus the decolouration of the iodine and the production of hydrogen were explained in the simplest manner.

As we suppose there is not a photographic dark room in the country which is unprovided with a book of litmus paper, photographers may easily try a simple experiment suggested by Pelouze fifty years ago, and again reproduced in an article in the *Chemical News* by Mr. J. E. Marsh. He recalls the statement of Pelouze that dry litmus paper is not acted upon by glacial acetic acid, and says, "In fact, dry litmus paper immersed in glacial acetic acid remains practically as blue as it was before. . . . A striking lecture experiment consists in placing a piece of blue litmus paper in distilled water, and another piece, after having been dried in a desiccator, in glacial acetic acid. The paper in the acid is then taken out and dropped into the water, when both the papers rapidly change from blue to red.

Some time ago considerable excitement was caused by the announcement that Herr Joseph Kowack had discovered a plant of most remarkable weather-forecasting properties. We need not say that if such a wonderful curiosity of vegetable nature existed it would simply be invaluable to photographers. So much importance was attached to the plant and its introducer, that experiments were set on foot in the Jodrel Laboratory of the Royal Gardens at Kew, and in the *Kew Bulletin of Miscellaneous Information* an account is given of the results obtained: "Notwithstanding these unexampled facilities, Herr Kowack made a very poor show of what it was possible to obtain in the matter of forecasting anything. There were numerous changes in the weather in October, but although there were over 140 predictions, Dr. Oliver states that only one change was anticipated by Herr Kowack." Hence the whole affair, as regards photographic use, is a fiasco, which here we need not further allude to.

THE DEVELOPMENT OF GELATINE LANTERN SLIDES.

Pressure of other business has hitherto prevented my fulfilling the promise made in the last of my series of articles on *Lantern Slides on Gelatine Plates* in last volume to devote a chapter to the subject of development, but I now propose to carry out my intention.

It is scarcely necessary to say that the development of transparencies—especially lantern ones—differs from that of negatives, otherwise the present lines need not be written. In the case of negatives we have to study gradation chiefly, and in the end aim at a degree of density in the highest lights which will, if the other portions of the image bear due relation to it, give a satisfactory print. Sufficient or "printing" density must be obtained; but if the really necessary mark be over-passed it matters very little, provided only the rest of the image is equally over-dense, or, in other words, that due gradation prevails.

But in a lantern slide we must start from a different point altogether. Of course we must have gradation, but instead of measuring that from density we must take "clear glass" as our starting-point and grade from that. The highest lights of the picture must, in fact, be represented by a perfect absence of deposit of any kind, and no departure from this rule, however well graduated, however dense or however delicate the image may be otherwise, will permit a satisfactory result on the screen. For other kinds of transparencies—for the stereoscope, or for purely decorative purposes—a slight veil over the high lights is of no moment: is, in fact, no more detrimental to the general result than it would be on the shadows of a negative.

Starting, then, with absolute purity of high lights as the one thing to be aimed at, we have to combine with that essential just sufficient density in the shadows to give "pluck" and sparkle to the picture when illuminated. If the plates be all right and the development properly conducted, this result is not difficult of attainment, and the degree of absolute density necessary in even the deepest shadows is, as compared with a negative, surprisingly small. If from bad development or incorrect exposure the ultimate density be too great, and the high lights are still clear, the effect will be harshness or excess of contrast. If, on the other hand, the lights be veiled before the shadow density is reached, or in order to keep the lights bright development has to be arrested before sufficient strength has been attained, we flatness or want of pluck and contrast.

It has been said that gelatine plates will not give the highest quality of result for lantern purposes, and certainly a few years ago it seemed as if that statement was accurate. I have seen at mixed "lantern shows"—*i.e.*, where slides by different operators and different processes were thrown on the screen promiscuously—the most absurd comparisons between collodion and gelatine plates, very much to the detriment of the latter; but that was in the days when amateur producers of lantern slides employed for the purpose the same plates and the same development as for negatives. Now, however, it is recognised that *the* best results can only be got from special plates, and if these be used, whether commercial or home-made, the old stigma is entirely removed from gelatine.

The question is how to proceed. In the case of collodion, whether wet or dry, a great deal is or can be done by varying the exposure and suiting the development to it, in obtaining rich modifications of colour while still retaining clearness and gradation in the trans-

parency: but with gelatine my experience is that the exposure must, in the first place, be as carefully made as or even more so than if it were a negative, and any question of tone decided by the developer alone. I speak now of gelatino-bromide plates, such as those prepared by the formula I gave, or any of the reliable commercial lantern plates now on the market.

With a proper exposure—which, of course, can only be arrived at by actual trial or by experience—the best result is undoubtedly gained by the application of a developing solution of full strength; *i.e.*, of sufficient strength to complete the process in one operation without any further addition of either alkali or restrainer. Under such circumstances the operation is rapid, and there is less chance of the almost inevitable staining of the film, while the gradation is usually better than when the "tentative" or slow method of working is followed, though for negative purposes that may be recommended. It is easier, knowing the plates, to accurately judge the exposure necessary for a transparency than for a negative, and consequently it is not so difficult to fix upon what may be termed a "normal" solution.

Of the numerous developers in vogue or recommended for negative purposes, the only ones that need be considered as practicable for transparency work are pyro, ferrous oxalate, and hydroquinone. Of these ferrous oxalate may, I think, now be set aside as superseded entirely in all its good qualities, without its defects, by hydroquinone. For pure black or grey shades ferrous oxalate had, no doubt, an advantage over pyro, which does not readily yield such tones; and when its freedom from yellow stain is taken into additional consideration, it is not surprising that the iron developer should have formerly found great favour for positive work of all kinds. For transparencies, however, the same results can now be got with hydroquinone with less trouble, with equal freedom from discolouration, and without the necessity for the special precautions in making, storing, and using that prevail with ferrous oxalate.

For general work I must say I personally prefer pyro for all transparency purposes, as it gives a better if not the fullest range of tones than hydroquinone. Thus, if brownish black or nearly black tones are satisfactory, pyro and ammonia, combined with sulphite of soda or followed by an acid clearing solution, will do all that is necessary. If purer black tones are required, it is only necessary to change the alkali, using carbonate of potash or of soda instead of ammonia. If the potash salt be used sulphite is scarcely necessary, though it perhaps saves the necessity for an after application of a clearing bath. With carbonate of soda, however, the sulphite must certainly be used, or the pervading colour of the slide will be a sickly yellow.

If tones of a warmer or "purple" character are desired resembling albumen prints or collodion transparencies, the employment of "metabisulphite" of potash, in conjunction with pyro, will bring about the desired result. It is remarkable how this particular salt seems to work in the direction of purplish tones when none of the other sulphites nor free sulphurous acid possess the same property. I have seen transparencies produced on gelatine plates by the aid of "metabisulphite" which it would be extremely difficult to distinguish from the best collodion emulsion work.

The normal solution for pyro development may be something like the following, which is my own "stock" formula, and appears suitable for any good plate, so far as I have used it with my own and several brands of commercial films:—

I.

Pyro	20 grains.
Sulphite of soda	90 „
Citric acid	5 „
Water	10 ounces.

II.

Liquor ammonia (·880)	30 minims.
Bromide of potassium	3 grains.
Water	10 ounces.

The last I keep in stronger solution for "stock," diluting it down to above proportions for actual use. The stock solution consists of:—

Liquor ammonia (·880)	1 ounce.
Bromide of potassium	48 grains.
Water	1 ounce.

One drachm of the stock solution added to ten ounces of water makes the working developer (II.), which is to be used in equal proportions with the pyro (I.). The latter may be kept in concentrated stock solution if preferred, but in my own practice I find it better to keep the sulphite in solution of known strength, and to weigh out the pyro and citric acid as required.

With a correct exposure this combination will give very pleasing black tones, with a tendency to brown, or with some plates an olive shade. If a browner colour be desired the sulphite of soda may be omitted, and should any yellowing occur in development the clearing solution of acid alum resorted to. On the other hand, should pure black tones be the desideratum, for the ammonia solution given above one of the following may be substituted:—

III.

Carbonate of soda (crystals)	360 grains.
Bromide of potassium	3 „
Water	10 ounces.

Or IV.

Carbonate of potash	400 grains.
Bromide of potassium	3 „
Water	10 ounces.

In the last case the restraining bromide may be omitted, but it should be remarked that with many commercial plates the carbonate of potash has a very strong tendency to produce frilling, which should be taken into account in time.

If the warmer tones are required, the formula I use with metabisulphite of potash stands as follows:—

I.

Pyro	30 grains.
Metabisulphite of potash	30 „
Water	10 ounces.

II.

Liquor ammonia (·880)	1 drachm.
Bromide of potassium	3 grains.
Water	10 ounces,

to be mixed in equal proportions for use. Both these solutions may be kept in the concentrated state and diluted for use, but it must be borne in mind that owing to the presence of free sulphurous acid in the pyro in this formula its own ammonia solution alone is to be used, and not the weaker one previously given.

Those who prefer the pure black tones, formerly obtainable with certainty only by the use of ferrous oxalate, will find the following hydroquinone developer give satisfactory results:—

I.

Hydroquinone ("permanent")	30 grains.
Sulphite of soda	120 „
Citric acid	5 „
Water	10 ounces.

II.

Hydrate of soda	60 grains.
Sulphite of soda	120 „
Bromide of potassium	5 „
Water	10 ounces,

to be mixed in equal proportions when required for use. This developer acts far more slowly than pyro, especially in *starting* the image, therefore patience must be exercised, and the results will be all that can be desired. Hydroquinone with some brands of plates has a tendency to give excessive density, and this is especially objectionable for transparencies for the lantern. If such inclination should show itself, dilute the mixed developer with water instead of varying the proportions of the ingredients.

The formulæ and proportions I have given relate to normal or correct exposures, but in case of error in the latter respect it will rest with the operator to modify the proportions so as to produce the best result possible. This, however, will never, in my opinion, equal that attainable with proper exposure, which I take it to be the principal point to be looked at in lantern slide making.

C. Beckett Lloyd.

THE NEW BENZOLINE LIMELIGHT.

III.—Theoretical Considerations.

In carrying out a series of experiments it is necessary to take some theory as a guide. A bad theory is better than no theory at all, for in following it up very often the true principle is brought to light. In forming a theory it is desirable to take into consideration all known facts bearing on the question, then to devise some theory that will explain these facts, and afterwards to test its truth by experiments.

In that little department of science which is occupied by the limelight in its various forms, several facts, which we may term axioms, are well established.

1. The amount of light emanating from the incandescent lime is dependent, in some unknown ratio, on the heat of the flame playing upon it: the hotter this flame becomes the more *intense* is the incandescence, and the more brilliant is the light.

2. The power of the light, when the heat of the flame is constant, varies directly as the *area* of incandescence.

3. The more perfectly the gases are mixed previous to combustion the more intense is the incandescence, and the brighter is the light; thus the mixed-gas jet is more powerful than the blow-through jet.

4. In the mixed jet the aperture of the nipple is limited to a certain definite size; but this maximum size varies slightly according to the manner in which the gases are conducted to it, and also according to the kind and quality of the gas consumed.

5. The maximum bore in the case of pure hydrogen is smaller than in the case of coal gas.

6. The limelights of hydrogen and coal gas are about equal in brilliancy with the same size of nipples; but as coal gas can be used in a nipple of larger bore than is practicable with pure hydrogen, the maximum light of coal gas is greater than the maximum light of pure hydrogen.

The first axiom relates to the *thermometric* heat of the flame playing upon the lime; the second has to do with the *specific* heat of the flame; the third indicates a loss of power and waste of gas due to imperfect combustion when the gases are not well mixed; the fourth axiom depends on the incapacity of flame to pass through small apertures in cold metal; the fifth and sixth show that the flames of oxyhydrogen and oxycoal gas have different properties.

Before discussing these matters it will be best to admit that my knowledge of physics and chemistry is by no means profound, and that therefore my remarks are held open to criticism and correction.

The heat of the oxyhydrogen flame is usually stated in scientific manuals to be greater than that of any other known flame; this I believe to be an error if the *thermometric* heat is meant, though it is true if *specific* heat is referred to.

Thermometric heat is the heat which affects the thermometer. A high degree of it melts minute refractory substances, such as platinum; but it *may* have little actual *quantity* of heat or working power: thus it may have little effect when applied to the boiling of water or production of steam.

A flame having a high degree of specific heat is capable of doing a fair amount of work, such as converting water into steam, but may not be able to indicate a high temperature with the thermometer—not to melt refractory substances.

With the limelight a flame of high thermometric heat will produce a great incandescence and much light from a small spot of the lime, but may not be able to heat a large *area* of the lime surface. On the other hand, a flame of large specific heat is capable of heating a large area of the lime, but the degree of incandescence may be low and the light poor. Thus two flames may be of the same size, and yet produce different results in the limelight.

The oxyhydrogen flame is produced by the gradual combination of, let us say, one pound of hydrogen with eight pounds of oxygen, mixed intimately together, and escaping from the nipple of a mixed-gas jet. There are thus nine pounds of gaseous fuel, which are changed by combustion or chemical union into nine pounds of intensely superheated *steam*. This superheated steam immediately loses its heat, partly by transference to the lime, partly by radiation, and partly by convection or dissipation in the surrounding air.

It is not difficult to calculate theoretically the actual temperature of the oxyhydrogen flame. The change of one pound of hydrogen and eight pounds of oxygen into nine pounds of steam is accompanied by the liberation of 34,400 units of heat (Bloxam). This means, I suppose, that our nine pounds of fuel are capable of raising the temperature of 34,400 pounds of water, just 1° C.; or, if we can imagine such a thing, it is capable of warming one pound of water to a temperature of 34,400° above the normal. However, when water is heated to 100° C. it begins to boil, and is converted into steam; and before the steam can be raised to 101° C. a large proportion of our heat power is expended—viz., 4833 units. By this loss our available heating power is reduced to 29,567 units. But even the steam cannot be warmed this number of degrees, for there are *nine* pounds of steam produced by the combustion of our stock of fuel, and our 29,567 units must be divided by nine, which leaves us only 3285° C. of increased heat.

Fortunately for our limelight there is another factor to be considered; the same heat which warms one pound of water one degree will increase the heat of one pound of steam more than *two* degrees. Thus, we finally arrive at the temperature of the oxyhydrogen flame, 6844° C.

If we calculated the temperature of a theoretical *oxycarbon* flame in the same manner, we find it is 10,178° C. (Bloxam), nearly half as much again as the oxyhydrogen flame. Pure carbon does not exist in the gaseous form, so far as I know; but compounds of carbon and hydrogen *do* exist in the forms of coal gas, and vapours of benzole and petroleum products. The temperature of an oxycoal-gas flame, which may be regarded as a mixture of four volumes of hydrogen gas, of carbon gas, and four of oxygen, is between the temperature of an oxyhydrogen flame, 6844° C., and the oxycarbon flame, 10,178°; hence, the coal-gas flame is *hotter* than the hydrogen flame.

With vapours of hydrocarbons mixed with pure oxygen, the higher the proportion of carbon consumed the hotter is the flame, and the more *intense* is the incandescence. Benzoline has more carbon in it than coal gas, hence the benzoline limelight is *brighter* than the coal-gas light.

Benzole, C_6H_6, has more carbon in its composition than benzoline, $C_{10}H_{22}$, or C_nH_{2n+2}, and therefore the benzole limelight is more powerful than the benzoline light. Experiments confirm this theory, for with a nipple of one-fourteenth of an inch bore, the benzoline light is forty per cent., and the benzole light is sixty per cent., brighter than coal gas with the same pressure of oxygen.

Albert W. Scott.

THE ILLUMINATION OF NEGATIVES FOR TRANSPARENCY PRINTING BY ARTIFICIAL LIGHT.

I.

The extraordinary impulse which has of late been given to the production of lantern slides at the hands of amateurs and others by the introduction of the so-called special lantern dry plate has, doubtless, done much to make the practice of photography by amateurs an all-the-year occupation, for, by their agency, advantage may be taken of many a winter evening to spend a pleasant hour or two in throwing off from a stock of negatives these delightful little positives. In the past the advent of dull October or dreary, dark November meant with many amateurs the collecting together of their stock of photographic apparatus, with the view of carefully storing the same away till the return of better light; and even with those workers who still confine themselves to working with plates of large sizes, *i.e.*, negatives of, say, whole-plate dimensions, to a certain extent, doubtless, such is still the practice; for, with all the popularity of the recently introduced lantern plate, it is a fact that such have been more particularly adapted for use with small-sized negatives for contact printing, or else for merely utilising a small portion of a larger negative. Not that such restrictions were brought about by any unsuitability on the part of the plate for reduction through the camera by daylight, but the almost impossibility to so illuminate a negative of large size by artificial light—say, a whole-plate, for instance—in such a manner as to print a transparency that will be absolutely free from flare spots or other equally serious defects which are entirely due to unequal illumination of the negative, deters many of those workers who only work large sizes from engaging in such an entertaining occupation during a winter's evening.

For some time I have given this subject a good deal of consideration, and, I believe, have experimented with all the known means of illumination. In the course of my experiments I was often elated at a few isolated successes which attended my efforts with the agency of magnesium ribbon, a few inches of which being ignited and wafted in front of a diffusing screen placed in advance of the negative; but these successes could not be repeated with anything like regularity. Doubtless, when operating with small negatives of the lantern size or quarter-plate class the chance of success was much greater, but whenever the negative to be printed assumed the dimensions of a whole-plate, failure invariably followed any attempt to equally illuminate all portions of the negative, and, therefore, the use of magnesium ribbon for such work entirely failed, and had to be discarded.

I next had recourse to the limelight, and for a time fought on manfully, in the hope of eventually overcoming the difficulty with its aid. Here I found I had the power of illumination, but no matter what means I employed to diffuse the rays of light when projected in a parallel direction, there was always an attendant flare spot. To overcome this the services of a large bi-convex lens was brought into requisition. This to some extent improved matters, but still the objection referred to was present in such an aggravated form as to completely spoil results when large negatives were being copied. And not only was the limelight unsuitable when employed to throw parallel rays through the negatives, but even the services of two jets were found insufficient to do the work when employed side by side of the camera and their combined light reflected from a screen placed in front of the negative.

Paraffin lamps next occupied my attention, but with them I could are no better. At the best they were troublesome, and when placed in front of the negative were just as prone to cause flare spots through the diffusing screen as any of the other methods I had employed.

My next attention was directed to the employment of common house gas as the illuminating agent for the work, and I soon became convinced that such was by far the most suitable, being in nearly every instance far more handy to use than any of the other means. And so I jogged along, trying all sorts of ways of illuminating the negative. Still, whenever the light was used to throw parallel rays through the negative I invariably failed to secure on development a perfect result. Over and over again I judged by the appearance of the image on the ground glass that I was about right, but experiment showed me such was very deceptive, and one by one my hopes were dashed to the ground; for, as we say in Scotland, "The proof of the puddin's in the preeing o't," and never was this saying better exemplified in my experience than when conducting these experiments. Finally, I was giving up all further attempts, and agreeing with the opinion of the worthy President of the Glasgow Amateur Photographic Association, who, after repeated trials on the same subject, came to the conclusion that to reduce through the camera a large-sized negative, and with the aid of any of the so-called lantern plates make a transparency with artificial light, was impossible, when I luckily thought over the whole of my experience. On coming to put this and that together, I was quite convinced that if success was to be achieved it would not be done by transmitting light direct through the negative in parallel rays from the source of light, no matter what lenses or diffusing screens were employed to equally illuminate the negative; on development such means were found wanting. I therefore turned my attention to the employment of reflected light, and on again making further experiments, I was overjoyed to find I had solved the problem. In the course of my later experiments, step by step I worked up the subject, and I can now, with the agency of common house gas, or limelight, or any useful paraffin lamp, undertake to print of an evening straight away, with absolute certainty of success, negatives of any size by reduction through the camera to lantern size. And not only can I do this with unerring certainty, but I can so arrange my means of lighting as to give extra illumination to any portion of a negative that is more dense in some parts than others, or, on the other hand, cut off the light from thin parts of a negative, which would, of course, print in less time than the denser portions, and this without the aid of any diffusing screens, which in themselves absorb so much light. In the course of my experiments I bethought myself that were I to make an illuminating chamber of such shape and size, and of such material that any ordinary source of light might be employed without the rays from such falling direct on the negative, but still of such illuminating power or intensity as to so light up the chamber that when a negative was placed against any aperture in the walls or sides of such that the same would be so illuminated as to permit of any of the so-called lantern or other dry plates being sufficiently exposed within reasonable limits of time, that I would stand a good chance of success, and therefore, after many other attempts, I decided to put this to the test; I no sooner fitted up the chamber than I saw at once I had for all time coming solved the problem of making lantern slides from any size negatives by artificial light. So delighted was I with the simplicity of the apparatus, and the ease of working the same, that there and then I decided to take out provisional protection in the shape of patent rights, and with those to whom I have shown the illuminating chamber working there is only one opinion expressed, and that is unqualified approval of its entire success. And not only is this chamber adapted for printing transparencies, it can be utilised for numerous other branches of photography, such as copying paintings or engravings, or any opaque objects, there being entire absence of reflections from paintings or even glazed pictures when placed inside the chamber to be photographed. In conjunction with several local gentlemen, I have submitted this apparatus to a series of exhaustive tests, and in no case has it failed.

At the request of the Council of the Glasgow Photographic Association I have agreed to submit my illuminating chamber for inspection by the members at their next meeting, along with some specimens of the work I have achieved with it.

In my next I shall describe fully the construction of the same, and give details of the results of a series of test experiments conducted by me, not only in the making of transparencies, but also in the photographing of opaque subjects by artificial light. Meantime, I claim to have overcome all difficulties in the way of printing transparencies by artificial light by reduction through the camera.

T. N. Armstrong.

THE STANDARD OF EXCELLENCE IN OUR ART.

[A Paper read at the Camera Club and published in its Journal.]

Granting me, for convenience, the use of the word art in a restricted sense to embrace only that which is usually understood by the term fine art, we have nothing to do with the consideration of the useful or economic arts, whose aim is but to supply the wants of an hour or an age, seeking to be useful regardless of any higher aim. Art, as I shall use the term, has only to do with the perpetuation of beauty, and is less the outcome of manipulative skill than the voluntary realisation of the action produced by the original on that part of the human fact which I find it difficult to describe by any other word than the soul.

Art, in it widest sense, must be either subservient to our lives or the object of it; if the former, then the results are essentially useful in the ordinary acceptation of the word, and become necessary to our social and national condition. The higher arts, such as music, the pictorial arts, poetry, and others, are with us to elevate and ennoble, not mere sensual pleasures, but pleasures which help to make life brighter and men better by lifting them for a time from beneath the burden and reality of life, which in their effects are more or less degrading to our better instincts; or they may have another, perhaps higher function, with respect to the unexplained though more than suspected part of our existence which is associated with the idea of another life.

It should be needless for me to point out the two rapidly divergent paths which our new pictorial art is developing. Hardly a week but we find some new application of photography in the world of manufacture and mechanism, but contemporaneously with this extending usefulness of the photographic craft we may also note the advance in the direction of art properly so called.

The photography which seeks merely to commemorate places and events must, sooner or later, be included in the category of arts useful, even though at times their usefulness be hard to discover, leaving us, therefore, free to pursue the consideration of that part to which alone I pray leave to attach the name of art. The dignity of such art or science has been admitted by the greatest men, and I deem it unnecessary to suggest new arguments or to quote old ones in justification.

To quote a modern writer upon art of undoubted eminence:—"Art, properly so-called, is no recreation; it cannot be learned at spare moments, nor pursued when we have nothing better to do. It is no handiwork for drawing-room tables, no relief *ennui* of boudoirs; it *must*

be understood and undertaken seriously, or not at all." Had this been understood as applying to photography, and been grasped more widely, photography would at the present time have stood higher in the general estimation, and its ablest exponents would have been spared the energetic disavowal of the great mass of worthless work.

It is not too much to assert that a work of art, to be good art, faithful to its intended purpose, and fulfilling entirely the intentions of the artist, must be the offspring of enthusiasm and love.

Work which is the outcome of dilettantism and holidays is trivial, and seldom appeals to any but the author. It is not difficult to trace the increased power of art as its connexion with nature becomes more intimate, and the nearer it is to the natural truth which it seeks to represent, so much the less are we sensible of its human origin—the wider its departure the sooner the mind reverts to the recollection of its artificiality, and values it the less.

It has been said of Shakespeare that he stood aside to watch the world, and then returned to record its doings; and it is precisely this that is required of the artist. The revelation of the hand that moves the puppets mars the entire show—and similarly an element of weakness is found in a picture which is a mere invention of the artist's, which will inevitably catch something of the commonplace character which reveals the guiding hand; hence a degree of spontaneous action is necessary, an impulse, an enthusiasm, if we would accomplish that which is great. "A man in ecstasy of anger or passion is an unconscious actor," and he that is enamoured of nature will self-forgetfully portray her truthfully according to the purity of the inspiration, and thus is the suspicion or evidence of design avoided.

Granted, then, that a work of art has a definite mission to humanity, its merit must be commensurate with the amount of response which it awakens in other minds. It will be beautiful only as it is true, and notwithstanding the fact that the majority are *actively* ignorant of the truth, yet this same majority readily recognise truth when clearly presented and inwardly find pleasure therein.

This tends to lead us to the somewhat metaphysical conception of an aboriginal appreciation of the beautiful and knowledge of the truth universally existent, but dwarfed, corrupted, and well nigh exterminated by the pressure of conventionalities and the ever-present struggle with the environment, but which responds at the sound of a true and harmonious chord, such chord, such work, be the instrument what it may, being the reappearance of the original mind, and will arouse in the listener or spectator sentiments exactly corresponding with the impressions made by nature upon the imagination of the artist. Only by this theory can we explain the fact that good art produces the same feeling of admiration upon all cultivated minds in all nations and in all ages.

The truth is in us all, latent or assertive, accordingly as our inclinations or as circumstances have led to the cultivation of our intelligence; and in the presence of good art, that is truth, we derive nothing which is entirely new, but only bring away a clear revelation of that which was already in us, and recognise as it were an affinity.

In some the truth within is more easily quickened, and once called into activity an increased desire is aroused which seeks to be satisfied; whilst, again, in others it is not until the truth is often repeated that the response comes, feeble at first, but surely, and on this I base the theory of education to fine art and the gradually increasing recognition of its value.

In the history of the civilised world some works of art there are which, in their appeal to human sympathy, are imperishable. It is not the arbitrary verdict of a school, but the voice of a race which unconsciously recognises truth and beauty. It may be that in earlier times the human mind was less fettered by surroundings, less begrimed, so to speak, by the smoke of civilisation, and hence its contact with nature became closer. There was absent the desire to appear at each exhibition, or to produce a contemporary social impression by the multiplicity of works, and hence the artist expended his skill only at such times as when his mind received, as it were, a vibration direct from nature, and his interpretation was true, and has been proportionately lasting.

Irrelevant as all these generalisations may appear, I must ask your pardon for introducing them. I have conceived it necessary for my purpose to lay the strongest possible emphasis upon the intellectual aspect of art, rather than the commonly if improperly styled æsthetic.

True as I believe these points to be concerning art generally, so also of photography, and I shall not in the present assembly make apology for regarding photography as an art, or for claiming for it a position side by side with sister arts of earlier origin. Given the factors and conditions, the time, the circumstances, &c., I take if there is only one entirely true artistic realisation of the natural impression. To put this in more commonplace form, if the subject be, for instance, "Feeding the calves," and the precise background and surroundings, number of figures, lighting, and all other circumstances be given, there is one, and only one, perfect pictorial realisation of that subject; there may be many good, but only one perfect, and the nearer the artist approaches to that one possible result, so is his work good, and its effect on others enduring. It may be that no one has ever found that one truth, but approaching near to it, nearer than all others, his work survives in our memories and claims supremacy; the impression conveyed may endure for long amongst the people, but it has not that immortality which belongs to a work which is the embodiment of the whole truth reflected from nature.

Hence it is that within our comparatively limited photographic sphere we have some few pictures which, possessing a nameless charm, have gained almost universal approbation, rising superior to prejudice or the teachings of certain schools, for these examples have respectively approached most nearly or, it may be, have actually attained the perfect artistic reflection. I have already spoken of the seriousness of art, the necessity for earnest thought. Nature itself is desperately real, and even in her most joyous aspects there is ever present an earnestness of purpose, unimpassioned and law-abiding; that which may appear whimsical is as much the outcome of law as the most sober facts, hence it should follow that good art is never reached by chance, and this, as a general principle, assuredly is so. Then some will call attention to "lucky hits," wherein a chance exposure has given a result surpassing in effect our most preconsidered efforts; even so, of all the pictorial arts in photography is this most possible, and it helps to show the necessity for self-suppression on the artist's part, and the mechanical instrument may thus convey nature's message as the mind and hand have too often failed to do.

It is generally admitted that we are ignorant of the possibilities of the power which photography has placed in our hands, and it may be in some respects this new art is destined to accomplish more completely than any other the highest object of artistic endeavour. Even in the most perfect works of brush or chisel the presence of the very human is not far to seek—the morbid, the sensual, the puerile—whereas the very unconsciousness of the mechanical and chemical action which we employ may be a means of avoiding the introduction of our own personality. But this is purely speculative.

Now, if these generalisations I have advanced be mainly true, it assists me to the assertion that in the production of a photograph full regard for the action of the mind is of primary importance. If our valuation of the beauties in nature were solely dependent upon our sight organs, surely all men would seek to reproduce only the same scenes, and vast as the field might be we should, perchance, by this time have been approaching its exhaustion; as it is, one mind is powerfully moved by a combination of objects in nature which fails to appeal to another. Probably both see the same physical facts, but to the one only was there a mental impression formed which, giving pleasure, impelled the exercise of his faculties to perpetuate that impression in his reproduction. On these grounds we are better able to understand the possibility of a beautiful picture being suggested by the most commonplace and ordinarily uninteresting objects. It is not superiority of manipulative skill, or keenness of vision, or yet the acquired knowledge of rules laid down by past masters, that enables us to produce a photographic picture which shall satisfy, but the inherent and cultivated artistic faculty which once receiving a pleasurable impression from nature strives towards the reproduction of the intelligent or spiritual idea, having only a limited regard for the visual.

In this, to me at least, there is a powerful suggestion towards the solution of the long-contested questions—first, as to how wide a field or angle; and, secondly, as to how much of the minute physical facts in an object may be advisably given in a picture. The extent or the quantity of which the human eye is sensible appears to me to have less to do with the matter than we are apt to suppose. The same craftsmen who have given us the telescopes and microscopes also make our lenses, and these well-intentioned opticians have pandered to our vanity and love of power and possession, and have led us astray so that some, eager to avail themselves of a newly acquired power, make a print in which no blade of grass or tiniest pebble is lost. And so on this ground disputants have recently met in worthy conflict, and little wonder if their arguments were couched in unfriendly terms when each attempts to teach the other the use of his eyes.

The eye may be pleased with a congregation of brilliant colours, or with the symmetry of a crystal; but it is the mere pleasure of sense, and the soul remains unmoved. The eye may take in the contrasted lights and shadows on the surface of the unruffled lake, the fringe of bending reeds, and the lifted summits of tall hills, subdued in shadow when the sun is low; there the mind is filled with a spirit of rest and calm, and

with it carries away the general impression of the lake and mountain scene, but in that impression the memory of the species to which those water-reeds belonged, or if their stems be round or angular, has no part, nor yet the presence of a few small flowers on the bank, or the sheep and other objects far up the mountain-side, only discernible with diligent inspection. But I do remember that midway across the lake, where the water was shallow, long blades of grass sprang from the surface, and some there were silvery green that floated and caught the light and made bright streaks of trembling radiance; and there were, too, some flowers. I saw them well enough, and remembered and knew them again next day when the children came home laden with their wild flowers.

All these facts impressed me, but not one more must I bring into my picture if I would seek to give again the sentiments produced as I stood by the shores of that lake, for if in my picture my lens or my too-biassed pencil introduce other matters, I shall require to return to that scene to observe what these other matters did there, and, perchance, now I shall find evidence of human habitation which had previously escaped me. The impression which I now receive is one of simple rustic happiness—a cottage and a homestead and the activity of a life; the mountains and the lake are still there, but no longer paramount. It were, perhaps, better for our artistic perception if places had no name, and trees and flowers had not been classified by the scientist, so that we should take things for their innate beauty only. Look back upon your holiday sojourn amongst Welsh mountains, and admit that as you approached Snowdon from the eastward and watched the shifting light on those three harmonious peaks, had you not contemplated their ascent or been of an inquisitive mind you would have little cared to inquire whether those slopes were grass-covered or rocky, wild, or under cultivation, and the impression which you carried away, and of which you afterwards spoke with such pleasure was of a group of mountain peaks with steep declivity, of broken green and grey, more green where the grassy valley met it, and below a stretch of water, mirror-like, in which a herd of cattle—black, shaggy, and long-horned—stayed to drink; on either side the valley was hemmed in by ridges of hills, but you do not remember whether they were clothed with grass or heather, or any particular about them. Yet the impression on the mind was a full, deep pleasure, and satisfying; no picture, no work of art, however perfect, could be more so. Should we seek then to add one feature, and, if so, to what end? Equally, however, is it necessary to avoid arbitrary exclusion or destruction of detail, lest by the destruction we create a void which would no less destroy the completeness of the impression or would betray the presence of the prejudiced hand. Another point which, to my mind, is too often forgotten, is the distinctly *selective* character of art. He is most powerful as an orator who, whilst seeking to drive home to his hearers a doctrine, has, by reason of his peculiar genius, the power to centre all attention upon the one truth in his mind; all side issues and contingent subjects are distanced, not so much as to forget their connexion, but for the time the one question arrests all, and his hearers know of nothing else but the one truth pointed out; the speaker himself is not so much felt, he seeks to teach not what *he* believes, but the truth apart from himself. The painter, the dramatist, the poet, seek not to represent or describe all nature, but some individual facts lifted out from the surroundings for a time that they may be the better seen and understood, like one clear solo voice which rises above the attendant choir, exquisitely blended yet supreme. And even of the one selected fact or groups of facts art does not tell the whole. The poem that describes the beauties of an Italian landscape pauses not to give the details of a Murray or a Baedeker, but in the few facts noted a grand and powerful suggestion of the whole is given. Whilst writing this I casually take up a volume of Longfellow, and my eye falls upon the following, which will serve as an example:—

"The lovely town was white with apple-blooms,
And the great elms o'erhead
Dark shadows wove on their aerial looms,
Shot through with golden thread.

"Across the meadows, by the grey old manse,
The historic river flowed;"

and so on.

Surely no one can fail to find in these few lines that which will suffice to call up the whole of a fair country scene, and awaken those pleasurable feelings which inspired the writer.

Simple, selective, careless of detail, so long as the few recorded facts are true, is the best art, and wherefore not photography? The typical impressionist, like most reformers, over-reaches himself, and in his anxious avoidance of popular error, betrays his presence in another direction. How difficult it is to perceive the direct influence of nature's impulse they best know who lovingly and with sincerity have striven to succeed. The question of the amount of detail required in the one central object appears to me to come under precisely the same explanation. Just so much and no more as shall suffice to give to others the pleasure attendant upon the idea which we ourselves received, not the whole string of ideas which passed through our mind as we gazed upon the view. Convey the most powerful effect by the simplest possible vehicle, for we may recognise that strongest effects are concurrent with simplicity of design. The standard of excellence for us is not to be judged by the writings or the works of this or the other well-known man, nor is it to be drawn from the study of what great painters have done. Even our ideal colour should not be in imitation of an engraving, black or sepia drawing; in this latter respect our means are necessarily limited, we are wrong in being led by the dictates of him who loves to view nature with the magnifying power of a field glass, or of him who would show us the objects of nature as though they were dissolving into their original elements, and chaos were overwhelming everything. We require to be more independent in action, applying ourselves constantly to the observance of nature, and seeking to reproduce by those means with which our art supplies us, not the visual impression chiefly, but the mental, the pleasurable impression of which we ourselves become conscious when the great spirit of nature seemed to penetrate into our being. If some should ask how I propose to do this, with what instrument or by what modification of the appliances generally in use, I humbly make reply, I am trying to find out, and if you will, may hereafter offer suggestion. I feel assured that photography, by reason of its natural or scientific origin, should powerfully assist the receptive mind to work out and give to others, not merely a pretty thing to look upon, but a sentiment of pure delight, and so teach men to discern and understand the beautiful in nature. And now, having proceeded thus far, I find myself in imminent danger of that withering condemnation, "another convert to naturalism," and we all know there can be nothing worse than that! But of the influence of schools and factions I plead "not guilty." What I have said I have felt, not so much as a photographer, but as an earnest art student and a lover of nature—not a pastime, but a day-to-day principle; and although with firm conviction, yet with diffidence, I have offered my remarks, and thank you for your patient hearing.

A Horsley Hinton.

LETTER FROM GERMANY.

What is Nuktigonia?—Magnesium Flash Light for Colour-sensitive Plates.—Taking Interiors Facing Bright Windows.—The Compensator, a New Instrument for Equalising the Brightness of Wide-angle Lens Pictures.—Focussing with and without Stops.—Keeping Qualities of Untoned Pictures.—Uranium Intensifier.—Chromate of Sodium for Photo-Printing Processes.—Dr. Miethe's New Flash Lamp.

Recently I received a sample of a wonderful new American preparation, "Nuktigonia," which is said to permit the development of dry plates by daylight. The same consists of a deep yellow-red liquid of which 1 c.c. is to be added to 120 c.c. of developer. The price of sixty grammes of liquid is one mark.

It will be observed at once that the purpose of the preparation is the cutting off of the chemically active rays of daylight. The solution, as discovered by my son, is nothing else but a concentrated solution of a known azo-colour matter, Tropäolin, which is found in the market at the price of 2.20 marks per 100 grammes. The value of this invention is very questionable; the red-yellow solution, it is true, keeps off the chemically active daylight, but the plate has to remain in the solution during development; the negative can, therefore, be examined only from the face side. While the tray is being rocked it may happen that the protecting liquids will run off on one side of the negative, and the light will then affect the plate if the tray is not sufficiently covered. This shows that the plate will by no means become non-sensitive against daylight by applying the so-called "Nuktigonia;" and the formula prescribes, therefore, distinctly to have the tray covered when brought to daylight, to use a black dish for developing, and to add also Nuktigonia to the fixing bath; it says, finally, very explicitly, "not to lift the plate from the developer until the same is ready to be fixed." That the great advantage of controlling the development of the plate by its transparency is entirely lost by manipulation, and that the examination by daylight has also its difficulties, needs no further comment. The experiment of developing plates in daylight is also not new. Mr. Jahr, at a meeting of the Verein zur Forderung der Photographie in Berlin, relates that Mr. Kurtz, in New York, developed some years ago at a meeting a plate in a bright lamp light with oxalate developer, which retards also the active light by its brown colour.

Mr. Battin is of the opinion that the application of aurine might be still more advisable, and likewise the application of a dipping tray or bath made of red glass, as recommended years ago, so as to examine the plate

by looking through it during development. He remarks, however, that many times already he has developed the less sensitive bromide of silver paper under a brown oxalate of iron solution in daylight.

In an American contemporary I read about a great novelty of taking interiors on colour-sensitive plates with magnesium flash light. To magnesium containing not many red and yellow rays it is recommended to add ingredients which will produce yellow and red light. The following is recommended:—Pulverised metallic magnesium, one part; nitre, five to seven parts. The flames give a penetrating yellow light, for which the plate is very sensitive. The details of the shadows come out excellently, and the strength of the negative is equal to one made on the most rapid plate, and in white light. This method has proved to be very satisfactory for interiors, copies of paintings, and portraits. The quantity of powder to be used changes, of course, according to circumstances, the extremes being from two to thirty grammes. To this we would remark, that already two years ago—during the early days of this flash light—Messrs. Gadicke and Miethe applied mixtures containing soda for pictures of coloured objects, and obtained also a patent for the same.

Mr. Archenhold, one of my students, had to take a number of interiors lately facing bright windows, and obtained very successful results. He proceeded in the following way:—The light parts of the pictures which could easily be located on the ground glass were completely cut off from the objective by an opaque disc of the shape of the light parts, two precautions being observed. In the first place, the side of the disc facing the objective must be blackened and kept from exposure, to prevent any disturbing reflection; and, secondly, the disc should have a very thin wire, by which it can be worked along from one side to the other at a distance experimentally determined, so as to cover just the light parts of the object to be taken, and without the wire being seen on the picture. This manipulation is continued until the dark parts have sufficiently acted, after which the exposure proceeds for a short time without the disc.

This process permits a regulation of the exposure for the dark and light parts of the object in the correct proportion of their intensity. The dark parts will not be under-exposed, and the light parts are not over-exposed.

Mr. Stieglitz declares, with regard to the same subject, that the halation obtained generally around bright windows, originates from the reflected light of the back part of the plate. Negatives on "films" would suffer much less.

Dr. Miethe remarks, that for the moderation of this appearance the back part of the plate is coated with a black varnish by some photographers, but this would arrest the reflection only when it has the same refraction index as the glass, for instance, the black of Canada balsam.

Dr. Miethe, who is now editor of the *Wochenblatt*, at the last meeting of the Amateur Verein, called attention to the evil that the edges of a picture taken with a wide angle lens receive considerably less light than the centre part (at an angle of 100 only one-sixth). The whole visual field can therefore be only evenly exposed by a proper reduction of the light in the centre. This was done by a star-shaped piece of pasteboard, which was moved at a certain distance from the lens covering the same. In place of this Dr. Miethe uses a plano-convex lens of smoked glass with a corresponding plano-concave lens of white crown glass, which combination is called a "compensator," and is fastened directly to the objective. We recommend this compensator for all wide-angle lenses.

At the same meeting attention was called to an optical error which has had a wide circulation. We read in many photographic text-books about the change of focal distances with the size of the diaphragms, and it is recommended to make observations about this appearance, because it is an old habit of the photographer to focus the picture on the glass without diaphragms, and insert the latter only afterwards. Dr. Miethe, a great optimist, declares that the focus remains the same with new instruments notwithstanding diaphragms. Only old, badly corrected instruments, where the rays could not be brought to an exact focal point, have this appearance.

Another question of general interest, which was spoken about at the same meeting, is the following:—The fixed and washed, but not toned positives, give, as is generally known, brown pictures. Are these very durable? Has the toning another purpose than the changing of the colour of the originally brown pictures?

Mr. Stieglitz is of the opinion that the untoned pictures are just as durable as the toned ones, particularly those on gelatine chloride of silver paper. Untoned pictures, however, have to be washed more thoroughly. Dr. Vogel's experiments have demonstrated beyond a doubt the inferior durability of the untoned pictures. Dr. Wullenhoff says that gold is chemically less affected than silver, particularly by the various sulphur compounds.

The uranium intensifier recommended by E. Vogel, jun., was also the subject of conversation at the same meeting. It consists of—

Nitrate uranium	1 gramme.
Red prussiate of potassium	1 ,,
Glacial acetic acid	20 grammes.
Water	200 ,,

This intensifies strongly, and has also the advantage that parts only of the negative may be intensified separately by applying the solution with a brush. The intensifier can also be removed again from the whole plates or parts only by diluted ammonia. By long-continued washing it can also be reduced, the water gradually dissolving the brown substances which affect the intensification. Such intensified negatives are washed therefore only for a quarter of an hour.

At Professor Husnik's establishment, in Prague, they use now bichromate of sodium with the best success for all the different photo-mechanical processes,—photo-lithography, photo-zincography, leimtypy, pigment process, dusting-in process, and the latest water light-druck process. This salt, in technically pure condition, is one-third and more cheaper than the potassium salt of the same name, and where from fifteen to twenty sheets of different kinds are washed daily and spread upon glass much solution is used, and much is wasted and lost by the squeegeeing out of the superfluous liquid which is between the paper and glass plate.

Quite an agreeable property of the bichromate of sodium is its enormous solubility in water, so that by application of a strong bath, or an abundant addition to the albumen, gelatine, dextrine, &c., the crystallisation of this salt will never be accomplished. The potassium salt will dissolve in ten to twelve times its weight, according to the temperature of the water, whereas the sodium salt will dissolve in only double its quantity of water.

The sodium possessing a much smaller atomic weight than the potassium, more chromic acid is bought; for instance, in one kilo of the sodium salt in question than in the potassium salt of the same name; and it does not require, therefore, such strong baths to obtain the same effect. But this advantage is to some extent counterbalanced by the circumstance that all bichromate of sodium salts which are found in the market contain water, and are produced in that condition for the convenience of dyeing establishments who apply only potassium salts for their solutions, and would otherwise be forced to make a change in the weight of the new salt for their formulæ.

For the above reasons, Professor Husnik says, "I can recommend this salt warmly for all reproduction processes, and I am certain that every one, after a first trial, will continue to use the same."

One of the latest novelties is Dr. Miethe's newly constructed magnesium flash lamp, for the use of magnesium powder only, and not for any explosive mixtures. The lamp consists of a simple Bunsen burner, in whose flame the magnesium powder is blown from the side obliquely toward the top. At some distance above the opening of the burner is a burning disc in diagonal position, toward which the magnesium powder is blown, so that a scattering of the powder and complete ignition is effected. Dr. Miethe declares that if he departs now from his and Gädicke's principle of the explosive magnesium mixtures, it is for the reason that with the latter only the surface of the flame is of any effect, this being very opaque. In consequence of this opacity all the magnesium burning up in the inner part of the large explosion flame would be lost for the light effect, while with the powder-light every particle comes into use. Much smaller quantities of powder are therefore required for his new lamp.

—*Anthony's Photographic Bulletin.* Dr. H. W. Vogel.

BLITZGRAPHING TWO MEMBERS OF THE PRESS.

Merely recognising the new term invented by the New Zealand press for flash-light photography, we subjoin a note received from a correspondent in Napier, N.Z., who says, "The annexed extracts from papers published here may amuse some of your readers. The fraternity at home would laugh at the apparatus that forms the subject of comment, and none of the patentees have any cause to fear being outdone. However, with the splendid clear light generally prevailing in this colony, 'Blitzgraphing' is not likely to be a brilliant success."

The press extracts are as follows:—

"Two press representatives were blitzgraphed last night. The process is not quite so bad as it sounds: they were simply photographed at a late hour at night. Photography has made rapid advances of late years, and the march of progress still continues. At home, where a good light for many months in the year is only available for a few hours daily, the problem of taking portraits at night was enough to attract the attention of the inventor. Some two years ago [illegible] were made with artificial light, and these being certainly improved [illegible] other improvements. Mr. W. H. Neal, of Tennyson-

street, had his attention drawn to the matter, and for the last six months he has been experimenting, having the valuable assistance of Mr. G. L. Clarke, the well known jeweller, who is an expert mineralogist, with a good knowledge of chemistry. The great difficulty to overcome was to prevent a puckering at the eyes, owing to the sitter when the light was turned on winking. Mr. Neal has overcome this entirely, for the sitter only winks when the operation is over. In the studio there are two gas stands of two lights each, and in front of them the usual screen, while between the lights of each stand is a funnel, the light in which is of a dirty colour, while it is by no means steady. There is a connexion between the camera and the artificial light, and suddenly, when the sitter is at his best, there is a brilliant flood of actinic light, occupying less than a tenth part of a second, and the blitzgraphing is over. The process, though founded on that in use in England, contains many improvements that have been introduced by the two gentlemen named, and it is quite likely it will be patented."

"Representatives of the *Herald* and *Telegraph* had a novel experience last night in connexion with an equally novel advertisement which appears elsewhere, announcing that Mr. W. H. Neal, the well-known photographer of Tennyson-street, is prepared to take photographs every Saturday night between 7.30 and 9.30, or on other nights by appointment. It is only some two years ago that the first partially successful attempts to take photographs at night were made, but since then rapid strides have been made. Some time ago Mr. Neal began to make experiments in that direction, and devised various improvements on the apparatus then in use. He has so far succeeded that in several trials lately he has taken some excellent photographs, and last night two newspaper representatives were invited to watch the process and 'sit' for their likenesses. On two stands to the left of the sitter burn gas jets shaded by some white material. At the back of these is a dull, dirty-looking flame proceeding out of a pyramid-shaped funnel, which is connected by various tubes and pipes with several mysterious cylinders arranged on the stand. These cylinders contain the materials used to give the necessary brilliant light. The camera and sitter being adjusted, Mr. Neal touched a handle, when the room was apparently lighted for the tenth part of a second by a flash of vivid sheet lightning. That was all. The exposure was even less than with the most rapid apparatus used in daylight. The plant, as we have said, is partially of Mr. Neal's invention. It has been made in Napier, Mr. G. L. Clarke lending valuable assistance to Mr. Neal in the manufacture and adjustment of the more delicate parts of the apparatus."

Our Editorial Table.

THE OCEAN OF AIR. BY AGNES GIBERNE.

London: SEELEY & Co., LIMITED.

MISS GIBERNE has certainly a happy way of popularising what are considered dull, dry, scientific facts. The work may be considered as a treatise on "meteorology for beginners." In the course of it she gives a graphic account of that remarkable balloon ascent in 1862, when Mr. Glaisher and Mr. Coxwell ascended to a height of seven miles, the greatest altitude that is known to have been achieved. The marvel is that they returned to earth alive, so intense was the cold and so attenuated the atmosphere. But, as the author asks, "What are seven miles—what are even ten miles—compared with the four or five hundred miles of atmosphere-depth? With all our utmost efforts we and the birds still find ourselves only able to creep and flutter on or near the floor of the ocean of air." The book, a handsome one, contains sixteen full-page process engravings from photographs illustrating atmospheric phenomena.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 239.—"Photographic Cameras." W. S. ROGERS.—*Dated January 7, 1890.*

No. 278.—"Improvements in or relating to Developing Trays or Dishes for Photographic Purposes." W. H. WALKER.—*Dated January 7, 1890.*

No. 317.—"Improved Arrangements for Photographing by Artificial Light." T. N. ARMSTRONG.—*Dated January 8, 1890.*

No. 359.—"Improvements in or relating to Photographic Cameras." Communicated by F. A. Brownell. A. J. BOULT.—*Dated January 8, 1890.*

No. 384.—"Improvements in or connected with Revolving Stereoscopic Panoramas." Complete specification. A. FUHRMANN.—*Dated January 9, 1890.*

No. 401.—"Improvements in Means or Apparatus for Producing a Flash Light, more especially applicable to Photography." T. H. REDWOOD.—*Dated January 9, 1890.*

No. 511.—"Adapting Photographic Shutters to Lenses." J. E. THORNTON and E. PICKARD.—*Dated January 11, 1890.*

No. 547.—"A New or Improved Manner of Colouring Photographic Impressions with Oil Colours." J. J. E. MAYALL.—*Dated January 11, 1890.*

PATENTS COMPLETED.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 1439. JOHN WILLIAM TURNER, Heathfield-street, Liverpool, Lancaster.—*December 21, 1889.*

THE invention relates to photographic detective or hand cameras in which a number of dry sensitive plates are stored, are successively submitted to the action of light, and are then deposited in a suitable receptacle until they are required for development.

The object is to so make such cameras that the plates are readily and easily placed therein and removed therefrom, and are with certainty moved into the required positions by simple and efficient mechanism.

The invention consists essentially in providing, first, rack, or equivalent mechanism, by which the plates are fed with certainty and regularity one after the other int oposition to receive the focussed image, and, second, oscillating grippers, by which the plates are removed from the focal centre and deposited in a container or receptacle.

A sliding rack operated by a pinion answers well to feed the plates forward intermittently. Each tooth of the rack acts on a plate, and springs are used to assist in moving the plates forward.

Grippers opened and closed by screw spring or equivalent mechanism and moved in an arc by means of a handle or lever are advantageously employed for removing the used plates into the container or receptacle.

The claims are:—1. Photographic cameras constructed substantially as herein set forth. 2. In photographic cameras the combination of rack mechanism with gripper appliances substantially in the manner and for the purpose set forth.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 1631. WILLIAM JAMES LANCASTER, Colmore Row, Birmingham.—*December 21, 1889.*

THIS invention relates to photographic cameras as hereinafter described, and is an improvement upon Letters Patent granted to me, and bearing date the 1st day of May, 1885, No. 5364, and the 1st day of February, 1887, No. 1533, respectively.

My present invention consists—

1st, in a triple tailboard without hinges, and when collapsed is made to fold over the ground glass of the focussing slide, whereby there are no loose parts, and the camera is by such an arrangement greatly simplified in its construction and working.

2ndly, mounting the back of the camera or focussing slide upon rock bearings, to admit of angular adjustment and the consequent foreshadowing of the picture.

3rdly, distending and contracting the triple tailboard parts and bellows.

4thly, in an improved construction of bellows—that is to say making the gussets graduate and follow each other step-like, instead of taper, whereby no part of a plate under exposure is cut off, as is common with bellows of the ordinary construction.

5thly, mounting the front of the camera upon pivot axes, in conjunction with quadrant slotted arms, for affixing the angular or other adjustment of the said front.

6thly, generally in sundry fittings and cognate camera parts.

The triple tailboard consists of three parts, sliding and working telescopically edgewise one within the other, and with the back of the camera supported and sliding upon the No. 1 part tailboard, whilst the front of the camera is attachedly connected and supported upon the fore part of the No. 3 part tailboard. Thus, the No. 3 part tailboard slides and works edgewise and telescopically within the No. 2 part tailboard, and the No. 2 part tailboard with the No. 3 part slides and works telescopically within the No. 1 part tailboard.

The lower portions of the two opposite sides of the back of the camera are mounted upon a transversely directed pivot axis or rod, whose outer ends pass through holes or bearings of upright brackets of carrier slides, working upon the two opposite edges of the No. 1 part tailboard. The extreme terminal ends of the axial rod as aforesaid are screwed, and upon which milled heads take which, when rotated in one direction, clamp the back of the frame to the bed, and when turned in the other direction they loosen the slide, which permits the said back or focussing slide to be adjusted by a sliding movement upon its bed or tailboard.

The tops of the brackets of the slides are curved from front to rear, and upon which the undersides or saddles of brackets secured to the sides of the back, as aforesaid, move; and which said brackets are clamped by a turn or screw, and a stiff joint thereby produced for keeping the said back at any angle to which it may have been placed or adjusted.

The front of the camera frame has fittings or opposite upright brackets, pivoted to upright fixed brackets, fixedly secured to the front top sides of the No. 3 part tailboard. The extreme lower ends of the bracket fittings have quadrant slots cut within them, and where through the outer ends of a clamping screw or rod pass; so that on the front being adjusted to any required angle, it is affixed there, by screwing home a milled head, or heads, on one end, or on both ends, of the clamping rod.

The upright bracket fittings are also longitudinally gapped, wherein the shanks of clamping devices move when vertical adjustment is required.

Thus the front of the camera admits of making both a swinging and a vertical movement for adjustment.

The No. 2 tailboard is distended or drawn in by a horizontally working screw taking within a screw box, and with the handle part presented at the front of the No. 1 part tailboard.

The No. 3 part tailboard is operated by a rack or pinion, or racks or pinions. The rack or racks is, or are, disposed on the under side of the tailboard, while the pinion or pinions is, or are, carried and directed transversely across the under-side front of the No. 2. part tailboard; so that a fine adjustment can be obtained by or from the rack and pinion movement irrespective of the positions of the tailboards one with another.

Thus the bellows are distended by loosening the clamps of the back part and sliding it longitudinally upon its bed; then a rough adjustment is effected by rotating the screw, which distends the middle tailboard part from the one within which it slides. A fine adjustment, or a further extension, is then obtained by rotating the head of the pinion axis, which is carried by the middle tailboard part.

The gussets of the bellows are graduated step-like (instead of running off taper), which admits of the whole of the plate being exposed.

The camera, when folded, occupies little space, which is a desideratum in carrying and for transit.

The back of the camera, or both the back and front of the carrier, may be mounted upon a double sewing arrangement, which admits of the same being adjusted both vertically and horizontally at the same time, instead of the brackets having independent slots for adjustment.

Thirdly, in carrying out this modification, which is the converse to that described, the supporting brackets have transverse slots cut within them with round holes, wherein reduced shoulders or necks of screw bosses take, when screwed home, while the shanks of the screws take into the slots, with the collars of the necks coming against the said brackets, which, when tightened up, hold the said parts in their adjusted positions.

Then the frame of the back is mounted upon or within extended or slot bearings, which admit of it having a double swing.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 21	North London	Myddelton Hall, Islington, N.
,, 21	...sgow & West of Scotland Am	1...., West Regent-street, Glasgow.
,, 21	...ton Club	The Studio, Chancery-lane, Bolton.
,, 22	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 23	Burton-on-Trent	The Institute, Union-street.
,, 23	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JANUARY 14.—The President (Mr. James Glaisher, F.R.S.) in the chair.

The first paper read was by Mr. CHAPMAN JONES, F.I.C., F.C.S., *On Contact in the Intensity of Negatives*. The paper commenced with a statement of the difficulty of judging the intensity of negatives during development, and the author suggested it was better to keep intensity so far down during development that there should be at all events no necessity for reducing, and explained that in attempting this it was possible that intensification of some kind would generally be afterwards needed. It was then put, that as some intensifying processes do not give a regular gradation through the whole of the scale, it was a desirable thing for a general process to settle upon one in which this regular gradation existed, reserving other means for negatives requiring special treatment. The methods particularly treated of in the paper were the use with selection of bichloride of mercury, followed by sulphite of soda, and of the same mercury solution followed by ferrous oxalate. Of these the latter method was stated to be preferred. It had been stated by the advocates of the sulphite method that it could be used repeatedly on negatives until a corresponding gain of intensity at each time of using. He had, however, not found this to be the case; he had investigated the reaction that took place with the sulphite plan, and found that half the silver and half the mercury left in the plate after the mercury bath was removed by the sulphite solution, and that a repetition of the process involved a removal each time of half the silver left in the plate. There was generally an increase of intensity due to the mercury and sulphite process, but not necessarily; at the same time, if such a small gain of intensity only was required, the sulphite plan might be adopted, and if further intensification was then required other methods might be followed without disadvantage. The solutions recommended were a saturated solution of bichloride of mercury, to each part of which only a drachm of hydrochloric acid was added. The plate was to be thoroughly washed after the mercury solution was used in bath and a half and repeated changes of water were required for this purpose. The second solution was then applied, consisting of one part, by measure, of a saturated solution of sulphate of iron, combined with six parts of a saturated solution of sulphite of potash. It should be slightly acidified with citric acid, which retarded the process. Besides the advantage of regular gradation, it was claimed that this process did not fog, even with repeated treatment, that the operations are clean, the negative is not very stained, and the highlights are not clouded up. Tests that he had applied also indicated the permanency of the deposit.

Mr. W. L. FORSTER thought that it was a very useful thing to have the principle of a process gone into and ascertained, as had now been done with the sulphite process. For his own part he had never looked on the process with favour, the amount of loss to detectable being so limited. On one point he would remark, that Mr. Chapman Jones had said that the sulphite process might be used to start with, and then where insufficient the plate to be equally amenable, as at first, to any other method; it had, however, been shown that the sulphite removed half the silver originally in the film, and, therefore, it was a question whether the negative was in as good a condition as at first for proceeding by a better process.

Captain ABNEY would confirm what Mr. Debenham had said as to the uncertainty of the sulphite process of intensification. He wished to thank Mr. Chapman Jones for working out the remainder of the process. Very useful things had been written and said about intensifying processes, especially he had a very great liking for the cyanide of silver process, after which he used the process with mercury, followed by ferrous oxalate recommended in the paper.

Mr. DEBENHAM remarked whether Captain Abney thought as perfect gradation could be obtained with cyanide of silver as with the mercury and oxalate?

Captain ABNEY thought it could, and there was a great convenience in the cyanide process as the solution by which the intensity could be brought down to just the required standard.

Mr. CHAPMAN JONES replied that as to there being no harm in beginning with the mercury and sulphite process, he meant that the negative was after one or more such a state for intensifying as before; certainly, half the silver was gone, but the mercury which had taken its place was in a condition amenable to treatment, that is to say, would serve equally well as a basis for intensifying upon.

Sir DAVID SALOMONS read a paper on *The Distance beyond which all Objects will be in Focus with any given Lens*. He had constructed a table giving distances based upon the calculation that any object might be considered in focus when the points in it did not exceed a circle of the one-hundredth of an inch. The French photographers had taken a smaller circle of confusion as that permissible, namely, one of about the two hundred and fiftieth of an inch. This he thought too fine, and stated that we could not in fact have detective cameras if the French measure were adopted.

Mr. DEBENHAM was afraid that the paper would tend to perpetuate a fallacy which prevailed amongst unscientific photographers. He had seen a published letter declaring that what was called a fixed focus lens was a great advantage. Of course there was not, and could not be, such a thing as a fixed focus lens. The assumption that a lens was in focus when there was a circle of confusion of one-hundredth of an inch was a mere assumption, and was not a fact. In the particular instance which Sir D. Salomons had worked out, of a lens of ten-inch focus, it would result from the calculations given that the lens might be out of focus by the eighth of an inch and still be called in focus. He thought that any practical photographer would know that even with a stop of *f*-12 there would be an appreciable difference of focus when the lens was racked one-eighth of an inch in or out. As to the statement that, if the French measure of permissible confusion were adopted, detective cameras could not be used, that would depend upon the length of focus of the lens used. With a short-focus lens there might be just as great rapidity with a certain definition of objects at given varying distances as with a longer focus lens and a definition of lower quality. Another point that had not been touched upon was the effect of curvature of field in bringing objects into or out of focus. With detective cameras the field was certainly generally more or less curved, and this curvature might cause marginal objects to be very much more out of focus than the calculation represented.

Mr. T. R. DALLMEYER said that the calculations of Sir David Salomons were a continuation of those made by his late father—calculations which had been quoted and received with approval generally. As to the complaint that the one hundredth of an inch was too great confusion to be tolerated, calculations could of course be made for the French or any other measure.

Sir DAVID SALOMONS in replying, said that it was almost impossible practically to carry out the French standard.

A paper communicated by Mr. W. K. Burton, now in Japan, upon *Eikonogen as a Developer in Practice*, was read by Mr. CHAPMAN JONES. In the course of the paper, the author remarked that as to the keeping quality of eikonogen in comparison with that of pyro, he found that in plain solution the eikonogen changed the more quickly of the two, but that when mixed with sulphite and alkali it kept better than pyro. Comparing the work of the two when both were used of equal strength, he found that the pyro image came up first, but that the eikonogen image eventually came out, and with a rather less exposure, equal, he thought, to a gain of from twenty-five to thirty per cent.

Mr. WARNERKE thought it a mistake to put eikonogen and pyro on the same footing. He found different treatment required with the two agents. With eikonogen not a mere in quantity was required than with pyro; caustic alkali also he found much better and much quicker than carbonate. He used—

Water	100 parts.
Eikonogen	20 ,,
Caustic potash	20 ,,
Sulphite of soda	40 ,,

He used boiling water for the solution, not only for rapidity of dissolving, but also because boiling got rid of the air. For use he diluted this strong solution with from three to ten parts of water, according to whether he wanted an intense or a soft image.

Mr. WOLLASTON inquired whether Mr. Warnerke had succeeded in getting soft and density with eikonogen for line work in copying? He (Mr. Wollaston) had not done so.

Mr. WARNERKE replied that it was especially for work of that kind that he found eikonogen useful, as he could get intensity with it that he could not obtain with pyro.

It was announced that nominations for members of Council for the ensuing year must be sent in by the 21st instant. Messrs. Scamell and Samuels were appointed auditors; and Messrs. Scamell, Freshwater, Charles Sawyers, and Atkinson, scrutineers of voting papers at the ensuing Council elections.

Messrs. H. G. Sheppard, E. E. Corke, and Rajmonge Chuer, were elected members of the Society.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 9, Mr. L. Medland in the chair.

Mr. Beck showed two lenses of the rapid aplanatic kind, both fitted with Iris diaphragms. The mountings of one was in aluminium, and was exceedingly light. He also showed a camera, called the Peerops, for half-plate, the metal work of which was of the same material; and, although there was the usual complete set of movements, and every part appeared to be strong as well as compact, the weight was reduced to about the amount of two and a half pounds. With brasswork instead of aluminium the weight would be about one pound greater.

The Chairman showed a negative covered with markings resembling those seen on a varnished plate which had been exposed to water. These markings came on whilst the plate was being intensified with bichloride of mercury solution. The plate had not been varnished.

Mr. A. HADDON remarked that not only did the markings look like the effect of water on a varnished film, but there were ridges parallel to two sides of the plate, resembling those caused by varnish when being run off.

Other members noticed the same thing, and suggested that there might have been a mistake in supposing that the negative had not been varnished previous to immersion in the mercury solution.

Mr. T. E. Freshwater showed some lantern slides the cover glasses of which had suffered some disintegration, such as had been found to exist in a plate recently brought before the Association. These were all of French manufacture, and belonged to the year 1878, being photographs of the Paris Exhibition of that date. Another slide of the same period made by Mr. York, the cover glass of which was presumably of English make, was still without defect. In one of the pictures shown the image of the photograph could be seen in the disintegration or corrosion of the cover glass.

Mr. W. E. DEBENHAM remarked that the photograph under the cover glass which showed this sort of reproduction was a coloured one, probably painted in oil, and the reproduction appeared to him not to be of the photograph but of the patches of colour. These might either act by direct setting off, as the separating margin was exceedingly thin, or by different hygroscopic conditions caused by the paint inducing or retarding condensation.

Mr. A. COWAN said that in the *Photographic Review* of December 28 last there was a formula from an American source of a developer containing carbonate of lithium. The quantity of this alkali—one grain to the ounce—had appeared to him and others so small as to suggest that there had been a misprint. He had, however, followed the instructions given, and found the mixture to be extremely rapid and energetic. He had also used the carbonate of lithium with eikonogen with good result. In one experiment he had added the one-tenth of a grain of bromide to the pyro and lithium developer, and great clearness resulted. Specimens produced by these methods were handed round and afterwards included in the lantern exhibits.

Works by Messrs. Atkins, Kellow, Medland, and Freshwater were shown in the Association's lantern.

CAMERA CLUB.

ON Thursday, January 9, the first demonstration of the new rollable transparent film was given at the above Club, when a paper was read by Mr. W. H. Walker. Sir George Prescott occupied the chair.

Mr. WALKER gave a short history of film photography and its progress in the hands of the Eastman Company, and referred to improvements in roller slides. He then gave certain warnings and directions in regard to the use of the new film, cautioning against subjecting the film to high tension and deprecating the use of glycerine in our climate.

In the discussion Mr. FRANCIS COBB regretted that no examples of large-size work, 10×8 and upwards, had been shown. If for these sizes the film could be successfully made, the greatest advance yet made would have been attained.

Dr. LINDSAY JOHNSON said he had been experimenting in making the most perfect specimens of celluloid for optical purposes, and he exhibited some which were clear of striæ and bubbles.

Mr. D. P. RODGERS gave his experience with some of the new film, and showed an admirable negative taken upon it during the recent bad weather with a rapid shutter exposure. He was so satisfied with it that he had determined to take a large number of exposures with him in a trip to Egypt he was about to start on.

Messrs. Shipton, Sturmey, Corbould, Clark, Tringle, Bourne, and Dr. Paterson also spoke.

The subject for Thursday, January 23, is *English Church Architecture as a Subject for Photography*, when a paper will be read by the Rev. T. Perkins, M.A.

WEST LONDON PHOTOGRAPHIC SOCIETY.

THE annual *conversazione* and exhibition of members' work was held at the Addison Hall, W., on January 10 and 11.

The PRESIDENT (Mr. Charles Bilton), after formally opening the proceedings, congratulated the Society upon the success of the exhibition and also those members who had been fortunate enough to gain medals, at the same time reminding those who had not been so successful that their failure on the present occasion should stimulate them to renewed and greater efforts in the future. He then briefly referred to the report of the Judges (Messrs. George Davison, F. P. Cembrano, and F. M. Skipworth), who had made the following awards:—In Class 1, "Landscape, half-plate and under," the President's silver medal was awarded to a frame of *Dutch Landscape*, by Mr. W. L. Colls, printed in platinotype; this exhibit also gaining the first bronze medal in the class, the second medal going to Mr. G. F. Blackmore for three pictures—*Even-tide*, *The Silver Lining*, and *Romney Lock*—printed in bromide; a third medal being awarded to the Secretary (Mr. J. A. Hodges) for three platinum prints—*Conway Quay*, *A Quiet Pool*, and *On the River Ogwen*. In the opinion of the Judges, "This was a very well-contested class, and we have had pleasure in awarding some of the medals withheld in the other classes. Amongst other pictures, we would draw attention to *A Grey Morning*, by Mr. H. Selby; *Blowing up for Rain*, by Mr. J. Wilson; and *A Coming Storm*, by Mr. C. Garner Richardson." In Class 2, "Landscape larger than half-plate," the bronze medal was awarded to Mr. W. L. Colls for a whole-plate view of *Bettws-y-Coed Bridge*. In Class 3, "Architectural views, half-plate and under," the medal was awarded to Mr. J. A. Hodges for a frame of three pictures in platinotype—*Conway Castle*, *Reception Room and Refectory*, *Plas Mawr*, "a very admirable series." In Class 4, "Architecture larger than half-plate," the medal goes to Mr. C. Whiting for a platinum print of *Exeter Cathedral Choir*. In regard to Class 5, "Portraiture," the report says, "Whilst withholding any award in this class, we would indicate that *The Sister and Brother*, by Mr. T. Tingfau Chang, is considerably the best exhibit." In Classes 7, 8, 9, and 10 no awards were made; but, in reference to Class 8, "Landscape enlargements," the Judges say, "*Greywell Tunnel* and *In Cassiobury Park*, by Dr. F. H. Low, show good technical work, *Kew Bridge*, by the same exhibitor, being the best pictorially, though not held of sufficient merit. In Class 9 the only distinctive genre picture is *Spinning the Top*, by Mr. J. A. Hodges, but it is rather a painting than a photograph. Of the rest we would refer to *Watching the Amateur*, by Mr. L. C. Bennett." In the lantern slide division a medal was awarded to Mr. C. Whiting for the best six architectural slides, and also a medal for the best six marine slides, medals being withheld in the remaining classes, though a series of landscape slides by Mr. L. C. Bennett were commended. The President, in concluding, informed the members that the names of the competitors were not disclosed to the Judges until after the awards had been made.

The medals were then presented to the successful competitors by the President, after which Dr. F. HARRISON LOW proposed a vote of thanks to the Judges.

Mr. DAVISON, responding on behalf of the Judges, said although it was generally held that the task a judge had to perform was usually a thankless one, yet he was glad to find from the manner in which the awards had been received that such was not the case invariably. There was, however, a thought far back in the inner recesses of his own mind that there might be some dissatisfaction at the number of medals withheld. Although he did not then propose to justify that, he had not the slightest doubt but that the exhibitors would, on calm reflection, feel convinced that the action of the Judges was justifiable. They went through their task with great care, going over some pictures again and again, and when a discussion arose as to whether a medal should be awarded or not a decision was arrived at by a fair system of give and take. The Society was to be congratulated on the appearance of Class 1, "Landscape, half-plate and under." Considering the size of the collection as a whole, he did not think he had ever seen a better class. Although they had given two extra awards in that class, there were still three other exhibits well worthy of mention. They were photographs which would bear examining, and, although perhaps defective in some respects compared with the winning pictures, yet still possessed considerable merit, not merely technical merit, but something approaching the "pictorial and complete." The "Architectural Class, half-plate and under," was also an exceptionally good one, on account of the excellence of some of the exhibits, among which he would refer especially to *Conway Castle*, *Refectory and Reception Room*, *Plas Mawr*, a set of three platinotypes by Mr. Hodges, charming in colour, well chosen and beautiful in subject, and technically of great perfection. Also in Class 1 he would especially refer to the three medalled pictures by Mr. Blackmore, which were of high artistic merit; and, speaking for himself, he would say he hoped to see much more work from Mr. Blackmore at future exhibitions.

A very enjoyable evening was then spent by the members and their friends in inspecting the pictures and lantern slides exhibited. Light refreshments were provided by the President, the creature comforts of the members being attended to by Mrs. Low and Mrs. Hodges. A musical programme, in which Messrs. M. Morgan, H. Selby, Pilgrim, Sicklemore, and other gentlemen took part, contributed in no small degree to the success of the evening.

The next meeting takes place on Friday, the 24th instant, when the discussion on *Hand Cameras* will be concluded. The competition slides will also be shown by the lantern.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JANUARY 7,—Mr. L. Medland in the chair.

The SECRETARY read a letter of apology from Rev. E. Healy, stating that illness prevented his taking the chair that evening.

The Chairman showed a negative which bore the appearance of having been frosted on the gelatine side.

It was suggested that the negative had been intensified with bichloride of mercury which had been some time at rest.

Mr. MEDLAND said several other negatives had been treated in exactly the same way afterwards, and in the same intensifier, and showed no such marks.

Mr. HUDSON suggested that the bichloride had been warm and that the action of the cold air upon the plate had formed the crystals.

Mr. A. MACKIE was of opinion that the negative had been inadvertently varnished before intensification was attempted.

Mr. MEDLAND assured Mr. Mackie that this was not the case.

Mr. MEDLAND then passed round a very useful cutting shape which he had had made, and by use of which he was enabled to cut lantern-slide masks of various sizes. He stated that the cutter had been made for him by Newman.

An interesting exhibition of lantern slides by the members then took place, Mr. Bishop manipulating the lantern. Mr. Mackie and Mr. Douglas exhibited some beautiful slides on collodio-bromide; Mr. Parfitt, some capital slides on the new Alpha plates, negatives by hand camera; Mr. Medland, some excellent studies of animal life at the Zoological Gardens; Mr. G. J. Clarke, some slides of the ruins of Pompeii, the negatives having been made from albumen prints by gaslight, and the lantern slides made on Mawson's plates by the same light, both negatives and lantern slides developed with hydroquinone. Mr. Bishop showed some capital slides, the negatives taken by hand camera in the various parks. Messrs. Oakley, Coventon, and Lester also showed some capital slides of scenery in various parts of England and Wales. Altogether the exhibition was most successful.

The SECRETARY reported that the Council were making arrangements to hold a *conversazione* in connexion with the annual exhibition of members' work to be held at Northampton House at an early date.

The date has since been fixed for Tuesday, March 4, and members are requested to send their work to Northampton House, Paul's-road, Canonbury, at least a week before that date, directed to the Secretary. Early notice will be given of the arrangements for the evening.

The next meeting of the Society will be on January 21, when Mr. A. Mackie will give a demonstration on *Collodio-bromide: its Manufacture and Uses*.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JANUARY 9,—Mr. E. Howard Jaques (Vice-President) in the chair.

It was announced that the Council had given an order to Mr. Place for the Society lantern, and that it was not to exceed thirty guineas; and that the annual exhibition would be open to the public on Tuesday and Wednesday next, the 21st and 22nd instant, at the Temperance Hall, Temple-street, from ten a.m. to ten p.m., the price of admission to non-members being fixed at 6*d*. each.

Mr. C. J. FOWLER then read a paper—*Notes on the Summer Excursions*—illustrated by a large number of lantern slides made from the negatives taken by the lecturer and the following members:—Messrs. Middleton, Pickard,

Manley, Longmore, Griffiths, Southall, Pumphrey, Lesson, &c.; and included scenes from Yardley Wood, Dudley Castle, Coleshill, Berkswell, Warwick, Droitwich, Shakespearian villages, Worcester, &c.

Mr. W. J. Harrison threw some pictures on the screen which were made on the new celluloid film.

The annual exhibition will only be open for two days, but will be very representative, as nearly four hundred exhibits have been sent in.

LEWES PHOTOGRAPHIC SOCIETY.

JANUARY 7.—Mr. J. Tunks (Vice-President) in the chair.

The balance sheet of the Lewes and Sussex Photographic Exhibition was read, showing a balance in hand of 2l. 16s. 1d., and was adopted.

At the conclusion of the usual business the remainder of the evening was devoted to the making of lantern slides by contact, slides being exposed and developed by Mr. A. H. Wedding and the Hon. Secretary.

It has been arranged to offer certificates for competition amongst the members once a quarter for various subjects. The first competition will be for lantern transparencies.

MANCHESTER PHOTOGRAPHIC SOCIETY.

THE soiree and exhibition held at the December meeting was a nice little affair. The ordinary meeting room was used for the exhibition of members' work, which included some fine pictures by W. G. Coate and Alan Garnett. H. Clayton sent several beautiful albums full of pictures taken on holiday tours, and a number of stereoscopic slides; Mr. Smith had several novelties to show, and some good pictures; Mr. Blakely brought opal enlargements; Mr. J. Higson sent a few charming little landscape studies; then there were stereoscopic transparencies in goodly numbers from many other members.

The large tea room was devoted to apparatus and professional exhibits. Messrs. Watson exhibited a fine 10 × 8 camera, and one of their whole-plate scene cameras, which was much admired; Messrs. Talbot & Eamer exhibited diamond detective cameras and results produced by them; Messrs. Taylor, Taylor, & Hobson sent a grand exhibit of lenses; some novelties from Vevers, &c.; but the chief attraction in the apparatus was concentrated in Messrs. Swinden & Earp's patent hand camera, which was exhibited and described by one of the inventors. Messrs Morgan & Kidd sent some magnificent bromide enlargements; and others were forwarded by the Eastman Company, a frame of photographs, by Mr. Scarton, were much admired, as were several by Mr. J. B. Edwards. The chief interest, however, in picture exhibits was concentrated in those from Valentine Blanchard, printed by his new platinum process, and the opal cards of Mr. Friese Green. A soiree or photographic exhibition could not nowadays be considered complete without a lantern exhibition. This was conducted by the Lantern Committee. First, some slides by the members were exhibited: these included a number of right-down good pictures by Messrs. James Wood, Rigby, Broadbank, Thompson, and others (on Mawson & Swan's plates); then a series were exhibited sent by the editor of the *American Photographer*: these were not considered "very great;" next came a series of slides, sent by the Ilford Dry Plate Company, made on Alpha plates—evidently these were collected from a number of amateurs—they were chiefly remarkable for variety, but there were some good slides amongst them.

JANUARY 9.—Vice-President Alan Garnett in the chair.

THE HON. SECRETARY (Mr. W. I. Chadwick) said he was unable to read the minutes, as in consequence of a serious fire which occurred on his city premises on Christmas Day the minute-book he feared had been burnt with the rest of the things. However, for the present the minutes were postponed.

Question-box:—"What is the best way of keeping hyposulphite of soda?"

The Chairman, Mr. R. Atherton, Mr. W. Blakeley, the Hon. Secretary, and many others replied, all in favour of keeping it in a saturated solution and diluting as required for use. Mr. CHADWICK said he kept it for his own private use in a large earthenware jar, and measured it out with an old tea-cup. One of the saturated solution to one of water was what he generally used for negatives or transparencies, but always freshly mixed from crystals for fixing paper prints. Mr. BLAKELEY said he used the saturated solution diluted with three or four times its bulk of water for negatives and paper prints. Mr. ATHERTON said it was important to use it neutral. Mr. WHITHAM used it as a weak-toned solution, *undiluted*, for negatives and transparencies.

A letter from the Hon. Secretary of the Local Committee of the Convention (Mr. Evans, of Chester) was read. Further particulars to be obtained.

The HON. SECRETARY proposed that the President and Hon. Secretary of the Amateur Photographic Society of Manchester be elected hon. members of this Society. Carried unanimously.

Mr. H. M. WHITEFIELD proposed a lantern slide competition amongst the members.

The question of prizes was discussed. Most of the members objected to medals, and confessed they would be ashamed to possess several medals won in some of the recent competitions for work of so little merit. A fine autotype, or a picture by H. P. Robinson, or that class of subject, was considered a more suitable subject for a prize than a five or ten-shilling medal. The slides to be judged by some society out of Manchester, and shown afterwards at the next meeting of this Society.

BATH PHOTOGRAPHIC SOCIETY.

JANUARY 8.—Mr. W. Pumphrey (President) in the chair.

Mr. Archibald C. Coke was elected a member of the Society.

THE CHAIRMAN said that a distinguished visitor was present—Mr. H. Sumner Gates, the Secretary of the Cambridge (U.S.) Camera Club—and in extending him a hearty welcome he should remark that in photographic circles existed a universally accepted custom of offering a welcome to visitors whenever they might travel. He (the Chairman) hoped to be favoured with Mr. Gates's experience with flash-light photography.

Mr. GATES thanked the Chairman for the kind manner in which he had been received. He had had some experience with flash-light work in America. As a rule they used a larger flame than appeared customary here, and more magnesium was burnt, but the light so obtained was diffused through a screen, by which means the shadows were less heavy. The Scovill Company, New York, issue the powder in the form of a cartridge, which is very effective. Some pictures done this way he had already sent to the States for, and the Society might see them at a future meeting. He hoped to reciprocate their hospitality to some members of this Society, should they visit America.

The HON. SECRETARY exhibited several large photographs lent by Mr. Rosen, of the Autotype Company. These illustrated the various coloured tissues in use for carbon printing, and comprised sepia, ruby brown, blue, engraving black, red. The examples of collotype, auto-carbon, and auto-crayon were also handed round for inspection.

The CHAIRMAN thought it desirable to say a few words in connexion with flash-light work before starting the experiments of the evening. In the first place he regarded the process as the complement—though in reserve—to ordinary instantaneous photography. Instead of the work being controlled by the rapidity of closing the camera, it is the rapidity of the light one has to deal with, as it commences and ceases with an instantaneous flash. Such a light we find in the combustion of the metal magnesium. The ordinary form used to be exhibited as a thin ribbon of the metal, but there was this disadvantage, that the light came almost from a point, thus some portions of the subject must be badly lighted or in deep shadow. The present plan is to spread the metal in the form of powder over a large surface and for a shorter time. The powder, which should be fine, is burnt in a spirit flame, and instead of proceeding from a point, it has a broad and a powerful light.

About a dozen cameras were then brought into use, and several negatives of the Chairman and others secured.

Mr. A. Spurge manipulated the flashing apparatus during the evening, and a convenient dark room was fitted up for those who desired to make use of it.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

JANUARY 8.—The Vice-President (Mr. S. S. Partridge) in the chair.

One member was elected.

The election of officers for 1880 was then proceeded with, the following being the result:—*President*: Mr. S. S. Partridge. *Vice-President*: Mr. J. T. Cook. —*Committee*: Messrs. Sculthorp, Wilson, Pierpoint, Porrett, Leeder, F. Brown, Blackwell, and Bankart.—*Treasurer*: Mr. W. Sculthorp.—*Secretary*: Mr. H. Pickering, High Cross-street.

It was decided to offer the following medals for competition among the members for the ensuing session:—Silver and bronze medals by the Society for the two best sets of six lantern slides; silver and bronze medals by the Society for the best and second-best six prints, whole-plate; silver and bronze medals by the past President for prints under whole-plate, and silver and bronze medals by the President for quarter-plate prints.

It was arranged that the competition take place as under:—Lantern slide competition, at the February meeting; enlargement competition, at the March meeting; print competition, at the April meeting.

A small Sub-Committee was formed to arrange the details of excursions; the following were proposed:—Messrs. Pierpoint, Porrett, and Bankart.

The conditions of competition as arranged for last year were accepted.

OLDHAM PHOTOGRAPHIC SOCIETY.

THE annual *soiree* and dance in connexion with the above Society took place on Thursday last week in the rooms of the Oldham Lyceum, and close on seventy members and friends sat down to an excellent "spread." After full justice had been done to the viands an adjournment was made to the Club Room, where dancing was indulged in.

At ten o'clock the first lantern display was given in the Chess Room downstairs, a splendid set of slides illustrating *Paris and its Exhibition* having been expressly sent for exhibition by Messrs. York & Son, of London. Slides, songs, and second lantern interval took place about twelve o'clock. Dancing was kept up until shortly after two, when the company began to disperse.

IPSWICH PHOTOGRAPHIC SOCIETY.

JANUARY 8.—Second annual meeting.—The President (Mr. J. Dixon Piper) in the chair.

Five new members were elected.

The Committee's report for the past year showed a highly satisfactory state of affairs, there being a small balance in hand and no outstanding liabilities. The number of members was forty-six as against forty the previous year.

The following officers were then elected:—*President*: Mr. J. Dixon Piper.—*Vice-Presidents*: Messrs. E. H. Mydleton-Gavey, M.R.C.S., and Frank Mason.—*Committee*: Messrs. J. E. Curtis, R. Cash, A. C. Churchman, J. C. Wiggin, Frank Woolnough, and A. F. Penraven.—*Auditor*: Mr. Evan Edwards.—*Hon. Secretary and Treasurer*: Mr. E. R. Pringle.

There was then an exhibition of members' work, several well-filled, interesting, and highly creditable albums being shown.

DARLINGTON PHOTOGRAPHIC SOCIETY.

JANUARY 13.—Mr. E. Ensor presided.

Mr. L. W. Williamson was elected a member.

An exhibition of lantern slides executed by the members was given. Over one hundred and twenty slides were shown, many of which possessed considerable merit.

SUNDERLAND PHOTOGRAPHIC ASSOCIATION.

THE monthly meeting of the above Association was held on the 11th ultimo, the President, Mr. J. W. Mounsey, in the chair, when the photographs sent in for the Society's annual competition were exhibited, and the report of the Judge, Mr. J. Haswell, D.C.L., read.

In his report Dr. Haswell awards the first prize for the three best landscapes to Mr. C. E. Cowper, whose work he pronounces good in composition and half tone. The second place in the same class is well secured by Mr. W. Pratt, jun., with very neat work. In the class for portraiture the prize is taken by Mr. R. Robson with a pleasing study of a little boy. In the class for instantaneous pictures the prize is awarded to Mr. W. J. Pope, one of his views—a street scene—being particularly happy in composition, the disposition of figures being compared with that in the paintings of street life associated with such names as Kennington and Clausen. The enlargements of Mr. Newby, who takes the prizes in that class, are very successful. The class for lantern slides was judged as shown by Mr. Ridgeway, who kindly manipulated his lantern for the purpose. The slide by Mr. W. Milburn gained first prize, the subjects being very varied in character, and yielding pleasing results on the screen. Special mention is made of the picture of a timber waggon, with horses drinking at a stream. *The Perry Beck Waterfall*, by the same exhibitor, is a brilliant photograph. A good second place is taken by Mr. W. Pratt, jun., his views in Hareshaw Glen being very fine.

The Association offers a prize for the best snow picture during the winter, 1889-90.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

JANUARY 9,—Mr. J. Mathewson in the chair.

The slides of last month's lantern slide competition were exhibited by the lantern. The variety of tone and range of density of the sets of slides were most interesting, each set having been made from the same negatives.

Various detective camera pictures were exhibited. Fallowfield's "Facile" and Talbot & Eamer's "Diamond" detective cameras were on exhibition and their working explained.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

A TRADE UNION IN PHOTOGRAPHY.

To the EDITOR.

SIR,—The manifesto on the above subject recently issued by Mr. Arthur G. Field in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC is deserving of careful perusal and productive of much food for reflection. I have personally given the scheme some considerable amount of consideration, and have endeavoured to look upon it in a perfectly unprejudiced manner, but in the end I am bound to admit that I have come to the conclusion that it is not only untenable, but practically unworkable. At the outset Mr. Field contends that the union would be of service to employers, as it would guarantee the ability of the workmen. How it could do this I for one fail to see, as photographic work is not mere hand labour. I can perfectly understand a trade union guaranteeing the ability of a dock labourer, a gas stoker, a carpenter, bricklayer, or a baker, but I would respectfully submit that photographic assistants are not mechanics, and have no desire to rank as such.

As to a uniform rate of pay to all operators, printers, and retouchers, throughout the kingdom, the idea may be very good, but how about the working out of the scheme? Suppose the operators' salary to be fixed at three guineas per week, the printers' at, say, thirty-five shillings, and the retouchers' at two guineas. There are many firms to whom this would mean ruin if they continued to issue portraits at their present prices. If the salary of the *employé* is to be fixed and uniform, then it clearly follows that the price of photographic portraits must be also fixed, and there comes the rub. The partisans of the movement will probably say that this means the survival of the fittest; I should opine that it means the failure of the photographic trade union. To compel a man of business to pay a uniform wage to his *employés* and to charge a uniform rate for his productions savour too much of protection, and that of the worst type, for the scheme to ever become popular with English photographers. Every photographic operator whose ability was qualified by the union would be compelled to accept the salary fixed by them, and in some cases this would mean a considerable jump up, while in others it would mean a considerable jump down. If an operator who is an artist can obtain a salary of six or seven guineas per week, and find employers only too ready to pay him that sum, he is not likely to join a trade union which would place him on a level, as regards status and salary, with another who can only obtain from two and a half to three guineas. Herein lies the difference between photographic workers and mechanics; one good mechanic is as good, or nearly so, as another, while one photographic operator, or printer, may be several grades above or below another, although both may be thoroughly capable as operators or printers. From whence is the "guaranteeing executive" going to draw its knowledge of ability? Does it intend to certify as "able" only those operators of the very highest rank, and drawing proportionately high salaries, and so exclude from the "union" and from the profession men who at present draw a salary of from thirty shillings to three pounds per week? Where there is a uniform rate of pay there should undoubtedly be a uniform ratio of ability. Apart from the question of salary comes that of working hours. I grant that many a printer and many an operator has to work far too many hours a day, but then he has his remedy; the sweating houses do not monopolise the trade altogether, and the *employé* who finds his strength unduly taxed can make a change if he wishes it, and that without asking the permission of any trade union.

In the published scheme, provision seems to be made for strikes; and with the recent experience before our eyes this is surely no incentive for us to join any such association.

I note one of the tests of ability suggested is, "That the applicant for membership shall have been (for six months) in receipt of the ordinary wages paid in his district for workers in his branch of the trade."

Take any district in the United Kingdom, and we shall find that hardly any two photographers in that district pay the same salary, so what is to be considered the "ordinary wage?"

If I could see that the projected union would in any way tend to raise the status of photography, or of photographers, I should be only too pleased to become a member and a worker for it, but the socialistic doctrines seem to be far too strongly marked in the prospectus. All non-unionists, and all who employ non-unionists, are to be ousted from the profession, which is to be governed in the future by a syndicate of monopolists. A bright outlook, truly.

I am of opinion that whatever grievances photographic *employés* may have would be ensured speedy redress, without any descent into trade unionism, if they would only speak out when they discover any such grievance. THE BRITISH JOURNAL OF PHOTOGRAPHY is as much the organ of the operator or the printer as it is of his employer, and the aggrieved among them have only to discuss their grievances in the columns of that periodical to ensure their being seen and heeded by the aggressors.—I am, yours, &c.,

C. BRANGWIN BARNES.

6, *Victoria-street, Windsor.*

A "PATENTED" PRINTING FRAME.

To the EDITOR.

SIR,—In your editorial remarks appended to the foot of "Kakabekka's" letter of December 20, you state "that printing frames having hinged bars and catches to fasten down the free end have been for many years in use. They are also described and figured in numerous treatises on photography."

Will you kindly inform me when and where you ever saw a printing frame on the same principle as my patent? because if your statement is true, then, although the idea emanated as far as myself is concerned from my own brains, I am not the inventor. I should like to know if the same has ever been put before the public previous to my patent, because, as stated in my letter to you of last week (which you merely printed a paragraph from), I claim it as my invention and not a copy, and would be sorry to allow the public to think so, as yours and "Kakabekka's" letters infer.—I am, yours, &c.,

ALBERT TOWERS.

6, *Alexandra-terrace, Egerton-street, January* 8, 1890.

[If we understand the principle of Mr. Towers' invention aright (and if we do not we are open to be corrected by him), it consists in bringing down the pressure springs upon the pressure board of the printing frame by a *direct* instead of a sliding action, which latter is apt, by its friction at the point of impact, to cause a slight movement of the padded pressure board in its relation to the negative. His request that we should inform him where we have seen frames possessing such action is reasonable, and we reply by saying we have had such in use for more than twenty years. This, however, is not much to the purpose; but what is so, is that bars hinged at one end and carrying springs which press against the pressure boards of the frame are described and figured in several standard works on photography, one only of which we shall here cite in evidence, viz., Mr. Carey Lea's *Manual of Photography*, 1871 edition, page 45.—ED.]

FORMATION OF A LANTERN CLUB.

To the EDITOR.

SIR,—Will you permit me to call the attention of your readers to a step which I trust now to see taken, viz., to bring together, either by means of a Club or Association, in a practical form, those who are interested in the work of photographic optical lanterns?

I will not here detail the advantages that may possibly accrue from such an Association, except to suggest (*a*) the development and improvement of the lantern itself; (*b*) to help in popularising it generally; (*c*) to enable those who are fond of so delightful and scientific an amusement to become known to each other, and thus develop their common pursuit; (*d*) to hold in London and the country periodical exhibitions; (*e*) to facilitate the interchange of photographic slides; and (*f*) generally to promote lantern work.

The parts of such an Association and its rules remain to be formulated. Meanwhile, I wish to put plainly through your columns a very pointed

but respectful request, viz., will all those who are favourable to the idea forward to me at 16, Chesilton-road, Munster Park, S.W., or to the Hon. Slingsby Bothol, at Chelsea Lodge, Chelsea Embankment, their names and addresses, in order that they may be invited to a meeting or informed of any proceedings that may be taken?—I am, yours, &c.,

46, *Chesilton-road, Fulham, S.W.* T. H. Holding.

FLASH-LIGHT PHOTOGRAPHY IN AMERICA.

To the Editor.

Sir,—In one of last summer's numbers of the Journal (not having same by me, I cannot give the exact date) a writer refers to the statements made that in America certain alleged exposures with magnesium flash light had been made, which he pronounces absurdly impossible, and wishes he could have the chance of pulling the statements to pieces.

These were to the effect that most excellent interior exposures could be made through a series of apartments by a succession of flashes made in each one. Also, that a combination of daylight and flash-light exposures could be made, through an open window for the one, and an interior for the other.

As both these alleged "impossibilities" are commonly done here with either Pine's or Hemfalg's flash lamps, using pure magnesium powder, I am led to send you a few prints by this post illustrating same. One is an interior of a furniture dealer's premises, four rooms deep, illuminated by a flash made in each room. The others are a combination of outdoor and interior lights. The camera was set during the day, and the exposure made through the open window, using a small stop. The cap and slide were replaced, and after dark the second exposure was made with a single charge of ten grains of pure magnesium powder. The particular lamp used was Pine's. I think the prints are a sufficient reply to your correspondent's stricture. I am, yours, &c., W. H. Walmsley.

1022, *Walnut-street, Philadelphia, January 3rd*, 1890.

[The prints which accompanied this letter are amongst the most brilliant and beautiful we have ever seen, and we shall have pleasure in showing them to all interested.—Ed.]

LIGHT FOR ENLARGING.

To the Editor.

Sir,—You answered a query of mine as to the best forms of light for enlarging, by saying, "Albo-carbon, *if used in a proper burner*." Would you kindly let me know what is the best form of burner to use under these circumstances, and, if anything very special, where it can be obtained?

2. If a diaphragm of any sort in front of the light is desirable when using a condenser?

3. If using a paraffin lamp, what is then the best form of lamp and burner to use?

Answers to these queries will much oblige.—I am, yours, &c.,

32, *Dacres street, W., January* 14, 1890. W. A. Wills.

P.S.—I can endorse what was said by a correspondent last week about difficulty of obtaining instantaneous plates in the tropics, as recently I took a number of instantaneous views, both on sea and land, on a voyage to the River Plate and back, and although these developed at the time in the hot weather were sufficiently exposed—no doubt owing to the greater chemical activity of the developer—yet, when brought home and developed in the month of November with the same developer, &c., the remainder were uniformly under-exposed. The camera used was the "Eureka," the shutter of which is by no means rapid, and the plates, Thomas's extra rapid, nominally, Ilford No. 25. No doubt the plates deteriorated considerably with the long sea voyage, as the later ones were more under-exposed than the earlier; but even subjects such as the harbour of St. Vincent, under a boiling sun, I was obliged to intensify.

[1. What we consider the best form of burner for albo-carbon is two small fishtails separated from each other to the extent of an inch, so as to ensure their flames not coming in contact at the top, to which they have a tendency. The flames stand flat side towards the condenser. 2. A diaphragm in front of the flame is desirable, because the smaller the flame the sharper (*ceteris paribus*) is the enlargement. 3. A paraffin lamp with two burners, one behind the other, as in the case of the albo-carbon, will answer well. When the flames touch at the top there is good illumination, but it is of a yellow colour and not equal to that obtained as above described.—Ed.]

EXPOSING BY A STRING PENDULUM.

To the Editor.

Sir,—*Apropos* of your review of the *American Annual* for 1890, and of your allusion to a writer therein having abstained from taking a patent for that little device known, as I imagine, to every photographer, viz., employing a string with a plummet at the end for beating time or counting seconds, I may remark that very many of those who have but recently entered the field of photography have a *penchant* for imagining that devices which suggest themselves for facilitating practice have never occurred to others who have gone before them, and for applying to the Patent Office for protection for such inventions. This probably is the reason why there is such a plethora of applications to the Patent Office.

Concerning the plummet pendulum idea, it has to my knowledge been in use since the third ordinary meeting of the Photographic Society, held on April 7, 1853, a paper having been read on that date, entitled, *On a Cheap and Simple Mode of Levelling the Camera*, by Mr. Wilkinson, who described in what manner he effected this by means of a silk thread having a musket bullet attached to each end, which was thrown over the camera and which would show by the threads touching all the way down the sides when it was level. I now extract a few sentences from his paper:—"It also occurred to me that in taking portraits you sometimes require to have a measure of time, and by a little modification we have here the most accurate chronometer that can be produced. Instead of three feet I make it thirty-nine inches, and the decimal necessary, say two-tenths, from the centre of support to the centre of the bullet. I then get a pendulum which vibrates to a second exactly; from the point of suspension, the point of oscillation, I hang it by a pin, and I there have a chronometer of the greatest possible accuracy, and I can employ it for taking portraits of one, two, three, or four seconds; it will vibrate for a minute. Consequently I have a mode of levelling my camera with the greatest accuracy, a measure of time, a measure of distance (in stereoscopic work), and all at a cost considerably under one penny."

From this you will perceive, sir, that it would be well if ingenious young inventors, who make discoveries which *they* might consider worth patenting, would make confidants of their more experienced brethren before landing themselves into unsound positions.—I am, yours, &c.,

Hammersmith, January 11, 1890. George Mackinnon.

ISOCHROMATIC PRINTS AT THE PHOTOGRAPHIC SOCIETY OF FRANCE.

To the Editor.

Sir,—May we ask you to kindly allow us space to correct, in a few words, the misleading remarks of your French correspondent, Mr. E. Stebbing, which appeared in your last issue, in reference to the prints from negatives on isochromatic and ordinary plates which (by invitation of the esteemed President, M. Davanne) we recently presented to the Photographic Society of France?

We do not complain of Mr. Stebbing's report of the proceedings at the meeting of the Society. It is not surprising that some of the members, seeing the results for the first time, should be unable to understand how the great difference between the isochromatic and ordinary plates could be produced by colour-sensitiveness alone, without the slightest alteration in the lighting or other conditions; but we venture to submit that it is quite unwarrantable, and outside the duty of a journalist, for Mr. Stebbing to describe the results shown by us as owing to, what he terms, "the colouration dodge," which he says he practised in common with others many years ago. If Mr. Stebbing had been better informed he would have known that, as a matter of fact, our isochromatic plates are not coloured at all, the film being the same colour as ordinary plates.

The "colouration dodge" has long since been exploded, although until within the last four years it was held by some to be the solution of the problem. (Mr. Stebbing should write about what he understands.) There is not the slightest foundation for his absurd statement that "the colouration of the gelatine film is thought to be fettered in England;" it has always been common property. There is nothing to hinder any one dying films all the colours of the rainbow if they are so minded; but if Mr. Stebbing intends to lead your readers to infer that every one is at liberty to use commercially the eosinated silver bromide process patented by Tailfer & Clayton—for which we hold the English rights—he is sadly mistaken.

We have expended a considerable amount of time, energy, and money to introduce this process, "on which depends the future of photography," into this country, and we have the opinions of the best English counsel as to the validity of the patent; but as this is a question which can only be definitely settled in the law courts, we are prepared, as we have already stated in your columns, so to test the matter on the first opportunity in case of serious infringement. Apologising for troubling you in this matter,—We are, yours, &c., B. J. Edwards & Co.

The Grove, Hackney, London, January 13, 1890.

AMATEURISM.

To the Editor.

Sir,—Your correspondent, Mr. J. Hubert, not only misquotes me, but gives me credit, so to speak, for words I did not use and sentiments I did not express.

The idea that a first-class photographer (by which I understand his ability to turn out the best work) must necessarily, and as a matter of course, know and understand all the theory and practice (the former more particularly) of photography, presupposes an educated man, and an argument that every first-class photographer *is* an educated man is, I think, untenable. One of the best I ever knew, and he had more than a local reputation, could barely write his own name.

In writing what I did, to call attention to a most unsatisfactory state of affairs, I wanted to urge, particularly on our numerous local societies, the desirability of more educational effort.

Educate the rising generation of photographers, and what will not they be able to achieve, when in due course they become the photographers of their day?—I am, yours, &c., A PHOTOGRAPHIC CHEMIST.

Answers to Correspondents.

J. R. C.—See leading article in the present number That answers your query.

REFLECTORS.—Try the effect of one of Chapuis' daylight reflectors, placed so as to give a large amount of top light.

CHROME ALUM.—We know of nothing that will again render the gelatine soluble which would not injure the fabric.

LANTERN SLIDE.—Consult the index of the last two volumes of the JOURNAL. You will there find several articles on the subject.

A. X.—Better send the precipitate to the refiner, as, without a good deal of trouble, the chloride would not be pure enough for use.

A. BROOKES.—If the carbon tissue has become mouldy it should be discarded. Before doing so, however, it might be well to sensitise a piece to see if it is really unuseable.

A. J. WELLS.—The form of lens should be meniscus, the focus about six inches, the diameter not less than an inch. The rapidity of exposure will largely depend upon the size of diaphragm.

A. C. X.—The lettering on the card may be done by means of a rubber stamp and the ordinary ink supplied for use with it. This would be the neatest and, at the same time, the cheapest method.

B. W. H.—1. Place a mark inside the camera between the lens and the plate.—2. The same method as employed in ordinary printing, diffusing the light either through ground glass or tissue paper.

OPTICAL.—Meldola's *Chemistry*, reviewed by us a few months ago, is one of the best. Brewster's *Optics* is a good work, but everything depends upon which department of the science you wish to study.

BEGINNER.—The stains on the prints are due to the paper or the pictures after printing being handled with dirty fingers; *i.e.*, contaminated with hypo-sulphite of soda. Care and cleanliness will avoid them in future.

E. C.—The marks on the paper appear to be due to scum on the surface of the silver solution at the time the paper was floated upon it. This scum may arise from some deleterious matter being on the bottom or sides of the dish and then rising to the surface.

W. A. J.—1. The metal vessels will answer very well if they are properly coated with the enamel.—2. All will depend upon the strength of the solution. If it be made of the strength of four ounces of hyposulphite to the pint of water, about fifteen minutes will suffice.

O. I. L.—It is not at all necessary that the picture be marked "copyright" to protect the copyright. Any one who copies a picture does it at his own risk. It is his business to see if any copyright exists. If you have pirated a copyright work you will have to take the consequences. If the full penalty is enforced it is 10*l.* for each copy.

LUX.—1. Procure two plano-convex condensing lenses, fourteen inches in diameter, and mount them in wood. They will cost less, perhaps, than you anticipate. An ordinary carpenter can make the instrument under your directions.—2. We are aware of cameras in the American market similar to the one you purpose making. The obliquity of the mirror does not interfere with the uniform sharpness of the image on the ground glass above it.

BORE inquires: "Would you kindly, in your 'Answers to Correspondents,' state exact formula for salting paper, *re* your article on salted paper, January 3?"—The following is a very good formula:—Chloride of barium, half an ounce; gelatine, twenty grains; water, forty ounces. The paper should be immersed; if it be floated only, the proportion of chloride must be increased. The paper should be sensitised on a sixty-grain solution of ammonio-nitrate of silver.

W. CAMPBELL.—The apparatus, as shown by the sketch, will suit quite well for enlarging, only instead of a lamp with a single flame turned edgeway, employ a duplex lamp with its flames sideway to the condenser. The lens figured will answer, but it will be slower than if a portrait lens were employed. No. 1 of the prints is the best. If the negative will not give a stronger image, better intensify it a little, but not much. It may then give prints good enough for competition. Try first the effect of printing it in a weak light.

GROUP says: "Having photographed 12×10 group of family, one of the members not being able to attend, kindly let me know, through your paper, which is the best and simplest way of putting the other figure in if I get a C.-D.-V. of him."—First mask out all but the figure in the small negative, then take a print on a piece of paper the size of the group negative in the position it is to occupy in the finished picture; next paint over the print with non-actinic water-colour, such as gamboge; when dry, print the group in the ordinary way. The colour will be removed in washing the print prior to toning.

G. H. R. writes: "I have bought some No. 1 engraving black carbon tissue for the purpose of trying some photo-lithography, and I have successfully got the carbon tissue on stone. How can I remove the part of the film that has not been exposed to the light, as it is essential for my purpose to get every bit of film away from the stone except that which has been exposed? I have tried hot water to remove it, but it still leaves a very thin film."—If the action of the water be continued the whole of the unacted upon gelatine should dissolve. If it does not the tissue, from some cause or other, has become insoluble. To test if this is the case, put a piece of it, without exposure to light, in warm water; if the gelatinous matter dissolves away from the paper it is all right, if it does not the difficulty is accounted for.

EAST ANGLICAN and W. H. C. have not conformed to our rule by sending their names and addresses, hence their queries are not answered.

P. A. J. says: "A few years ago a popular man in this district sat to a photographer, who made the picture copyright; now the gentleman has given me permission to make an enlargement from it. I wrote to the photographer, asking a loan of the negative, and offering to pay something for its use, instead of having to copy a print. The photographer refused to lend the negative and threatens proceedings if I copy a print, as he says it is his copyright. Can I get into trouble as the sitter has given me permission?"—If the copyright belongs to the photographer the sitter has no right in the matter at all. His permission to copy will not in any way free you from responsibility.

ALF SIMS says: "I have just made up some collodion for enamelling prints, using six grains of pyroxyline to each ounce of a mixture of equal parts of ether and methylated spirit; but when the film is dry on the glass it is opaque like ground glass instead of being transparent. On making up a small quantity, using the same pyroxyline and ether, but pure alcohol instead of the methylated, the film dried perfectly transparent. I saw in a copy of the JOURNAL some time back that methylated spirit would do very well for enamel collodion, but evidently it will not."—Methylated alcohol will do quite well for the purpose, but our correspondent has evidently been using what is known as "methylated finish;" that is, the spirit in which a certain proportion of resin is dissolved. When thus prepared it can be vended without a license. Finish is of no use for collodion, but methylated spirit minus the resin answers perfectly.

MESSRS. KEMPSALL & BRIGINSHAW send us a highly ornate calendar printed in colours and nicely framed for wall decoration.

FROM the proprietors of *The Camera* we have received their useful *Photographer's Diary and Desk Book*, which also contains formulæ and hints in practice.

WE have also to acknowledge two other calendars, one from Messrs. Arundel & Marshall, Hoxton, and one from Mr. Thomas Fletcher, of gas-heating celebrity.

THE Calendar of Messrs. McGhie & Co., of Glasgow, for 1890, is illustrated by a most admirable engraving printed in America. This in itself will ensure the safe preservation of the Calendar.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.—The annual exhibition of members' work will be held in the Temperance Hall, Temple-street, Birmingham, on Tuesday and Wednesday next week. Open from ten a.m. to ten p.m. each day. A lantern display each evening at half-past seven.

WE have received Tylar's *Practical Hints and Calendar for* 1890, the calendar portion of which makes capital reading, for opposite to each day is some bit of proverbial philosophy condensed in the space of one line, some of them being exceedingly appropriate. Interspersed with the "hints" is a compendious price list of Mr. Tylar's specialities.

MESSRS. J. & B. DODSWORTH, Cannon-street-road, E., have sent us a sample of a new and cheap blotting paper that they are introducing for photographers' use, alleged to be quite free from injurious chemicals. The advantages claimed for it over the ordinary blotting are, that it will not tear so readily, though really more absorbent of moisture, and it gives off no fluff to adhere to the prints, which two qualities, together with its low price, ought, they consider, to guarantee its universal adoption.

THE LATE FATHER PERRY.—Such news as has been received from the Eclipse expeditions which left this country is clouded with the sad announcement of the death of Father Perry, who appears to have obtained some observations, and made several successful exposures, with the four-inch lens and the twenty-inch mirror; but the development of the negatives was not carried out, possibly owing to the illness of the distinguished astronomer. Stephen Joseph Perry was born in London in 1833, and, after studying at the Catholic colleges at Douai and Rome, entered the Society of Jesus in 1853. Until 1860 he went through a special course of mathematics at Paris, and then was appointed Professor and Director of the Observatory at Stonyhurst College. The only occasions on which he has been absent from Stonyhurst for any length of time were for studying theology at St. Beuno's College (four years) and to take part in scientific expeditions. Among these expeditions were the magnetic survey of France in 1868–69; the transits of Venus in 1874 and 1882, when he was stationed at Kerguelen and Madagascar respectively; and the eclipses of 1886, 1887, and 1889 at the West Indies, Russia, and Salut Isles. He was elected Fellow of the Royal Astronomical Society in 1869, and of the Royal Society in 1874, and belonged to several other learned societies. His death will be a subject of great regret, not only to the small circle of students at Stonyhurst whose affections he had won, but to men of all classes in North Lancashire, and certainly to all who are acquainted with the value of his scientific work. Father Perry died on the 27th ultimo, and his body was taken to Demerara in H.M.S. *Comus*.—*English Mechanic.*

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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CONCERNING PATENTS AND TRADE MARKS.

Much material for the compilation of a moderately reliable compendium of law relating to patents, designs, and trade marks is to be picked up in those law courts in which disputed cases are brought for adjudication. We say "moderately reliable," for, alas! the law, in its practice, is far from being an exact science, whatever it may be in theory, and one Judge does not always agree with another, even when a case has been argued before both.

Some of these disputed cases, which have recently been reported in the *Official Patent Journal*, have formed the bases on which a *Digest of the Patent, Design, and Trade Mark Cases* has been made by Mr. T. A. C. Hampson, and edited by Mr. John Cutler, both Barristers-at-law. From this, we in turn shall here make a further and rather brief "Digest," selecting cases in which a principle is involved that may aptly compare with those which obtain in photographic cases, and these principles the reader will of course apply to any special photographic invention or discovery in which he is interested.

The effect of a disclaimer is, that where a portion of a specification is disclaimed it is a notification to the public that they may do what is so disclaimed.

In regard to a Disclosure, it was objected to a patent that the Patentee had not disclosed all the knowledge he possessed, he admitting in evidence that he had in his mind a substitute for one part of his invention which he subsequently patented. The Patentee explained that at the date of the patent he did not think the substitute equally good, and that though he had patented it, he had now returned to the original. The Judge held that this did not invalidate the patent.

When, in a case of Opposition, the Opponent has assisted in developing the invention under the instructions of the Applicant, the patent will be granted to the Applicant alone. The Comptroller had directed a patent to be sealed to the Applicant and Opponent jointly, but on an appeal to the Law Officer the patent was directed to be sealed to Applicant.

An inventor may, previous to taking out a patent for any invention, speak of the end to be served by, or the result or purport of such invention without invalidating a subsequent patent for it, provided he does not disclose the means by which he attains such result; and here, and in this connexion, we state, although not on the authority of this *Digest*, in which the question is not raised, but on that of a well-known patent expert, that an invention may be shown to one or two persons previous to patenting it, but nothing that has been shown to seven persons, or at any meeting at which seven or more persons were present, can afterwards form the subject of a valid patent, this being held to be publication, for it is an axiom in this country that the thing to be patented must not have been previously published.

If a person makes a drawing of a machine without having described it, and such drawing be published in a book, if that drawing be one which any machinist would understand and make from it a machine, then cannot a patent be taken out in respect of a machine substantially the same.

A prior specification dealing with analogous matter, but not describing a practical mode of producing the patented article, is held not to have anticipated the later invention.

A combination of known mechanical appliances and principles to attain a combination of results long sought for, but not previously obtained, in a machine in common use, is held to amount to a new result and the doctrine of mechanical equivalents applied.

A license to use a patented invention is held to authorise such licensee to use it at all places of business which may by him, or his firm, be started elsewhere. In the case cited the plaintiff contended that the license only authorised the defendants to manufacture a certain article at a definite place in connexion with the business of the original licensees; but the Judge held that the defendants, as carrying on the original business of the licensees at a certain place, were entitled to start other businesses elsewhere, and to apply the patent to articles manufactured by them in such other businesses.

In regard to general public knowledge: In a case in which the plaintiff took out a summons for particulars, asking that the defendants give pages and lines in support of alleged anticipation, it was ultimately held by the Court of Appeal that it is not necessary or proper for a defendant who relies on general public knowledge as an objection to a patent to state in his particulars of objections the books or publications which contain that knowledge, but that such general public knowledge must be proved by ordinary evidence, with reference to well-known books if necessary.

An invention in a previous specification described but not claimed is held to be proof of previous publication.

A patentee cannot amend by striking out his original claim and inserting a claim for a subordinate arrangement described in his specification. The Comptroller-General refused to allow this to be done, and the Attorney-General confirmed his decision.

Where the directions contained in the specification are sufficient to enable a person having a reasonably competent knowledge of the subject and reasonably competent skill to make the article without further invention, though it might be

that some trial and experiment are required, it is held by the Court of Appeal that the specification is sufficient.

An application of an old or known article to an analogous purpose is not subject matter for a valid patent.

Threats of an action to restrain: Threats made by a solicitor's letter are sufficient grounds for an action; and the fact that a person making threats refrains from bringing an action to assert his rights is very material on a motion for an *interim* injunction. The right of action for threats given by the Patents Act (1883, Sec. 32) is taken away by the commencement of an action for infringement commenced and prosecuted with due diligence. Where an action for threats is brought, and a cross action for infringement, some arrangement should be made in order to avoid incurring unnecessary costs by trying the same action in two different forms.

A discrepancy between the provisional and complete specifications as amended is held a fatal variance. In a case tried it was held on appeal that in a certain particular there was a discrepancy between the provisional and complete specifications that the amendment had extended the scope of the invention, and, therefore, that the patent was bad.

Into matters involving cases of design we do not consider it necessary to enter, these not being of such special interest to photographers as those relating to Patents and Trade Marks. Concerning the latter we have only to say that—

Any word descriptive of the article to which it is sought to be applied is not capable of being registered as a Trade Mark.

The common name of an article in a European country cannot, on the importation of the article into England, be registered as a fancy word for such article.

A geographical term is held not to be a good Trade Mark. A case in which the name of a factory or locality where certain goods were made was unsuitable and not capable of being registered.

When a mark has been on the register as a mark used before the 13th August, 1875, for a long time, and persons who might have given evidence on the subject are dead, evidence to show that the mark was not used before that date, by a person seeking to expunge the mark, will be received with caution.

ACID SOLUTIONS OF "HYPO."

It is an old experiment that prints immersed straight from the printing frame into a recently acidified solution of "hypo" will become toned by the aid of sulphur, and the "toning by sulphur," which the old combined toning and fixing bath brought about, was the great cause of the downfall of a process that was at once beautiful and easy, that undoubtedly permitted permanent prints to be obtained by its aid, but which, unfortunately in the vast majority of cases, produced tones as evanescent as they were beautiful. We are convinced that a thorough investigation of the subject, even at this day, when processes of known absolute permanency exist, would be fruitful in valuable practical results. We fear, however, that such an investigation is quite improbable, from the very fact that the initial facts of the decomposition of the "hypo" itself—the thiosulphate of soda, to give its chemical designation—are not yet accurately determined or agreed upon. Some brief allusions to recent experiments and theories will not be without their use to those who desire to consider the bearings of a question which, from the earliest days, has been of paramount interest to photography and photographers.

Quoting from an abstract (in the *Journal of the Chemica Society*) of a paper by Berthelot, we read that "thiosulphates, as is well-known, are decomposed by acids with liberation of sulphurous anhydride and precipitation of sulphur. The sulphur, however, exists in different allotropic modifications, the sulphurous anhydride reacts with the liberated thiosulphuric acid before it has time to decompose and forms thionic acids, and the latter are partially dissociated by water. It follows that the final state of the system is a condition of equilibrium between many reactions." This, without being very detailed, supplies a sufficiently concise general idea of a reaction which must always present itself for consideration in the cases where "sulphur toning" is concerned. If, however, we turn in the same journal to an explanation of the results of the same reaction—the mixing of thiosulphate of soda solution and acid—we find a very different explanation offered by another writer, Herr W. Vaubel. He, after detailing a variety of experiments and deducing the formulæ of the resulting compounds, concludes that "the decomposition of thiosulphuric acid is not the simple one generally believed, but that the first phase is a decomposition into hydrogen sulphide and sulphuric anhydride, which then further react on each other. The various reactions taking place would then be expressed by the equations—

$$\text{(I.)}\quad H_2S_2O_3 = H_2S + SO_3$$
$$\text{(II.)}\quad H_2S + SO_3 = SO_2 + S + H_2O$$
$$\text{(III.)}\quad 2\,H_2S + SO_2 = 3\,S + 2\,H_2O$$
$$\text{(IV.)}\quad 3\,H_2S + SO_3 = 4\,S + 3\,H_2O.'$$

This chemist, in making his experiments, treated the thiosulphate in a large flask with acids of different degrees of concentration—sometimes at ordinary temperatures, at other times by the application of heat—and always left the results of the reaction to further react upon themselves for several hours, ultimately diluting them with water before determining the composition of the constituents of the liquid. This method is found fault with by Herr G. Vortman, who, to avoid what he considers to be the ill-effects of such a method, heats the thiosulphate solution to boiling point, with either more or less than the theoretical quantity of the dilute acid or solution of the metallic salt in a small flask, and sends through the liquid a slow stream of either carbonic anhydride or hydrogen from the very commencement of the experiment, with the object of removing the sulphurous anhydride formed from the reaction, and preventing its oxidation in the vessel by the oxygen of the air. He then examines the contents of the flask for the other products. Now, although Herr Vaubel replies to this paper, insisting upon the correctness of his views, it must be evident to any one with but a slight knowledge of chemistry that the contact of atmospheric oxygen and these easily oxidisable compounds must tend to vitiate the determination of the results of the prior reaction.

To turn to Herr Vortman's results we again find something different from either Berthelot or Vaubel, as he obtains oxygen as one of the factors of the reaction. "The initial decomposition of thiosulphuric acid is expressed by the equation, $2\,H_2S_2O_3 = 2\,H_2S + O_2 + 2\,SO_2$; the end products varying with the nature of the acid or metallic salt present. In the case of the presence of metals, such as, for example, silver, whose sulphides are insoluble in acids, a precipitate of sulphide of silver is formed, and the oxygen reacts either with the sulphurous anhydride with the formation of sulphuric acid, or with a portion of the undecomposed sodium thiosulphate with the formation of tetrathionate or pentathionate; the last reaction, however, ensues only in those cases in which either an excess of thiosulphate is.

present, or the metallic salt undergoes reduction from a higher to a lower state of oxidation."

It is quite evident that, assuming the theory of the last paragraph to be correct, a plausible way for accounting for the colouration of a print by acid hypo might be suggested by likening the action of the silver sulphide thus formed to that of metallic silver, and its selective precipitation in wet collodion development. Whatever the true explanation of this and similar phenomena may be, it is evident from the quotations we make that we are still far from being able to form a true working hypothesis regarding the old sulphur toning.

Various rumours have been afloat with reference to the financial success of the late Paris *Exposition*. One thing is now certain, namely, that the English guarantors in connexion with the enterprise, will not be called upon for a contribution. The final meeting of the Executive Council of the British Section was held one day last week, when the President, Sir Polydore de Keyser, announced that the Council would be able to meet all its liabilities without making any call whatever upon the guarantors; therefore the bonds they so generously gave would be handed back to them. Much of the success of the British Section, if not the whole of it, was due to Mr. Trueman Wood, the able Secretary of the Society of Arts. Mr. Wood, as many of our readers are aware, is an ardent amateur photographer, therefore there is little wonder that British photography was not displayed at a disadvantage.

Several photographic exhibitors in the late French Exhibition, to whom were awarded gold or silver medals, have been complaining that a charge should be made for them. This is not the first time that a similar thing has occurred at previous exhibitions, though, we are proud to say, not in an English international one. However, each prize gainer gets a diploma, which, to most people, is the more valuable part of the honour, and *fac-similes* of the medals, plated or gilded as the case may be, are to be had for small sums. After all, those who make use of the medals they have gained for business purposes do not usually exhibit the medals themselves, but electrotypes from them, so that, practically, replicas are to them as useful as the originals.

Here is an interesting point in connexion with lantern matters. A lamp with several wicks, and burning paraffin oil, was used a few evenings since in a large and lofty room in which a goodly company was assembled. The lamp, though in skilled hands, could not be made to yield a good light. If the wicks were turned low there was no light, and the lamp emitted unpleasant fumes. If they were adjusted at their normal height the lamp smoked badly, and the light, as a matter of course, was yellow and poor. Previous to attempting the exhibition, the lamp had been trimmed and tried, when it was found to work quite satisfactorily. So it did next day, when again tried, although it had not been touched since the previous night. The maker of the apparatus, when appealed to, accounted for the trouble by saying it arose from a deficiency of oxygen in the atmosphere of the room, owing to the number of people present!

French meteorologists, it appears, have just discovered that the Eiffel Tower will prove far more valuable to them for observation than was at first imagined. Indeed, it is said that it possesses most of the advantages of an observatory built upon a mountain. In confirmation of this, it is stated that, recently, while a severe frost prevailed in the city, a strong warm breeze was blowing at the summit of the tower, and it was three days before this temperature reached the ground. In no elevated observatory could such direct vertical observations be made as here. Photography will be pressed into service at this elevated position as a matter of course.

Negatives which can be at once employed as direct ones, as in silver printing, or as intermediates in such mechanical processes as require them, have always been a desideratum. If an ordinary negative be stripped from the glass on to a gelatine film—the plan usually adopted—a reversed negative is obtained which is all that can be desired. But such a negative, however thin the gelatine may be, is useless again for silver printing, if great sharpness be an essential. With negatives on celluloid films, it was claimed for them, when they were first introduced, that they would yield impressions equally sharp from whichever side they were printed. Such, however, is not the case, as every one is aware who has tried the experiment. The film now being introduced by the Eastman Company is so exceedingly thin and transparent that prints can be made either from the front or the back of the negatives without any perceptible difference in the sharpness. This will prove a great convenience to collotype workers and others. Unfortunately the new film is not well adapted for the ordinary film carriers, except for the smaller sizes. For the larger sizes, at present it must be used with the roll holder.

One would imagine that really good carbon pictures, of the panel size, on opal glass, mounted with a hinged back of cardboard to support them, when sold retail for one shilling and sixpence, could not prove very remunerative to the producer, particularly when it is considered that, before the pictures reach the hands of the retailer, there have been two, if not more, profits upon them. Such, however, is the price we see these pictures marked at in a fancy stationer's window. We well remember the time, and that only a few years back, when the glass alone, and that, too, of an inferior quality, could not be obtained for three times the amount now charged for the pictures and mounting complete. Such is the effect of all-round competition.

Nothing exemplifies, in a practical way, the difference in the time of exposure with different processes better than a picture in which a clock is included. It is curious to note the difference in a clock face, as rendered in a modern photograph, when compared with a similar object in an ancient one. In the days of the calotype, for example, when the exposure for, say, a church was, perhaps, from a quarter to half an hour, both the hands of the clock were blurred, the minute one being quite lost through its movement. In the collodion days the hour hand was sharply rendered, but the minute hand was much blurred. Indeed, it was easy to see, by the length of the blurring, what had been the time of exposure. In the modern negative both hands of a church clock are rendered with equal distinctness.

THE NEW ROLLABLE FILM OF THE EASTMAN COMPANY.

Rumours of the advent of a new transparent film, sufficiently plastic to be rolled away on a spool, but requiring no stripping or special after treatment whatever, have for some time past been flying around; but the jubilee of photography has come and gone, and it is an appropriate achievement for the first dawn of the second half century of our art to inaugurate such an important advance in film photography as the new rollable film of the Eastman Company. A few samples, it is true, were in the hands of some privileged workers before the present year, but the 9th of January last, at the Camera Club, saw its official presentation to the photographic world under the chaperonage of Mr. Walker.

As I was one of the privileged few who were permitted to make the *débutante's* acquintance *avant la lettre*, a short account of my experiences may be of use to intending workers.

Celluloid is the material of which the substratum or support is formed; there is no novelty in this, for many years ago the same material was proposed by Parkes as a substitute for glass, and the numerous samples of celluloid films, prepared both by English and American dealers, are now well known. The new departure of the Eastman Company, who, by the way, prepare their own celluloid, consists in the excessive thinness of the film—the average thickness of several pieces when coated with emulsion guaging, I find, only two and a half thousandths of an inch, or, in other words, it would take four hundred of them to make up a packet one inch in thickness.

A natural sequence of this thinness is its great pliability, so that it can be easily wound on a spool for use in a roll holder.

I can speak very highly of the rapidity of the emulsion with which these transparent films are coated, for it may be considered as equal to that on any of our instantaneous dry plates, and has permitted me to do hand-camera work with an *f*-12 stop during the last and present months.

A striking proof of the weakness of the light at this time of year is shown on some of my exposures, owing to the use of a wide-angled lens; the image of the sun has fallen on the film, but so poor was it in actinic rays, that it was actually unable to cause reversal of the image, but is represented on the negative by a black disc.

It has always been usual to ascribe the non-stripping tendencies of the older film to the developer, and undoubtedly some developers had a greater tanning effect upon the soluble gelatine substratum than others. This was undoubtedly a drawback, for it takes time when one has once become accustomed to a certain form of developer to have to study all at once the *finesses* of another. In the present film no such necessity arises, for it can be treated exactly like any other dry plate, and I have found it amenable to any form of development. When hard pressed with ammonia it has, like many American emulsions, a tendency to give green fog, and therefore, in cases of hand-camera or instantaneous work, it would be best to discard the ammonia and use the fixed alkalies.

Although when first cut off from the spool the celluloid has a tendency to curl, the sensitive side being inwards, the moment it is immersed in water the gelatine swells and the film straightens out and becomes fairly flat, so that I find it perfectly possible to place the film directly in the developer without first soaking it, manipulating it as if I were exciting ordinary silver paper. Even if it should not lay quite flat at first it is only a matter of time, to allow the gelatine to become properly swollen—indeed, a prolonged washing sometimes causes the films to curl with the gelatine outwards. To provide against any such difficulty arising the Eastman Company sell a special glass-bottomed, wooden, developing tray, provided with slips of wood to hold the film down. I have, however, found no necessity for such a dish, at least not for small sizes, but the economy effected in quantity of developer renders such a dish highly advisable.

One cannot better describe the operations of developing, fixing, and subsequent washing the celluloids than saying that exactly the same procedure may be followed as if ordinary dry plates were being manipulated. It is only in the subsequent drying of the films that some little extra precautions are necessary. The emulsion that is placed on the celluloid strips, on drying, naturally contracts, and tends to make the film curl up. The fact that they are rolled on the spool sensitive side inwards increases this permanent set, so that if the washed films are simply suspended like paper from one corner, on drying they will curl up into thin spills like pencil cases, the gelatine being inwards. These, it is true, can be rolled out the reverse way around a wooden roller, when they will lie perfectly flat; but still the tendency to curl has not been entirely killed, and after a short time, if not left under pressure, they will begin to curl again. For this reason I prefer to dry the films in a flat position. The gelatine then dries with a permanent set, and if left till *perfectly dry* will evince no tendency to further contract and pull up the support. A treatment with glycerine has been advocated, but I would say, above all, avoid its use except in the driest of climates. The addition of this substance undoubtedly prevents the films curling up, for the simple reason that it keeps the gelatine always in a moist condition, never allowing it to perfectly dry, and so contract, but the effect, when such a damp film, unvarnished, is placed in contact with sensitised silver paper, should rather be imagined than tried. I therefore strongly advise workers to dry the films *flat*. My own method is to pin the two upper corners to a shelf, and then nip the bottom edge between two pieces of wood that are sprung together by an indiarubber band, another thin strip being placed between them to act as a fulcrum. The weight of this clip keeps the films perfectly taut, and when quite dry they will be found quite flat and supple, and ready at once for the printing frame.

So much for the merits of the new innovation. Now let us examine its faults, actual and possible. The possible ones are, either that the celluloid substratum will become by time hard and brittle and refuse to unroll, or it may gradually decompose and turn yellow, or shrivel up. I do not apprehend much danger from either of these hypotheses. Celluloid in the form of combs and other household articles has been in use for some time past, and I have not as yet detected any such defects in it.

Of the actual faults from which the films suffer one is a sort of double band right across the film, having all the appearance of a join, which is occasionally found in a roll. This, if it happens to fall unluckily, entirely destroys this negative out of the set. Another defect is a prevalence of tree-like markings, branching out in the direction of the pull. They do not always appear, but if they do, they make themselves very evident on the print. From a somewhat careful examination I am disposed to put them down to an electrical cause. The markings are not on the celluloid, but consist of reduced silver in the gelatine film, and only appear under development. I had at first ascribed them to a voltaic action due to the force exerted in unrolling the film. The gelatine is in close contact, under pressure, with the celluloid, and it is then forcibly separated from it, and such a proceeding should very well set up a galvanic discharge. This theory of mine was strengthened by the fact that on unrolling the latter half of my spool very slowly the marks were much minimised, if not entirely avoided. On more closely examining these arborescent markings I find this theory hardly tenable, for if it were correct the marks should be on the outer surface of the gelatine, where it is in contact with the back of the celluloid, but on examining them carefully I find that they are on the *inside* of the gelatine, between it and the support, and it is possible to scrape away most of the image before they are obliterated. It seems, therefore, impossible that the unwinding can have had anything to do with it. A suggestion has been made that they may be caused when the celluloid is stripped from the glass or other support on which it is coated, but even this theory is not very tenable, and we must regard, at present at least, the cause of their appearance as non-proven.

Another defect, and one sometimes rather prevalent, is that of small bubbles or irregularities in the celluloid film; these raise the gelatine emulsion above the level of the rest of the surface, and when rolled up tightly a pressure is set up at this point, and under development it comes out as a black spot, and standing out in relief above the rest of the film, looks exactly as if it were a particle of black dust that had fallen on and stuck to the film.

These are the only two defects that I have as yet met with, and both of them should be easily avoided in subsequent batches. It would be too much to expect such a radical novelty as the present rollable film to come into our hands quite perfect, and there are very few of the processes at present most popular that were brought out in so satisfactory a condition.

We have, perhaps, not heard the last word of film photography, but the Eastman Company can be congratulated on having made a very decided step in the direction of perfection. LYONEL CLARK.

"ODD JOBS."

THE title of this article is intended to convey the idea of work that is not usually included in a general every-day practice, but which at some time or other the photographer is called upon to perform. The most disagreeable of any, in my opinion, is post-mortem photography. What pleasure people can find in looking at the horrid presentments so frequently made is past my comprehension, but such photography has to be done, and it is as well to make the best of it. Setting aside the repugnance most photographers have to the work, the conditions imposed are often trying in the extreme, from a photographic point of view, as regarding the size of the room and quality of the light. The disinclination one has to handle the subject, and the restrictions of a sentimental nature imported into the proceedings by relatives or friends, often hamper the successful performance of this class of work very much. It has to be done, and if the results are to be better than a horrid nightmare, we must smother our squeamishness, and make the best of it. The following hints may, perhaps, be of some use to those who have sufficiently strong nerves to undertake work of this character. As a preliminary move, ascertain, if possible, the cause of death, which if of a contagious nature, throw up the job without hesitation; if not, get it over as soon as may be.

Now the conditions are generally that the subject lies on an ordinary bed or in a coffin. The first is the best for the photographer,

as with the assistance of an attendant the body may be so arranged that a fairly pleasant picture can be made. One arm can be posed outside the coverlet, and accessories arranged so that a sleeping figure is suggested. Now, with regard to the lighting, it frequently happens there is very little daylight available, but providing there is a practicable quantity, the results are better with it and a long exposure than with artificial light and shorter. The magnesium, or flash light, is apt, unless the operator has had considerable experience with them, to produce either flat effects or too much contrast, it not always being possible, by reason of the surroundings, of firing them off to the best advantage. The bed or couch on which the body lies should be wheeled into the best possible position with regard to light and convenience for working. The preliminary preparation of the body ought to be such that the eyes and mouth are closed. If, unfortunately, this has not been properly effected, an improvement may be made by passing a narrow tape under the chin and tying it tightly over the head. With regard to the eyes, they will have to be remedied by the retoucher on the negative. There is considerable reluctance with most people to take any steps of this kind, but the attendant will generally, acting under your directions, afford the help. The idea you wish to convey is that of a sleeping person, and no little alteration of this kind should be shirked. A pleasant, life-like appearance is not an invariable result, take what trouble you may, but such precautions will make a much more agreeable picture than if they are neglected. Supposing the subject is already in the coffin, unless the friends desire the surroundings to be included in the photograph (but this is usually left to the discretion of the operator), confine the attention to the face, hiding all traces of the coffin by drapery. The camera should be placed high and pointed down, or the head of the coffin raised, as the case may be, perhaps both. A view of the face from below is not making the best of the subject, and exaggerates the unpleasant peculiarities of the expense of the more favourable ones. When all is said and done, in nine cases out of ten the portrait is very unlike the living person. We are probably told that this is the only opportunity of getting a portrait of any kind, and it is of no consequence to the photographer, he gets paid, and there his interest ceases.

In most cases a great improvement can be effected by reproducing from the original negative and finishing in black and white. The artist can then by retaining the likeness so alter the surroundings that instead of a thing to shudder at, it may be made into a pleasant-looking picture, that can be copied and so multiplied at discretion, or reproduced in any way that may be thought desirable. It may be objected that people will not run to the expense. Perhaps some will not, but by distinctly showing the advantages many may be induced to have the improved picture. One very important factor, from a business point of view, is to supply the photographs promptly, as the recollections of the friends of the deceased person soon revert to the remembrance of how they appeared when living, rather than of the short time they were on view afterwards; and every week makes your post-mortem photograph appear less like, and consequently less favourably looked at. We will now leave this gruesome subject, and take another of a somewhat livelier character—that is, photographing buildings, masonry, &c., for legal purposes.

Now this may be quite pleasant out-of-door work, or it may be such that the photographer will hold his breath and rush into the open air at the first opportunity. The place may be dark, damp, and full of foul odours, and the inhabitants such that it is an advisable precaution to leave your valuables at home, and have the protection of a policeman. These dark, unsavoury subjects have occasionally to be photographed. To do them the apparatus used should be such that can be quickly put up and removed, and no loose pieces to look after, and be provided with means for artificial light. The photographer of the present day has many things in his favour as compared with the old wet plate days, when such work was almost dangerous. I remember a well-known photographer who was invalided for a fortnight after one of these experiences. Wide-angle lenses are generally necessary, the work being mostly at close quarters. Look to the lens just before use to see that it is not dimmed with condensed moisture, and let the whole apparatus be carefully enveloped in the focussing cloth to protect it from dust, which during the demolition of old buildings is almost suffocating, and will penetrate every unprotected chink and cranny, giving rise to lots of trouble.

It is sometimes necessary to do a little acrobatic performance by climbing over roofs to get a view of the parts required. Before now I have had to lash my camera to a chimney stack to get into a good position. Your assistant should be provided with some rope and a few pieces of board, that often on such occasions come in useful. Some architectural feature may have to be photographed which necessitates the camera being raised to a great height, when a very tall pair of steps may be made available by screwing the camera on to the top of them. You can mount the steps and focus, but it is out of the question to make the exposure standing upon them at the same time, as the vibration would spoil all, even if you could keep your balance. The remedy is to attach a thin cord to the cap of the lens and to a focussing cloth properly adjusted, open the slide, the cap being very loosely placed on the lens, with the cord hanging down. Descend to *terra firma*, and when the vibration of the steps has ceased, carefully twitch the cap off the lens with the cord to make your exposure, when another pull will draw the focussing cloth over the lens, and so complete the process. The steps can be remounted, the dark slide closed and withdrawn, and the operation is complete, without vibration, and with very little trouble.

Leaving architectural subjects, there are often odd jobs of photographing domestic animals, horses, dogs, cats, &c. These are all plain sailing for those who make a speciality of this class of work, but even then the number of failures are considerable; but for those who only try occasionally, an unlimited amount of patience is required. Providing the light is good, with quick plates and a rapid shutter, it is easy enough to secure a sharp picture, but getting a proper pose is where the difficulty comes in. The photographer should know the different points of the animal he has to take; if he does not happen to be a judge himself, the study of good paintings will be of some assistance. A horse should never be taken directly broadside, or with the legs hidden one behind the other; neither should it be taken full front. No matter how sharp such a picture may be, it never looks well. The side should be always more or less in perspective, with the head turned slightly to one side, the legs separated, and the ears erect. In hot weather, when there are many flies about, it is almost impossible to get a satisfactory picture. The animals are fidgety, continually twitching their tails, or shaking their heads, or moving in some way or other that is pretty well continuous, the chance of a satisfactory exposure is very small. Cool weather, with a good diffused light, simplifies matters considerably. Of course, it is a great thing to secure good definition, but it is not all. Expression is quite as important, and the artistic value of a photograph depends more on this than anything else. To be a successful portraitist of animals, the photographer must have a love for them. It is astonishing how soon a bond of sympathy is established between men and animals if man sets about it in the right way, and how such sympathy smoothens the otherwise difficult operation of taking an expressive portrait. In such hands they become tractable, and can be persuaded to do pretty much as desired. Horses are also much influenced by the tone of the voice, having very discriminating ears. A loud, rough voice generally causes a frightened expression, not only of the face, but of the whole body, as may be noticed by the shifting of the legs and moving of the ears. That there is infinite variety in expression of animals is undoubted, and we need only to look at Landseer's renderings of them to see and appreciate their pictorial value. Horses who have brutal keepers are difficult to get to look right, and never if the man is in evidence. There are, of course, different temperaments. Some are naturally vicious, but none are so irredeemably bad as to be uninfluenced by kind and judicious treatment, which will, with the worst, have much more effect than any amount of savagery, which oftentimes is the cause of the ill-temper. It is not to be supposed that the photographer can revolutionise the character of an animal in the short time he has to deal with it, but no doubt a soothing, pleasant voice and manner will have considerable influence with almost any, and that a man naturally a lover of animals, will get along with them more satisfactorily than any body else. This discriminating power is frequently not so much taken into account as it should be, and many failures may be attributed to it. Let it be remembered that a horse can see behind him without, or very slightly, turning his head, and has, moreover, very sharp eyesight, which he trusts to more than to any other sense, which is to his disadvantage,

accepting appearances for reality. A strip of painted canvas that a child could destroy would, to most horses, be a barrier as effective as a stout rail; they would not try to force themselves through it, but leap over, if they tried to pass it at all; but the probability is they would do neither, but trot round the apparent enclosure until they saw no obstruction, then quietly pass through. Acting on the knowledge of these peculiarities, it becomes more easy to deal with them. They are, moreover, possessed of considerable curiosity, and this trait is one of the greatest advantages to the photographer. An unusual noise will cause them to prick up their ears and look inquiringly for the source. This is the time for the exposure to be made. The mere shuffling of the feet on gravel is a good lure, and answers the purpose almost as well, if not better, than anything else. But whatever plan is adopted, let the plan be the only one, and avoid having any moving objects about at the same time to distract the attention.

Dogs are not quite so easily managed; they are more knowing, and want a reason for what they are expected to do. If treated roughly, they usually slink about with their tails down, and a most melancholy expression on their faces; or they will lie down, with their backs towards your camera; in fact, any way contrary to that you require. As to getting a bright, earnest, inquiring look, that is out of the question. Dogs will generally run after anything running away—small dogs especially. Pretending to throw a stone or a ball will generally prove attractive for sufficient time to make the exposure. Large dogs, as mastiffs, or St. Bernard's, seem to despise the frivolity of this proceeding, and a chance of some other kind must be watched for. They almost always sit or lie down immediately they are requested to be quiet. They generally keep an eye on their master, and directly he comes to a rest they follow suit. To keep a dog on his feet his keeper must not indicate that he has come to the end of his journey, or must appear as though about to start on another. Making queer noises may elicit a temporary interest, but it soon loses its effect, and they tell you, as plainly as looks can, it's of no use trying to humbug them, and they act accordingly.

Cats are generally a great trouble to photograph anywhere, except in their own homes. If they are brought to the studio, the majority of them, soon as at liberty, raise Cain and break things. As to getting them to stay where you want them, it is entirely out of the question. They will get under a chair, or behind a background, anywhere and everywhere but where they ought to be; so unless the photographer requires an afternoon's practice in patience, he better not have cats brought to the studio. The only way to get pictures of cats is to take them where they *voluntarily* settle down. They can be gradually induced to frequent some warm, comfortable spot on a table or some article of furniture raised some little height above the floor that will be in a suitable position for taking them. Trying to force a cat to do anything it is not inclined to is so much labour thrown away; and the most *sauve* and insinuating manners very often meet with an ungrateful return. Once frighten a cat, and you are its enemy for life. The best cat portraits are almost all chance ones. When pussy is warm and comfortable, with an appetite fully satisfied, you may make exposure after exposure successfully; and a nice picture of cat and kittens is one of the most popular pictures you can take.

Just one more odd job, and that is having to copy an old oil painting *in situ*, say on some staircase, where it has hung for generations. Here often the difficulties to contend with are frightful. The light is frequently bad, and the space cramped; the slope of the staircase and the yellow-brownness of the picture to be copied adding to the trouble. I once had something of this sort to do in an old Hall, and this is how I set about it. With some boards and boxes I levelled up the stairs for a platform, on which I placed a pair of steps, having measured the distance for focussing by trying on something else at the same distance. I arranged the camera as nearly opposite the centre of the picture as I could judge (it was too lofty to reach and take the actual measurement), the camera being wedged up as level as I could manage it, the slide was inserted, and the exposure, which was over an hour, made. The result was fair, and that is all I could say for it; and there was a considerable amount of reflected light over the whole picture; and I had not accurately centred it, but being on a much larger plate than the subject actually required, and oval in shape, it was as good as I expected, and when finished did not look glaringly bad. At the same time, such jobs are not those a photographer takes from choice, but occasionally turn up to vary the monotony of every-day work.

EDWARD DUNMORE.

THE NEW BENZOLINE LIMELIGHT.

IV.—NIPPLES.

IN the preceding article we found, both by theory and by experiments, that the more carbon is consumed in a limelight flame the hotter does the latter become, and the more brilliant is the light with nipples of one-fourteenth of an inch bore.

This may at first sight appear irreconcilable with our sixth axiom, which states that the limelights of coal gas and hydrogen are about equal in brilliancy with the same size of nipple. The explanation is simple: the oxyhydrogen flame is not so hot as the oxycoal gas flame, and does not produce so high a degree of incandescence on the lime; but it has a greater *specific* heat, and is, therefore, capable of producing a larger *area* of incandescence than coal gas; thus the hydrogen limelight is a *larger* light than the coal-gas light. What is lost in intensity is gained by greater area, on the same principle that a large oil lamp may give as much light as a tiny limelight.

The oxyether light is very similar to the oxyhydrogen in its properties, and hence is said to give a *spreading* flame on the lime—to yield a large light with a small aperture in the nipple. With ether, as with hydrogen, large bores cannot be used.

For ordinary lantern work, an incandescent area of one inch in diameter is not too large; hence there is no loss of light caused by the use of pure hydrogen, as the area does not exceed this amount.

For microscopic enlarging, in which an illuminant larger than a quarter-inch diameter is not required, the coal-gas light should be superior to the hydrogen light.

Our fifth axiom states that the maximum bore of nipple in the case of pure hydrogen is smaller than in the case of coal gas; the question arises, Why this should be so? The explanation is the same as before: the hydrogen flame has a greater specific heat than coal gas.

The rapidity of flame in passing from one particle of gas to another is limited. Inside a tube, a definite period of time is required for the passage of the flame from one end to the other; and if the tube is *cold*, it is evident that the flame or superheated steam is cooled during this passage. If the bore is narrow and there is an opposing current of gas proceding in the contrary direction, the time required may be so prolonged that the steam is cooled to a degree which will no longer inflame the oxyhydrogen gas touching it; hence, in a narrow-bore nipple the flame does not "pass back." When the opposing current ceases, or becomes too weak, the flame can travel more quickly through the bore of the nipple, and once it gets past the narrow part, it goes on without hindrance, and produces a "pop" more or less loud in proportion to the quantity of explosive gas it can reach.

If we were to pass hot water through a lengthy lead pipe of half-inch bore, the fluid would proceed a considerable distance before it was cooled to the normal temperature; but if hot air was passed through a similar tube at the same rate of speed, we should find that the air was cooled almost immediately. This is because water has a far higher specific heat than air has; the former absorbs vastly more heat in rising to a certain temperature; and in the cooling process water gives out much more heat, and takes a longer time in parting with it than does an equal volume of air.

The oxyhydrogen flame is superheated steam possessing a high specific heat; the oxycarbon flame is intensely heated *carbonic acid* gas, of only one-half the specific heat of steam; hence, in passing through a narrow bore in cold metal, the oxycarbon flame is cooled in one-half the time required for steam; and, consequently, the oxycarbon flame can be safely burnt in a nipple having a bore twice as large as the oxyhydrogen flame. The maximum bore with pure hydrogen is about one-eighteenth of an inch; theoretically, the maximum bore of an oxycarbon flame should be one-ninth in diameter.

Hence it follows that the more carbon is consumed in a limelight the larger is the size of bore in the nipple available. The maximum bore with the coal-gas limelight is greater than with hydrogen, also greater still with benzoline, and again larger with benzole.

Two or three factors have been omitted in the foregoing remarks, such as the initial heat of the oxycarbon flame being greater than that of the oxyhydrogen flame, &c.: but these appear to nullify each other, and their consideration would be too abstruse and speculative.

It was this theory which attracted my attention to the use of benzoline for the limelight. It is to some extent supported by facts, as in the comparison of hydrogen and coal gas; but if anybody can devise a more plausible theory of nipples than this, I am quite willing to accept it as truth.

As carbonic acid gas has a lower specific heat than steam, it follows that the more carbon is consumed in a limelight the smaller is the area of incandescence. Owing to this there is little gain of light produced, in the case of small-bore nipples, by using benzoline instead of coal gas, because coal gas, being richer in hydrogen, gives a larger area of illumination than does benzoline, and experiment shows, with a nipple of one-twentieth of an inch, that a light of only 400 candles is obtainable with benzoline, even with a high pressure of oxygen.

Hence, to get the full advantage of benzoline it is necessary to use a nipple with bore sufficiently large to heat a large portion of the lime. This is accomplished by an aperture of one-fifteenth of an inch, which is capable of heating the whole side of the lime with a high gas pressure; with such a nipple the advantage of benzoline is very marked.

Benzole gives the brightest limelight, but it is not a large light; its brilliancy is four times as great as that of a good blow-through jet with coal gas, though the area of incandescence is about the same. There is, I understand, a demand in certain quarters for a limelight which gives a great light from a small point; for the lantern microscope the benzole light ought to prove useful. A one-fourteenth of an inch nipple answers well for it, though doubtless a larger bore could be used.

The oxybenzole flame may also prove useful in scientific or laboratory work, such as destructive analysis of refractory substances, its thermometric heat being considerably higher than that of the oxyhydrogen flame.

As I have recommended large-bore nipples to be used, it may be as well to state that the correct size of aperture is only one condition of a good nipple; if the other conditions are not satisfied the light will be both poor and noisy. With most jets in the market having small bores the enlarging of the orifice to one-fourteenth of an inch would probably spoil the jet; and if the operator does not understand the principles involved in the making of a first-class nipple, he will do wisely either in leaving his jet alone, or else in intrusting it to some person who makes a speciality of the limelight. A good nipple of large bore costs little, and is very easy to make, provided you know *how* to do it. Experience shows that platinum tips are a mistake with large-bore nipples.

In a previous article I mentioned that the light benzoline would probably be found suitable for dissolving. This point has been settled, and the warm bath saturator is now applicable to biunial and triple as well as single lanterns. There is no tendency to pop, and the manipulation is precisely the same as with coal gas. The saturator is found to be workable by unskilled operators, and it gives less trouble than does the filling of a bag with coal gas. All one has to do is to fill the vessel with the proper fluid, and to light the nightlight, connect the three brass nozzles to the cylinder and jet taps, and then leave the saturator to take care of itself till the exhibition is over. The working cost, in fluid and nightlights, is twopence per hour, the oxygen is the same in quantity as with coal gas, and the light is much better with proper nipples.

The warm bath saturator is, I believe, the only one in the market which can be used safely with a blow-through jet.

ALBERT W. SCOTT.

THE LATE CUTHBERT BEDE AND HIS BOOK, *PHOTOGRAPHIC PLEASURES.*

[A Communication to the Glasgow Photographic Society.]

I THINK we may safely take it for granted that all of us have read *The Adventures of Verdant Green, Freshman at Oxford.* Published more than thirty years ago, it still enjoys a world-wide popularity. It is not, however, so generally known that the same author has a work which appeals more especially to us who are interested in photographic matters. The title of this work is *Photographic Pleasures*, popularly portrayed with pen and pencil, and I purpose showing you, through the medium of the lantern, some of the more interesting sketches which are to be found in the volume. Before proceeding to do so, however, a few details regarding the author may perhaps be appropriately given. In the first place, we will have thrown on the screen the portrait of Cuthbert Bede, which appears as frontispiece to the volume of *Verdant Green* which I have in my possession, and then we will have the picture which appeared in the *Illustrated London News* of December 28, 1889. The original is a Meisenbach photo-block from a photograph taken by Messrs. Hill & Saunders, of Cambridge. It is almost superfluous to state the fact that Cuthbert Bede is only a *nom de plume*, our author's real name being Edward Bradley, or, rather, the Rev. Edward Bradley. At the time of his death, which took place on the 12th of December last, he was Vicar of Lenton, a village near Grantham. Although his famous work depicts student life at Oxford, he was not himself an Oxford graduate. He received his education at Durham University, where he took his degree. He was ordained in 1850, and was successively Incumbent of Bobbington, in Staffordshire (1857), Rector of Denton, Hunts (1859), Rector of Stretton, near Oakham (1871), and, finally, he was presented in 1883 to the Vicarage of Lenton. *Verdant Green* was published in 1854, and *Photographic Pleasures* in 1855. The following are his other works, with year of publication:—*Nearer and Dearer* (1857); *Fairy Fables* and *Happy Hours* (1858); *Glencreggan* (1860), this being a record of a visit paid to Kintyre; *Curate of Cranston* (1862); *Tour in Tartan Land* (1863); *The White Wife* (1864); *The Rook's Garden* (1865); *Matins and Muttons* (1866); *Fortheringay and Mary Queen of Scots* (1886); *Little Mr. Bouncer*, a sequel to *Verdant Green* (1878). He contributed, also, articles to *Punch* and to the *Graphic*. The above list will show that he was a prolific author, and he not only could write with his pen, but he could draw with his pencil. The illustrations accompanying the letterpress were invariably his own. You will be better able to judge of his success in this direction when you see some of the pictures from his *Photographic Pleasures*. Here is the title-page. He dedicates the book, "To all the light-hearted friends of light painting these pages of light literature are with no light regard dedicated."

The book is divided into twelve chapters:—

CHAP.
I. "Photography regarded as a Light Subject."
II. "Photography in a Legendary Light."
III. "Photography in a High Art Light."
IV. "Photography in an Artistic Light."
V. "Photography in a Portrait Painting Light."
VI. "Photography in a Love Light."
VII. "Photography in an Amateur Light."
VIII. "Photography in an Aristocratic Light."
IX. "Photography in a Negative Light."
X. "Photography in a Positive Light."
XI. "Photography in a Detective Light."
XII. "Photography in All Manner of Lights."

The illustrations are twenty-four in number, all of them full-page. The picture which forms the frontispiece has for its title, "Portrait of a distinguished photographer who has just succeeded in focussing a view to his entire satisfaction." The first illustration in the body of the book shows a possible contingency which might happen to the unhappy possessor of a photographic tent; the letterpress underneath is as follows:—"An enthusiastic photographer tries a tent of his own invention. He is disagreeably interrupted in the pursuit of science by the entry of a wild Irishman, who forthwith is carried back in imagination to the pleasures of Donnybrook Fair, and is unable to resist the temptation that the tented head presents." The next illustration represents "A mediæval photographer, from an illumination in the (Gun) Cotton MSS.," and "Monsieur Daguerre introducing his pet to Mr. Bull, with the remark, 'My Sun, sir.'" Both pictures are intensely funny. The toy camera on wheels which the "son" draws after him is a fine touch of humour.

I may just refer to one or two of the more outrageous jokes in the chapter, "Photography in a Legendary Light." You have had from myself lately a little of the history regarded seriously, we will see what Cuthbert Bede has to say on the matter from his point of view, which we may safely call the comic side of the question:—"Porta was the gate that indirectly led to photography. It was in the sunny land of Italy that a philosopher, Baptista Porta by name—a Porta who thought no small beer of himself—invented the camera. He inhabited an apartment to which (owing, probably, to the oppressive nature of the window tax) the light was admitted through a small aperture. The whole of the discovery was owing to the hole,

for, as it was of a lenticular shape, the ray of light that passed through it painted upon the wall, in cheapest of frescoes, pictures of all that was going on on the outside. The philosopher saw the ray, cried 'Hurrah!' and constructed the camera, that Pandora's box in which photography lay concealed." Speaking of Sir Humphry Davy's attempts, he says, "His plates were like the hearts of flirts, the images impressed on them were but faint, and could not be fixed." Our author is a little mixed when he says, "Daguerre's pictures were fixed on paper impregnated with nitrate of silver, those of M. Niepce were upon glass, silver-plated copper, and polished tin." But let that pass. He gives Daguerre a side thrust when he says the Frenchman delayed the execution of the official document, viz., the giving over the process to the French nation, until a patent had been secured for an agent in England, "thus being guilty of a deception patent to all." The dispute between Talbot and the Rev. J. B. Reade as to the use of gallic acid as a developer is thus disposed of:—"The Rev. J. B. Reade addressed to the London Institution an account of a method for obtaining light pictures by a process in which infusion of galls was employed. This led to the infusion of no small amount of gall in a correspondence which took place on the subject between Mr. Reade and Mr. Talbot, the latter having, in an affidavit, denied Mr. Reade's title to the invention he claimed; the moral of all this being that Mr. Talbot had leant upon a reed until it pierced him." Referring to Scott Archer, we are told he "shot himself into the temple of fame by the use of guncotton."

The next illustration in order, entitled "Photographic Tableaux," embodies two pictures, "The Infant Photography Strangling the Serpents," these being Daguerre's and Talbot's patents, and "Photography between Love and Vanity." This is followed by a full-page picture, a simple mode of "levelling" a camera. The picture speaks for itself. The seventh illustration comprises three subjects, and are as follows:—The Fixing Process, where a bull is seen chasing a somewhat obese individual who has arrived at the wicket gate of the field only to find that he cannot get through; An Exciting Process is represented by a man being pushed overboard from a ship only to fall among the sharks who are expectantly waiting for him; The Sensitive Process depicts a pair of lovers in the conventional attitude, with the motto, "He to lips that fondly falter presses his without reproof."—*Tennyson.*

In the next picture which we will have upon the screen, we find photographic processes still further gone into. As each drawing has its title underneath, you will be able to extract the humour without the aid of any explanation of mine.

"A Photographic Fix" is our next subject. "Mr. Jones, being on his way to the lakes, embraces the favourable opportunity of calotyping some fishing boats on the Ulverstone Sands, Morecambe Bay. The tide unexpectedly comes up during the time that his head is beneath the hood; disagreeable position of Mr. Jones on emerging from the hood."

Then we come to a series of photographic fancies:—Applying the black varnish, best black varnish (a copy of *Uncle Tom's Cabin*), applying an exciting fluid, &c.

The following illustration is entitled, "To secure a pleasing portrait is everything. Daguerreotypist to cheerful sitter: The process will commence as soon as I lift up this slide. You will have the goodness to look fixedly at one object, and call up a pleasant expression to your countenance."

Another page of photographic facetiæ is to be found in the twelfth illustration, where we find a photographic bath, photographic abstraction, developing solutions, all portrayed from the Cuthbert Bede point of view.

In the chapter entitled "Photography in a Love Light" we find our author has one or two passages which are extremely pathetic, and I may be permitted to quote them.

The picture which we find interpolated in the chapter we have already quoted from, viz., "Photography in a Love Light," is representative of "one of the pleasures of photography," visiting country houses and calotyping all the eligible daughters, and the picture in question you now have thrown upon the screen.

Another illustration of photographic facetiæ comes after the foregoing, and we will leave it on the screen for some little time, so that the details may be studied.

Perhaps one of the most humorous sketches in the book is the one entitled "A Photographic Positive." The picture which, if I mistake not, appeared in *Punch* is self-explanatory.—Lady Mother (*loquitur*): "I shall feel obliged to you, Mr. Squills, if you would remove these stains from my daughter's face. I cannot persuade her to be sufficiently careful with her photographic chemicals, and she has had a misfortune with her nitrate of silver. Unless you can do something for her she will not be fit to be seen at Lady Mayfair's to-night."

The appearance of the lady amateur with her mottled visage is a fine bit of humour, and is portrayed in a manner worthy of Cruikshank. I fancy our professional members will rather enjoy this hit at the amateur dabbler in photography, and perhaps some of them may be going the length of saying, Serve her right!

The next picture to be thrown on the screen, as you will see from reading underneath, is called a photographic picture. Here you see a man focussing, and an old lady, who appears suddenly from round a corner, and who is not used to these new-fangled notions, is made to say, "Please, sir, don't for goodness' sake fire, sir."

In his preface the author refers to the fact that four of the pictures in his book had appeared in *Punch*, but he does not, I am sorry to say, indicate which particular ones these are. I rather think I have seen the one which I am now going to show you in the journal in question. It has for title, "What it has come to, and "What it may come to." In the former we find a young hopeful addressing his father, an ardent amateur you may take for granted, "Oh, pa! me and baby have emptied out all your bottles, and have cleaned them so nice!" and in the latter, "What it may come to, or the British nursery in 1865," a nurse is found asking the child in its chair, "Did it want its camera, then?" and the reply, "No, I don't; I want to go and print off my negatives! Boo! hoo! hoo!"

Passing on, we come to the method prescribed by Bede for procuring a photographic negative. He says, "Take any village, and in its vicinity select a field through which there is a public way. Focus your view, and make all ready for the negative. While the process is going on take your seat upon the next stile (the more distant the better), and lose yourself in the leaders of the *Times*. You will thus be giving an opportunity to children of a speculative turn of mind to solve their doubts as to what your camera really contains. At the expiration of twenty minutes shut up your *Times* and return to your camera. When you take out your slide you will find that you have secured a most excellent negative!"

Photographic faces comprise the following:—"Brown sees his face in the glass, and thinks he is rather an agreeable-looking fellow. Brown sees his face in the negative; his second thoughts are by no means the best. Portrait of a very beautiful lady who has had the misfortune to sneeze at the moment of the removal of the cap. Portrait of a very unsteady gentleman. Lady with hood, time of Elizabeth; and camera with hood, time of Victoria. Phœbus Apollo, portrait painter to General Earth."

Exciting for the sensitive has the accompanying letterpress:—Outraged Protectionist (whose ideas have not been developed in proportion with those of the photographer): "Ho, you there! illo! I'll teach you what it is to bring yer theodderlite 'ere, and come a measurin' for railroads on my land!"

Photographic people are next hit off. "Fancy portrait of Dr. Diamond. A sitting with Beard. Portrait of Dr. Diamond in his calico bag. Look on this picture, the Hon. Miss Haggis, from the portrait by Chaldon, R.A., and on this, the Hon. Miss Haggis, from a Daguerreotype. Gems from the Blackguards' Photographic Portrait Gallery. Brown is, of course, naturally anxious to see how Smith looks in the camera. Mr. Wedgwood, from a photograph by himself. Photographer: 'Be pleased to look straight at me, sir!' Sitter: 'Why, dang it, I've been a-doing it these ten minutes!'".

We come now to a picture which Mr. Bell will no doubt appreciate: The photographic detective, and photographic, focussing, and hocussing. Mr. Priggins as he appeared before the "Beak," Mr. Priggins as he appeared before the camera. I'm afraid the conditions are now reversed, and Mr. Priggins will not now look so amiable.

A Photographer astonishing the Natives. "Come along, Betsy Jane, do, and look at the man with the peep-show." This picture, the author tells us in a footnote, appeared in *Punch*.

The last sketch in the book is entitled "The Present Attitude of Photography," and in the concluding chapter we find the question asked, "What is there that our friend Camera will not do?" and I may be permitted to quote the last paragraph or two, and it will be a a matter of especial interest for us as an Association to find therein an allusion to a former President. I refer to Mr. Kibble.

WM. LANG, JUN., F.C.S.

THE ILLUMINATION OF NEGATIVES FOR TRANSPARENCY PRINTING BY ARTIFICIAL LIGHT.

II.

IN my previous article I referred to various methods employed in the illuminating of negatives when it was desired to print transparent positives by reduction through the camera, and stated that, after a series of exhaustive experiments, I was fully convinced that, no

matter what means were employed in the shape of screens to diffuse a direct light, when such was thrown on or passed through a negative it was almost impossible to avoid unequal illumination, or flare spots, and that, after a series of exhaustive experiments, I had hit on a plan of overcoming the difficulty by constructing a novel method of illumination by means of a "chamber," which is so flooded, or, in other words, so bottles up the light, as to give an equal degree of illumination to all portions of a negative, or, if desired, as would be necessary in the case of negatives of unequal density, more illumination at one part than another.

In the course of the experiments which I conducted I was more than ever convinced that the principle of throwing light through a negative in a direct stream in front of the objective, or copying lens, is as wrong in theory, and quite opposed to any of the ordinary rules followed in the various methods of photography, for the merest tyro will at once see that we impress the image on our sensitive plate in nearly every instance by the light that is reflected from the object we are photographing, and not by the light which emanates from the object itself. This led me to conduct a series of experiments on entirely different lines from that of blazing a direct light through a negative, with the intervention of a diffusing screen, and after much thought, as stated in my previous article, I decided to construct a "chamber" of such material as would so brilliantly illuminate a negative as to give the necessary degree of intensity to fully expose a sensitive plate within a reasonable space of time.

In working out these experiments I was impressed with the necessity of employing as the illuminating agent such a means as would be at once within the reach of any novice, and therefore at the outset confine my experiments to the use of common hydrogen or house gas, because were I to have confined my attention to the electric or lime-light, I would most probably have succeeded merely in obtaining results that would come within the sphere of a select few, or at least those who have the advantage of working by special means; and, further, I had constantly before me the idea that, in the event of my being able to solve the problem by what is doubtless one of the lesser means of illumination, I would, if successful with such, have no difficulty whatever with the limelight or electric light, when such came to be applied in a similar way to the work I was considering. And so I confined myself to common house gas, and then to ordinary paraffin lamps, such being within the reach of any one, no matter where situated. Working out these ideas, I had constructed a rough home-made article in the shape of a box of the following dimensions—20 × 12 × 8; and the inside of this box I lined with a compound that gave, when such was lit up with two powerful Argand burners arranged outside the field of view of the lens or aperture in which the negative was placed to be copied, such a powerful flood of diffused light as to illuminate the negative in a most brilliant manner. No sooner had I applied the match to the gas burners than I saw at once I had solved the problem for all time coming, for I had before me one of the most brilliant diffused lights imaginable, but at the same time of such an intensity as to make the practice of photography by artificial light and any ordinary dry plate a matter of certainty and ease.

My first experiment was the making of a lantern slide from a fairly dense, or, at least, a negative that was decidedly what is termed a slow printer. The negative was a whole-plate one, and, on being placed in the rebate on the front of the "chamber," it appeared most beautifully lit up. A whole-plate camera, carrying a six-inch Ross, rapid symmetrical lens, was then brought into play, and when the picture was reduced on the ground glass to lantern size, the lens would be something somewhere about *f*-13 or *f*-14. A Wratten miniature sensitometer whole-plate was then, by means of a cutting guage, cut into four lantern-sized plates, and one of these placed in the dark slide and exposed for six minutes. The developer employed was—

Hydroquinone	18 grains.
Metabisulphite potash	18 „
Bromide potash	4 „
Water	4 ounces.

Caustic potash was used as accelerator.

Development proceeded nicely, and when density sufficient was secured the positive was run through a solution of chrome alum, then washed and fixed, and then another bath of chrome alum, washed, and run through a very weak bath of ammonia and water, just a few drops to twenty ounces of water. While wet the picture showed a somewhat opalescent appearance, but this gradually faded away when the film began to dry, and it was very curious to observe the dry portions clear glass, while those portions that were still damp retained this opalescent appearance. On the whole being dry, however, a slide of singular beauty was the result, ranging in tint from dark shadows to almost absolute clear glass in the high lights. In fact, this slide is just as near a good collodion one as it is possible to obtain, and I question very much if any of those present at the meeting of the Glasgow Photographic Association last night, when this slide was projected on the screen, could have told that it was a gelatine one had they not been so informed.

Having been so successful with a Wratten plate making a lantern slide, I next turned my attention to the capabilities of the illuminated chamber for copying opaque objects, and my next experiment was the making of a small negative from an ordinary cabinet photograph. The photograph was placed in a half-plate film, and the back closed down with the springs; this was then placed *inside* the chamber, and at once appeared to be very brilliantly lit up; at the same time the glazed surface of the card did not show the least appearance of reflections. Another of the same plate was used, and an exposure of three minutes given. Result: a very good negative, free entirely from flare spots or inequality of lighting.

At this juncture my servant announced the arrival of a visitor, who turned out to be none other than Mr. Lang, the worthy President of the Glasgow Photographic Association. Mr. Lang had heard of my experiments, and feeling somewhat curious to know how I was jogging along, came armed with what he termed a fair test for the "chamber." The test he applied took the shape of a book illustration, but in placing this inside the chamber to be copied, he first of all took a 10 × 8 printing frame, and inserting a sheet of clean glass, he placed the picture up against the same, lit up the back, and placed the frame with the glass in front of the picture inside the chamber. No sooner was this done than I saw at once that a great success was scored in this respect also, for no matter how closely the picture was scrutinised not one particle of reflection could be observed from the surface of the glass. A Wratten plate was exposed for just one minute, and the result—everything that could be desired. In fact Mr. Lang seemed struck with the simplicity of the whole operation, and has since then, I understand, made a large number of negatives from book illustrations for his lectures by the same means with the greatest certainty of success in his exposures.

Having clearly demonstrated the suitability of the chamber for photography—opaque as well as transparent objects—I next turned my attention to the capabilities of the chamber for illuminating uneven negatives, *i.e.*, negatives thin at some sides and thick at others. I soon saw that in this also the chamber was quite equal to the occasion, for by feeding the two Argand gas burners by means of a Y-piece from one supply pipe, I had the means at hand of controlling the supply of gas in such a manner that when the maximum extent of light was in the chamber, this maximum was not reduced by lowering one of the burners, for by a neat bye-pass which is attached to the burner the simple cutting off of the supply from one burner gave increased pressure and flame to the other, but at the same time maintaining the maximum amount of light, but of course in quite a different locality of the chamber. This was just what I was striving for, and by means of the arrangements referred to it is a matter of the greatest ease to equally illuminate a negative that is thick at one end and thin at another.

My next experiments took the shape of photographing coloured objects by means of the same light, with the intervention of coloured screens inside the chamber, and here also I met with much that was instructive. But as the experiments which I conducted in the copying of pictures and coloured objects by means of yellow light and ordinary bromide plates are not quite so far advanced as I should like, I refrain from forming a very decided opinion on the merits of this mode of working. I am, however, strongly of opinion that such is the proper way to copy all coloured objects, and were such required to be lowered in tint to correspond with surroundings, isochromatic plates were also employed; but of these I hope to have something to say further on.

My next experiments were the printing of slides on what is now popularly termed the special lantern plate. No sooner did I begin to alter my plates than I at once saw how well adapted the chamber was to act as a sensitometer, for the light being always equal and the transparent object always being the same, the merest tyro will see that by its means the different rapidities of plates can be tested with the greatest accuracy. I soon found out that a lantern plate was very much slower than, say, a Wratten nineteen sensitometer one; and so working with the same stop I had to give a very much longer exposure. But this I cut down latterly by using a smart portrait combination which was working at about *f*-8, and several slides on lantern plates were shown by me at the meeting of the Glasgow Photographic Association held on the 16th instant, some of which varied from five to eighteen minutes' exposure, according to the stop used and also density of negative.

At the present moment I am experimenting as to the suitability of the chamber for being applied to any common camera for the purpose of enlargement, and in my next I hope to give the results of some of my other experiments. Meantime, I have only to add that my chamber has been registered for provisional protection pending the same being patented.

T. N. ARMSTRONG.

INFLUENCE OF THE PROCESS OF COOLING UPON THE OPTICAL PROPERTIES OF GLASS AND THE PRODUCTION OF PRESSED LENSES IN A THOROUGHLY ANNEALED STATE.

[A communication from the Glastechnisches Laboratorium, of Schott & Gen. in Jena.]

THE very imperfect state of annealing generally met with in the glass discs for larger telescopes formed for many years past a constant source of complaint of such opticians who in the manufacture of large-sized lenses are working strictly spherical surfaces. For this and other reasons it has been our aim ever since the erection of our works to improve on the process of annealing. The method hitherto in use, viz., that of allowing the temperature of the red hot glass to fall in a kiln completely enclosed by brickwork, which gradually transmits the heat stored up in it to the surrounding atmosphere, has been discontinued by us in all such cases, where high optical properties are aimed at, and in its place we adopted the plan of storing the glass in a vessel, the temperature of which may be accurately measured and subjected to a very slow and strictly uniform decrease, the duration of which may be adjusted to suit special requirements.

The experimental researches which formed the necessary predecessors of our new process of annealing offered ample opportunity for minutely studying the influence of internal strains and pressures upon the optical properties of the glass. We intend to treat *in extenso* on this subject at a later date; here it may suffice to mention the most important of those results which will interest practical opticians.

(1) Any kind of glass becomes strained, *i.e.*, the molecules of the glass are subjected to tension, unless the process of solidification be extended over a very long period.

(2) The refractive index of one and the same piece of glass varies according to the duration of the process of annealing; this diversity may extend to several units of the third decimal place.

(3) If a lens or circular disc on being carefully examined by means of polarised light be found to yield a regular black cross, which remains perfectly free from any distortion during a complete rotation of the disc about the optic axis, it may be inferred that the tension is strictly regular throughout the entire piece of glass under examination. The presence of a moderate tension of this kind has no other effect as if there were a slight gradual diminution of the refractive index in the direction of the axis. Owing to the symmetrical arrangement of the tensions round the axis, they do not exercise any detrimental influence on the image.

(4) If, however, a lens or circular disc, while being turned round its axis under examination in polarised light, show in any one or several positions a displaced black cross or any other irregular figure, the tension must be considered to be irregular. The influence of such tensions disimmetrically grouped round the axis is identical to that of a difference of the refractive power in different parts of the lens. Glasses of this kind should never be employed for the manufacture of large-sized objectives. With telescopic lenses made of glass where this defect existed in a moderate degree, many opticians attempt to compensate this differentiation of refraction by introducing at random deviations from strictly spherical surfaces through polishing, with the result of thus obtaining pretty satisfactory images.

By means of our method of annealing we have succeeded in producing discs for object lenses having a diameter up to 35 cm. nearly perfectly free from tension, the entire surface of the disc being made to become efficient under the polariscope. All that is necessary during the test is to exclude any differences of temperature of the discs, as these are apt to give rise to temporary tensions. Nearly all discs annealed according to the older system show the distinct black crosses characterising the presence of strain and pressure, even in those cases where the diameter of the discs does not exceed 12 cm.

Though it must be admitted that many opticians, before grinding large-sized lenses for telescopes, will ascertain the properties of the glass with respect to annealing, yet we know from experience that there is considerable inclination to underrate the serious effects of tension, and that many go as far as to consider examination before or after making a lens hardly worth the trouble.

We append to these lines a sketch of an apparatus, the principle of which is due to Professor Mach, of Prag, which may be readily put up, and by means of which plane plates (Fig. 2) or positive lenses (Fig. 1) may be tested. The apparatus must be adjusted in such a

Fig. 1

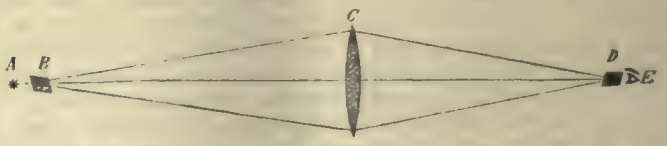
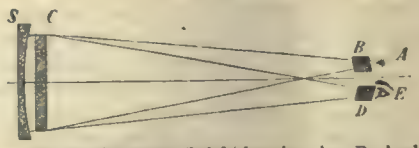


Fig. 2



A. Illuminating source (bright-burning petroleum flame).
B. Polarising Nicol prism.
C. Lens or disc to be tested.
D. Analysing prism.
E. The observer's eye.
S. Concave mirror.

In Fig. 1, A and E are conjugate points with respect to the lens C; in Fig. 2, both points are situated in the plane of the centre of curvature of the mirror S.

manner, that with parallel Nicol prisms the eye at E sees the lens or disc to be tested fully illuminated; if now the Nicol prisms be crossed total extinction will take place with glasses having no internal tensions, whereas with imperfectly annealed glasses the well-known figures indicative of tension will present themselves.

In order to examine the figures due to strain or pressure in all positions of the prism with respect of the disc of glass, it will be found advantageous to turn both prisms synchronically rather than to turn the discs themselves, as these owing to the touch of the warm hand may become locally heated.

In order to better distinguish the present new method of annealing from that hitherto in use (raw annealing), we have introduced the term "fine annealing" when referring to the former.

PRESSED GLASS.

Our experiments and improvements made with regard to the process of glass annealing have induced us to adopt for our fabrication the well-known plan, worked in Paris since many years, of moulding the glass by means of pressing it while in a semi-liquid state between metal cups having as nearly as possible the same curvatures as the lens. Lenses produced in this manner are utterly useless for the application in better-class instruments, if the ordinary quick process of annealing be employed, as the internal strain in the glass will generally be very great, and sometimes may become so excessive as to cause the rough lens to fly into small pieces as soon as an attempt is made to grind it. However, with our new method of annealing, which permits of annealing at such low temperatures as to put deformations out of the question, ready means are furnished to produce lenses of this kind entirely free from internal strains by subjecting them, after having allowed them to cool down, to a second process of annealing to the above-mentioned apparatus.

Wishing to remove a prejudice held by many opticians, we will not omit to distinctly state that the pressure exerted on the glass while in a semi-liquid state is by no means the cause of internal strain or pressure; on the contrary, the only source of these must be looked for in the accelerated process of chilling, which has to be made use of in order to prevent deformation.

The favourable practical results obtained by many opticians with glass prepared in this manner encourage us to recommend its application for all such cases where large numbers of lenses of the same

kind have to be made with various curvatures and diameters within the limits between 12 to 120 mm. The increased costs of glass prepared in this manner are amply compensated for by the saving of material and work. Lenses having the exact form of the desired lenses suffice as patterns. On account of the prolonged period of annealing we require as a rule a term for delivery from six to eight weeks. We are prepared to submit sample lenses to our customers.

PHOTOGRAPHIC EXHIBITION IN BIRMINGHAM.

The members of the Birmingham Photographic Society held their Annual Exhibition in the Temperance Hall, Temple-street, on Tuesday and Wednesday, January 21 and 22. In a short address, delivered on Tuesday evening by the President (J. B. Stone), he drew attention to the flourishing state of the Society as evidenced by the number of members (nearly 200, although the subscription has recently been doubled), and especially by the large number of pictures (400) hung on the walls. These were divided into twenty-two classes, and silver medals or prizes were awarded to the following workers:—E. C. Middleton (3), E. H. Jaques (2), W. Jerome Harrison, W. Rooke, J. H. Pickard, F. Pike, C. J. Fowler, A. E. Longmore, J. C. Huxley, H. W. Southall, and E. Hendren. Bronze medal to C. Phillips. Many pictures were also selected for honourable mention by the Judges—Messrs. H. P. Robinson, Geo. Bankart, — Cembrano, H. Fry, Rev. F. C. Lambert, P. Lange, A. Pringle, and A. Stroh.

The pictures were well hung, although the fact that many exhibitors did not frame their prints rendered the labours of the Hanging Committee very arduous. The Hon. Secretary, Mr. J. H. Pickard, was as energetic as ever, and he was well backed up by his colleague, Mr. A. J. Lesson, and by Messrs. Karlesse, Jaques, Horton, H. Baker, and Mason. Despite bad weather the Exhibition was well attended by the general public, and the result ought to be a distinct impetus to photography in Birmingham, and many recruits to the ranks of the Society.

THE GREENOCK CAMERA CLUB EXHIBITION.

The first Exhibition of the Greenock Camera Club was held in the Watt Museum Lecture Hall, and the advertised time that it was to be open was from the 9th to 11th of January inclusive, but the desire to have it open for a longer time was so great that the Museum Committee kindly consented to give the use of the room for the whole of the following week, which was taken advantage of by the Club, and after a show of nine days the Exhibition closed last Saturday. The admission was free, and the Exhibition was visited daily by a great number of people.

The work shown was by the members only, and the representative display would have done credit to a much larger society; and it shows both enterprise and pluck on the part of the members of the Greenock Club. Of course the larger proportion of the pictures shown were ordinary silver printing on albumenised paper, but other classes of printing were fairly represented—viz., platinotype, bromide, aristotype, &c. Taking the pictures as a whole (and there were over 200), they were much above average work.

The productions by Mr. Turner and Mr. Robb are worthy of special mention, both as regards the quantity and quality of their work. Amongst Mr Robb's pictures, No. 60, *Yachts*; 65, *Cottage at Abertaple*; and 105, *Morning in Greenock*, were specially fine. All his pictures, with the exception of one or two that were too dark in the foreground, showed careful selection and manipulation.

In Mr. Turner's exhibits, frame 55, *Yachts*, &c.; 90, "*Ilits*" *at Sochgair*; and 104, *Mill of Killin*, &c., stand out as fair samples of his work, which is getting to be familiar to us now, having seen it at several exhibitions, and where it has always worthily held a high place.

An interesting picture, No. 13, *Submarine Mining at Fort Matilda*, by T. L. Paterson. The rise of steam from the water has been very effectively represented, and the print looks as if the negative was quite fully exposed.

Good pictures by J. Stewart, T. L. Paterson, W. & M. Blackwood, H. W. Walker, J. Graham, and many others to numerous to note.

J. B. Craig's *Arbour Shaw* and *Inverkip, Ferry* are bits of real artistic work.

With regard to the group class, a good few frames of groups were exhibited, but in most of these productions we were struck by the absolute lack of any attempts to make the subjects inviting, so as to give some pleasure in looking at them. We think it would be quite easy to put a little variety into the positions and general arrangement of the group, so as to impart the element of some little interest to the onlooker beyond the staring faces (and that, too, without losing the likeness in any case), rather than these everlasting rows of figures set up in lines like ninepins.

The success of this first Exhibition must make the members of the Greenock Camera Club feel that they have started an institution, and that the Show will now be looked for in coming years, so that they will have to go on working for it not to disappoint the public, who will expect better things every time.

Foreign Notes and News.

M. Clement Sans discusses the merits of pyrocatechine in the *Progrès Photographique*. Eder's receipt he appears to regard as too expensive and too unpractical. His receipt certainly comes a good deal cheaper, and he claims for it that it gives a particularly beautiful violet black tone. Here it is:—

Rain water	60 c.c.
Sulphite of soda, forty per cent.	10 ,,
Pyrocatechine solution, one per cent.	2 ,,
Carbonate of soda, twenty per cent.	8 ,,
Caustic potash, seven per cent.	2 ,,

The image appears after about thirty seconds, gradually increases in depth, and the development is finished in from ten to fifteen minutes. In the case of very short exposures the development takes longer, sometimes as much as forty minutes. Clouding never takes place, but it is advisable not to heat the developer above 15° C., as frilling is then liable to occur. Two plates may be developed consecutively in the same bath, but if many more be tried the images lose density. The plates must, finally, be carefully washed and then dipped into a five to six per cent. chrome alum solution.

M. Sans also recommends the following method of intensifying:—

Solution I.

Rain water	200 c.c.
Gallic acid	1 gramme.
Sulphuric acid	2 drops.
Tartaric acid	0·01 gramme.
Lead nitrate	0·03 ,,

Solution II.

Rain water	100 c.c.
Silver nitrate	3 grammes.

Solution III.

Rain water	30 c.c.
Sulphate of iron	2 grammes.
Tartaric acid	0·04 gramme.
Calcium acetate	0·01 ,,

Two c.c. of Solution II. are added to 100 c.c. of Solution I., together with eight to ten drops of Solution III. This intensifier gives the plates a good bluish tinge. Of course, it goes without saying that here, at any rate, distilled water must be substituted for rain water, as our atmosphere—at least in the neighbourhood of London—cannot boast the purity of that of France.

That some of the reagents employed by the photographer present dangerous properties if carelessly handled is a well-known fact. Some of them, unfortunately, display considerable capacity for mischief if carelessly written. In an issue of the Journal some weeks back, a receipt by Herr Cronenberg for a toning bath containing rhodammonium (sulphocyanide of ammonium) which got into print in English as ammonium rhodanate—a body hitherto undiscovered—must have thrown those who read the paragraph into some mental confusion. Such are the occasional results of too much hurry.

But the best is yet to come. A country amateur, doubtless of an inquiring turn of mind, and one of the species apparently that is of opinion that the unknown and the excellent are necessarily one, immediately sent a considerable order for the new substance to a leading London photographic chemist, who was much exercised in his mind thereby. There is a broad humour about this incident worthier of a better cause.

The *Photographische Mittheilungen* contains also a great deal that is of interest on the subject of eosine and eosine-silver plates from the pen of Dr. Vogel, who, it will be remembered, was the first to introduce and point out the advantages of the latter. It must not be forgotten that eosine and eosine silver are both salts of an organic acid colouring matter, spoken of generally as eosinic acid to avoid its cumbrous scientific appellation. Ordinary eosine is the potassium salt; eosine silver is the silver salt. Eosine silver has a much greater yellow sensibility than ordinary eosine, and, in addition, reduces the blue sensibility of plates sensitised with it. It follows that when the latter is employed the exposure must take place through yellow glass, which is unnecessary with the eosine silver. If any one suspects that he has been sold eosine plates instead of eosine-silver plates, which not unfrequently happens, Dr. Vogel recommends a very simple experiment, namely, to employ the two in photographing sheets of chrome-yellow and cobalt-blue paper. The simple eosine will give greater intensity for the cobalt blue than for the chrome yellow. With genuine eosine silver the opposite effect will be observed.

Our Editorial Table.

Experimental Physics.

William Hume, Lothian-street, Edinburgh.

We hail with great delight every effort made in the direction of popularising science, and we look upon a series of tractates issued by Mr. Hume, a well-known scientific instrument maker in Edinburgh, as providing the means of doing so, not merely in an attractive and taking form, but upon a sound basis. It is with Part IV. of this series, devoted to *optics*, that we have specially to do at present.

At what we think is an exceedingly small price (thirty-two shillings), Mr. Hume provides an optical outfit consisting of lenses, lens holders, prism, polarising apparatus, photometer, diaphragms, Bunsen burner, coloured glasses, mirrors, and many other things conducive to the systematic study of this fascinating department of science. We cannot conceive of any domestic pleasure, especially where there are boys or young men, or even young ladies, that will surpass an occasional hour spent in conducting any of the numerous experimental exercises, of which there are 120, so plainly indicated in the sixteen pages devoted to them, and all of which are capable of being conducted by this educational outfit.

By the time the student has reached the 120th experiment, he will perhaps be surprised to find that, aided by the hints and explanations given in a second tract, or key, which accompanies the principal treatise, he is now pretty well versed in phenomena connected with the spectroscope and polariscope, having passed at a previous portion of his study through the focussing of lenses and systems of lenses, chromatic and other aberrations, refraction, reflection, comparisons of flames, the effect of diaphragms, and much of a like nature.

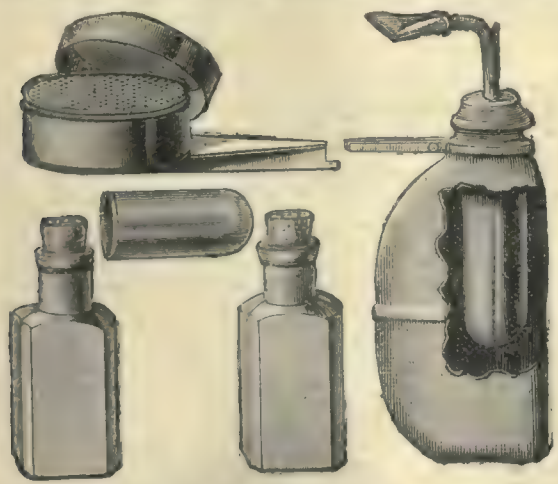
The apparatus itself is well made, each piece being nicely fitted and adapted for its special purpose. There is no difficulty in discovering the use of each of the various pieces comprising the "outfit," as this is shown in a full-page engraving in the *brochure*, together with descriptive letterpress.

The Hibbard Repeating Flash Lamp.

Samuel Fry & Co., Sole Wholesale Agents.

When, during last autumn, we were favoured by a visit from Mr. Wilfred French, of Boston, he told us of an expedient he adopted with great success in taking flash-light portraits. His sitters, one or more, being posed, he held aloft the lamp, the body of which was formed of rubber, and giving it a squeeze it in turn emitted a bright flash, which was only, however, a "flash in the pan," and intended educationally to acclimatise the subjects for a second one, which was that by which the exposure was made.

Some such lamp as the "Hibbard," which is American, must have been employed, as *it* is held in the hand during the flash, *it*, too, acts



by the pressure of the fingers upon an elastic body, and *it*, also, is capable of emitting a number of flashes in quick succession, on the same principle as the one devised by Mr. William Bishop.

The various parts are shown in the cut. Inside of the rubber body a glass reservoir depends from the top, and in this the magnesium powder is contained. By pressure upon the body the air forces a small quantity of the magnesium out at the flattened orifice, where it is ejected against the large flame of the circular spirit lamp shown in the cut, and which, when in use, is attached to the body by being slidden on the guides. The light is, of course, very brilliant, and the degree of pressure exerted by the fingers of the operator on the body determines its intensity. It is really a very handy little lamp, and can be accommodated very easily in one's pocket. The bottles shown in the cut are respectively for containing a supply of alcohol for the lamp and magnesium powder. We have used it with great success, and like it much. Provision is made for a reflector, and we have found a thin sheet of white cardboard answer the purpose well.

Hinton's Alba Varnish.

We have received from Messrs. Hinton & Co., Bedford-street, a sample of a new varnish they have prepared specially for protecting lantern slides, or, indeed, any positive pictures on glass. It is quite deserving of the name given, "Alba" varnish, for it is colourless. Like the chloroform and amber varnish of a past epoch, it is applied cold and dries instantaneously, giving a hard, bright surface, and in the case of a slide which, owing to a certain "matness" of the gelatine, gives a not very bright image on the screen, the Alba varnish imparts the desired brilliance.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 611.—"Improvements in Magic Lanterns and Apparatus relating thereto." Complete specification. W. C. Hughes.—*Dated January* 13, 1890.

No. 669.—"New or Improved Method of and Apparatus for Ascertaining the Requisite Time of Exposure in Photography." E. G. Ballard.—*Dated January* 14, 1890.

No. 742.—"Bindings for Photographs, Engravings, Pattern Cards, and similar Matter." A. Clarke.—*Dated January* 15, 1890.

No. 763.—"An Improved Method and Means of Obtaining Photographic Representations." W. F. Greene.—*Dated January* 15, 1890.

No. 765.—"Improvements in Plate-changing Apparatus for Photographic Cameras." Communicated by F. A. Fichtner. Complete specification. N. Browne.—*Dated January* 15, 1890.

No. 782.—"A Lifting Thimble for Photographic Use." Complete specification. C. Clark.—*Dated January* 16, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
January 27	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 28	Great Britain (Technical)	5a, Pall Mall East.
,, 28	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 29	Burnley	Bank Chambers, Hargreaves-street.
,, 30	Halifax Photographic Club	Mechanics' Hall.
,, 30	Liverpool Amateur	St. George's-crescent North.
,, 30	Oldham	The Lyceum, Union-st., Oldham.
,, 30	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

January 16,—Mr. J. J. Briginshaw in the chair.

Mr. A. Cowan brought up the results of some experiments that he had made with various modifications of the developer, suggested by the trials he had made and described at a former meeting, of an American formula containing Rochelle salt and carbonate of lithium. The present series of experiments had been made to discover what share each of the ingredients had in producing development, and whether other salts of somewhat similar character had a similar action to that of Rochelle salt. He had, therefore, made up developers containing two grains of pyro to the ounce, and twenty-five grains each of sulphite of soda, with a like quantity of one of the following salts:—Phosphate of soda, acetate of soda, biborate of soda, citrate of soda, and oxalate of soda. These compounds had again been tried with and without the addition of one grain to the ounce of carbonate of lithium. With the exception of the borate mixture, all these salts acted very similarly to that containing Rochelle salt, and it was found that they would develop without the addition of carbonate of lithium, although either a grain of that substance or a minim of liquid ammonia added made the action more rapid. Without such addition, development in each case appeared to be complete in about four minutes. One thing that had struck the speaker was that, although citrate of soda had been spoken of as a restrainer, yet in combination with sulphite of soda and pyro, and without any further addition in the shape of free alkali, the plate developed in the solution fairly rapidly and with full density. He had used no bromide, that not appearing to be necessary. It might be that citrate acted as a restrainer when bromide was present, and not otherwise. As to sulphite of soda acting as a

restrainer, he thought that he could show conclusively that that was not the case. A number of specimens were shown, exhibiting chiefly the developing power of a mixture containing pyro in conjunction with sulphite of soda and one of the alkaline salts before mentioned. They were mostly clear, dense, and of good colour.

Mr. A. HARDON referred to the neutral or alkaline condition of the sulphite, a condition which might account for the different effect of different samples in development. He described the method of manufacturing sulphite, and undertook to bring up the subject at another meeting, with reference particularly to means of ascertaining the condition of the salt as to neutrality.

Mr. W. E. DEDENHAM suggested that it would be interesting to have the experiments repeated with sulphite without the alkaline salt, and with the alkaline salt without the sulphite.

Mr. CONAN assented to this suggestion, and promised to bring up the results at a future meeting.

Mr. LAWFORD showed some bromide prints which he had toned with the intensifying solution of the Platinotype Company. The colour of the shadows was of an agreeable brown, but the lights were somewhat discoloured. In reply to a question, Mr. Lawford said that this yellow colouration might be due to the fact that the whites of the prints were originally not pure.

A question from the box was read—"Does reversal of image take place with collodio-bromide in the same way as with gelatine plates?" The question was adjourned to a future meeting.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE Committee of this Association met on the 17th instant.

Messrs. Lambert and Bird, of Bath, and Mr. R. Keene, of Derby, were elected as members.

The Committee were next engaged in considering two applications for assistance, in both cases grants were made.

Messrs. W. T. Coventon, F. Hues, H. Newson, and T. Samuels were appointed Arbitrators.

Friday, February 14, was fixed for the annual general meeting.

Mr. H. J. Pawley was elected Honorary Secretary, and will take up duties on the above date.

A special Committee meeting was then held, and the proposed new rules formally passed, and will be submitted to the general meeting for confirmation.

CAMERA CLUB.

ON Thursday, January 16, Mr. E. Tindall gave an address upon *Picnic Photography and Lenses*. Mr. H. M. Elder occupied the chair.

Previous to the lecture the Secretary handed round some interesting silver prints sent to him by Mr. W. K. Burton, and he further announced that Mr. Burton had contributed a paper, which would be read at the Club at one of the Thursday evenings in February.

An apparatus called the Hubbard flash lamp, sent by Messrs. Fry & Co., was also exhibited, and later in the evening experimental flashes were made by it. The apparatus is very portable, and has several good features to recommend it. The light afforded by it appeared to be unusually brilliant, and two or three flashes of about equal intensity can be obtained with one charge.

Mr. TINDALL'S lecture was illustrated throughout by the use of the lantern, a polariscope being fitted upon the front and a mixed gas jet being used. The lecture commenced by illustrating the wave movement of light by a diagram mechanically moved, and proceeded to describe the characteristics of polarised light and how it may be produced. A number of beautiful experimental illustrations were given, polarised light being passed through various substances so arranged as to give patterns or representations of certain objects in brilliant colours. In conclusion, Mr. Tindall lantern-ised two cloud negatives (subjects like sky and white clouds), one taken in the ordinary manner and the other with a Nicol prism interposed between the lens and the object-glass, the curious cosmetic effect of the latter being very well shown.

The CHAIRMAN then made some remarks and moved a hearty vote of thanks to Mr. Tindall for his lecture.

On Thursday, January 23, Mr. T. R. Dallmeyer will read a paper on *Some Practical Deductions from the Laws of Composite Foci*.

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

JANUARY 17.—Mr. T. W. Edwards in the chair. Discussion on cameras, stands, and shutters.

The discussion on cameras was postponed, but a good variety of shutters were in view, including Newman's Watson snap shutter, Kershaw's Guerry, Maynard, and Cross specimens of Caddett's shutters.

In stands there were specimens of Cox Universal, and Pumphrey's metal stand. Mr. W. Rose also showed one of the new Rectangle Optimus Fairyscope lenses, drawing attention to its advantages over the wide-angle Symmetrical of the same makers.

The following were elected members:—Messrs. R. Lyon, E. Cann, Robert Brown.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.

JANUARY 14.—Mr. S. F. Fleming (President) in the chair.

It was announced that the Annual Exhibition would be held in the middle of February.

Mr. M. KELLEN exhibited his latest detective camera and plate magazine. A dozen plates can be stored in the camera, and by moving a small lever each plate is dropped into a receptacle after having been exposed and the next put in position. The movement of the plate is caused by a small spring, which makes it impossible for more than one plate to be displaced at a time. The action is certain, and there is no fear of there being two exposures on the same plate. The whole twelve could be changed in less than a minute. Each plate is put into a thin cloth which is lined with non-actinic paper, thus saving the trouble of backing the plate.

Three limelight lantern exhibitions followed. Messrs. Davenport and Seed showed a large number of familiar views taken in Manxland. Mr. J. W. Wade illustrated his *Summer in Holland* and *Loiterings in Lakeland*, giving a number of scenes which went far to contradict the statement that mountains are out of proportion on a small picture.

DERBY PHOTOGRAPHIC SOCIETY.

JANUARY 14.—Annual meeting.—Mr. A. B. Hamilton presided.

In the unavoidable absence of Captain Abney, Mr. T. SCOTTON, at a very short notice, undertook to fill the breach, and read a paper on *The Early History of Photography*, concluding with a few practical hints to beginners on the more modern photographic processes.

A discussion followed.

WALLASEY PHOTOGRAPHIC ASSOCIATION.

JANUARY 15.—Mr. J. W. Gregg (Vice-President) in the chair.

Mr. H. Wilkinson, late President of the Association, was awarded a silver medal and Mr. Walter Pollard the second prize, for the best series of six views taken in connexion with the annual competition among the members. The Leeds Photographic Association acted as judges. During the evening the views were exhibited, and called forth general admiration.

Some routine business followed, and the members then adjourned to the large room of the Institute, where there was a large gathering of members and friends, and a pleasant lantern evening was passed, opening with an exhibition of the competitive slides.

Mr. J. EARP read a paper giving an account of a trip to Belgium and Holland. The lecture was illustrated profusely with a fine series of views taken by the lecturer with a Swinden & Earp hand camera. The views consisted of the principal places of interest in Antwerp, Brussels, Rotterdam, Amsterdam, and other cities, finishing up with some humorous scenes from the lecturer's starting-point, New Brighton.

The evening closed with a display of members' slides, consisting of local, Devonshire, Derbyshire, and Continental views, by Messrs. Gregg, Sharp, Wilkinson, J. Gill, Filkin, Barkley, Reader, G. Breading, and Pollard. The pictures were shown with the oxyhydrogen lantern by Mr. C. B. Reader.

At the next meeting, to be held on the 5th proximo, a demonstration on photo-printing processes will be given by Mr. Vaughan.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE third general meeting of the session was held on the evening of Thursday, January 16, in the rooms of the Philosophical Society, 207, Bath-street,—Mr. William Lang, jun., F.C.S. (President), in the chair.

After the reading of the minutes, four new members—James Gardner, Alfred H. Cade, Andrew Gibson, and Andrew Boag—were duly elected.

Mr. John Annan then showed two volumes of calotypes printed in 1844-45, and several of the original negatives from which the prints had been made.

Mr. FRED. MACKENZIE gave a demonstration of tuning speed of a drop shutter by means of a tuning fork.

Mr. WILLIAM LANG, jun., read a communication—the late Cuthbert Bede and his book, *Photographic Pleasures* [see page 55]. The whole of the various sketches in the volume by the author were shown by means of the Society's lantern.

Mr. T. N. Armstrong afterwards exhibited his new illuminating chamber for photographing at night by means of coal gas.

Copies of Mr. Lang's paper, *Forty Years' Photography*, 1839-89, communicated last session, and printed at the request of the Association, were afterwards distributed to the members present, as also tickets for the forthcoming popular evening, *Paris and its Exhibition*, by ex-Provost Clark, of Paisley.

PHOTOGRAPHIC SOCIETY OF VIENNA.

THE December meeting of the above Society, held, as usual, in the Green Room of the Academy of Sciences, under the Presidency of Regierungsrath Volkmer, was distinguished by an unusual amount of interest; fifty-three members were present and twenty-three guests.

After the PRESIDENT had opened the meeting, dealt with the report of the last meeting, the admission of new members, and the business of the Society generally, he proceeded to draw attention to the wonderful zoological photographs of Anschütz, which were alluded to some time ago in the JOURNAL, and a number of which were exhibited at the meeting.

A platinum print of Mr. Harry Tolley's *Carting Hay* (Nottingham, England) was also exhibited, and drew forth considerable praise from the members present, and these expressions of opinion were rather increased than otherwise when it became known that Mr. Tolley had presented his work to the Society.

A quantity of apparatus, among others the Simplex magazine camera and a compact transparency copying apparatus, were exhibited by Herr Lechner.

Professor LUCKHARDT then drew attention to a number of recent photographic publications which had been acquired by the Society, most of which have been already noticed in the columns of the JOURNAL. He then described the *Figaro* interview with General Boulanger, an account of which also appeared in the foreign column, and proceeded to point out how valuable an ally photography was becoming to the illustrated papers. He then discussed the advantages of celluloid, and showed to what an extent it had already made its way in America. For instance, celluloid stripping films may be used with much advantage for photogravure, the film being stripped and transferred to a block, by which means a relief is obtainable which may be employed for printing from, and also for transferring impressions to leather, &c.

Herr ACKERMAN threw some doubt on the automaticality of the photographic automaton exhibited at Hamburg in imitation of Engalbert's contrivance at the Paris Exhibition, stating that he had on one occasion detected a man whispering directions to it from outside. Mention was also made of a new process of photographing on canvas, introduced by Herr Sandrucek, which permits of the application of colour with special facility.

Professor Dr. EDER then proceeded to deliver the address he had promised, which he commenced by describing a number of new cameras. He then proceeded to deal with eikonogen, and also with the acid sodium-bisulphite solution, which, according to him, is nearly always added to the fixing bath at the Vienna Photographic Institute. The photo-lithographic paper of Franz & Hausnik was then discussed, and the speaker stated that the trials made with it at the Institute had turned out very satisfactorily. The most interesting parts of Dr. Eder's address, however, were where he exhibited and described Cohen's photographs of fish and Reisinger's reproductions of rock sections seen under the microscope. The former were taken by Herr Cohen with a flash light from the tanks of the Aquarium at Amsterdam; they were distinguished by great sharpness and precision. The rock sections, which gave great satisfaction to the geologists for whom they were photographed, were taken, some by Zirkos light, some by sunlight, and in some cases orthochromatic plates were employed, as also the old collodion process; and in a number of cases polarised light was employed. The results showed a great deal of delicate detail. This fact will, probably, be read with interest by geologists, who have for a long time been hankering after a means of rendering the microscopic peculiarities of rocks visible to a class; here they have one. Professor Eder also exhibited a portrait of the bacillus which makes milk turn thick, enlarged eight hundred times, photographed on an eosine-silver plate. Professor Eder terminated his lecture by exhibiting and describing enlargements of Professor Mach's celebrated views of projectiles.

The PRESIDENT then gave an account of a photographic tour made by him last summer, and the proceedings terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE ACID FIXING BATH.

To the EDITOR.

SIR,—As the opinions held by myself and others on this rather important subject, and publicly expressed at a recent meeting of the West London Photographic Society, have been deemed of sufficient importance to need editorial comment, I think it is only proper that I should briefly state my views on the matter.

In the first place, although the admission may in the eyes of many almost "put me out of court," let me at once disclaim any pretensions to a profound knowledge of chemistry. Having myself written the report in question, you may, I think, take it that the opinions expressed by those who took part in the discussion were correctly, though briefly, reported. I certainly did express the opinion that it was unwise to make any addition to the fixing bath. A simple solution of hyposulphite of soda will unaided effect its object satisfactorily, and, in my opinion, the addition of *any* acid is unnecessary, if not injurious. I have not experimented myself, but assuming the results arrived at by the writer of the editorial to be accurate, it would seem that under certain conditions the element of danger suggested by myself might exist. With pure chemicals and well-washed negatives the danger would practically be *nil*, but the fact cannot be overlooked that impure chemicals and careless washing are evils which one meets with daily. Many are in the habit of using a clearing bath containing a large percentage of acid. With imperfect washing, danger in such cases could hardly be said not to exist. The deposition of sulphur on the negative, when it does occur, is a rather more serious matter, I think, than you seem to regard it, as, apart from the effect it may have upon the future of the negative, it is by no means easy of removal. Friction may certainly get rid of the deposit, but with many commercial plates scratches more or less visible will result. Upon the whole, balancing the advantages and disadvantages of making the addition suggested, it appears to me, bearing in mind the possible elements of danger introduced, that the simplest and safest plan would be to use a solution of hyposulphite of soda *simpliciter*, without any complications.—I am, yours, &c.,

JOHN A. HODGES.

87, *Chancery-lane*, *January* 18, 1890.

STEREOSCOPIC PHOTOGRAPHY.

To the EDITOR.

SIR,—In the JOURNAL of January 10 there is a reprint of an excellent article from the *American Journal of Photography*, by Ellerslie Wallace, on *Stereoscopic Photography*; but I desire to call attention to what he says about stereographs of distant objects, viz., "The greater the distance of the subject from the camera, the greater ought to be the interval of separation between the lenses." If stereoscopic relief is the only thing to be desired, then this rule is quite correct, but if the picture is intended to give an exact idea of the object as seen by the eyes, which it ought to do, I fear that the rule must be pronounced wrong, because as soon as the width of our eyes is exceeded by the width between the lenses of the camera, we get in the resulting picture a false idea of perspective and magnitude.

Perhaps the most notable proof of this is to be seen in stereographs of the moon. These, to give the necessary relief, have to be taken at such times and positions of the moon as will make the right and left-hand pictures sensibly different, the same as if the lenses had been at an enormous distance apart; but this, although it proves that the moon is of a globular form, gives such an exaggerated view of it that no idea of its size is obtained, and instead of being like an immense globe, it appears to be dwarfed to a ball of a few inches in diameter.

In a similar way, if stereographs are taken with the lenses at a considerably greater distance apart than the normal width of the eyes, the resulting views must be more or less dwarfed, and no idea of natural size can be obtained; whereas with lenses at or near the same width as the eyes, we obtain an exact reproduction of what we see, with all the relief which we see in the objects themselves.

To illustrate the dwarfing effect of separating the lenses, I enclose a stereoscopic view, taken more than twenty years ago, of some of the rocks at the Holm of Noss, in Shetland. The two views were taken separately, for the purpose of giving exaggerated relief, so after one plate was exposed the camera was shifted somewhere about two feet for the second plate. The result in the stereoscope is that the rocks, which are probably about two hundred feet high, appear greatly dwarfed, and give quite the feeling of their having been photographed from a small model.

It must be admitted that cases may occur when it would be desirable to get an idea of the forms of certain objects and their relative positions in a distant view, and then the separation of the lenses or points of observation will give what cannot be obtained otherwise; but beyond giving details, they must be to a large extent untrustworthy.

Stereoscopic views, to be satisfactory, have to be arranged with perhaps more care than single views; but if a proper selection of objects is made, a truthful representation of them, both near and at a distance, can be obtained with lenses not more than three inches apart, and in which one of the most wonderful effects is the idea which they give of the natural sizes of the different objects.—I am, yours, &c., GEO. H. SLIGHT.

London, *January* 20, 1890.

A TRADE UNION IN PHOTOGRAPHY.

To the EDITOR.

SIR,—In reply to Mr. Brangwin Barnes's letter in your last issue, I will commence by admitting that he is seriously handicapped by lack of knowledge of the elementary machinery of trade unions. For instance, his questions concerning (1) guarantee of ability, (2) average or "ordinary" district wage, and (3) probability of future uniformity of rates, could be answered by any unionist. *Trade Unions*, a little Yankee work by Trant (Kegan Paul, Trench, & Co.), is a good elementary school of unionism. The Comte de Paris's *Trades Unions of England* (63, Fleet street) is a capital review. Howell, in *Conflicts of Capital and Labour*, devotes some chapters to the subject. Barnett's *State Report on Labour Statistics for* 1887 gave a condensed description of the methods of obtaining all the ends concerning which Mr. Barnes is so dubious. As, however, many of those who have given my communications so much more attention than they merit will never see these works, I will briefly describe the methods in question.

(1) *Guarantee of Ability.*—Mr. Barnes admits that the ability of a baker might be proved by a union. Let me first assure him that a baker is not a mechanic (of course I distinguish, as every bread-eater has had reason to do at times, between bakers *and* bakers); and then let me ask him *how* a union can prove it? By one of two methods: (*a*) by an examination similar to the Plumbers' Company's exam.; (*b*) by the workman in question having been in receipt of the wage paid in his district to workers *as competent as the union desires that he shall be.* If a first-class pastry hand can be guaranteed as a competent worker by any method under the sun, that method will also guarantee the ability of workers in the most delicate branches of our art.

(2) *Average, or "Ordinary," District Wage.*—As a rule, a union determines what is the average wage by directing each district committee, or in some cases each branch committee, to instruct its members to collect particulars of the rates of pay in their individual localities, and to meet at its centre and strike an average of the lot. Then this average is discussed with a view to deciding whether or not it would be fair to demand so high a qualification of applicants from the badly-paid localities. In effect, the system works admirably in many strong and conservative unions. By ordaining that each applicant for membership shall have been in receipt of this wage, they ensure his skill as a craftsman, for his employer thus guarantees competency by paying him the wage for which skilled labour in the district is willing to be hired.

(3) *Uniform Rates of Pay.*—I spoke of this as a possibility *when* the union should have become very powerful. I mean by this not a uniform wage for all members in whatever branch of trade, of course, but a uniform wage in each branch. But this does not mean, as Mr. Barnes evidently believes, that no member would be allowed to accept a higher than that wage. On the contrary, it would simply be a *minimum* rate, fixed as the sum for less than which no member of the branch of trade affected should work, even though he were "several grades below another" in ability. (A union is for the protection of the weak as well as for the organization of the strong.) It seems hardly necessary to have to add that it would be to the interest of a union to have a section of its members raising, by their high wages, the average wage of the members; and, as a result of being well paid, being able and ready to swell the funds for their weaker brethren.

(4) *Ostracism of "Rat-trap" Proprietors.*—Mr. Barnes speaks of the profession being "ruled by a syndicate of monopolists" as our ideal. Is

there such a syndicate in the union-haunted trades of bricklaying, baking, carpentry, &c., &c.?

(5) *Strikes.*—I certainly spoke of such a contingency as a strike, but a union would exist as an alternative to that crude method of redress rather than as an incentive to it. Strikes only occur where the organization is so weak that a possibility of loss is not apparent to the employer at first sight. The perfection of our organization would herald the natural death of the "strike."

"The *employé* can make a change if he wishes it, and that without asking the permission of any trade union!" Ah! so I understand. Yes, yes, he has his remedy for slavery; he can "*leave it and starve!*"

In conclusion, I object to being drawn into a discussion on "socialism," "protection," or "survival of the fittest," or even on "the migration of the red herring" of Carlyle.—I am, yours, &c., ARTHUR FIELD.

Maidstone, January 20, 1890.

ISOCHROMATIC PRINTS AT THE PHOTOGRAPHIC SOCIETY OF FRANCE.

To the EDITOR.

SIR,—In your last issue Messrs. Edwards & Co. insinuate that your Paris correspondent sends your well informed JOURNAL "misleading remarks, unwarrantable, and outside the duty of a journalist," writing about what he did not understand, &c. It appears that not only myself, but others as well, are too *clairvoyant* to allow spurious articles to pass off as genuine. I need not defend *ma bonne foi*. The enclosed article, inserted in the best photographic periodical of France, *Le Moniteur de la Photographie* (January 15, 1890), will confirm my statement, and show that this mercantile firm has now a larger field for its polite epithets:—

"The President (Photographic Society of France) presented isochromatic proofs in the name of Mr. Edwards, of London. Each isochromatic proof had by its side one obtained from an ordinary plate. Upon examination we have the opinion, as well as several of our colleagues, that the two proofs were not obtained by the same way of lighting. It was evident that one of the pictures was obtained by *un bonne frontale* (side light), whereas on the other no reflection from the canvas could be found; therefore it was not obtained under the same conditions of lighting. We do not imagine that isochromatism has the power to neutralise reflection. It would have been more sincere to have obtained from showing off of contrasts, and to have presented the proofs obtained in absolutely the same way of lighting. This is the simple remark made. M. Taillet was not called to account, nevertheless he maintained energetically, and too energetically, that we were in the wrong. We regret that M. Taillet should make himself the advocate of such a cause. That manufacturers deceive the public is not our business; but that in the midst of the Photographic Society of France, in presence of men whose competence equals, no doubt, that of M. Taillet, it is certified that two proofs—one of which presents evident marks of reflection, whereas the other none—were obtained under the same conditions of lighting (isochromatism apart), overpasses the limits of what is permitted.

"We think it our duty to add here that isochromatism belongs to everybody. That M. Taillet has his *tour de main* (dodge) we will not deny; but any one can make orthochromatic plates and have his own dodge or formula without any rights, any privilege, in favour of any one to stop the manufacture and the sale of orthochromatic preparations. The idea, as well as the colours, is *dans le domaine public* (public right). Formulæ are numerous giving the same results, and we cannot understand the fettering of a process having for its object the redressing of the scale of photographic tones, and we do not believe that the possession of one patent can authorize this fettering. We do not maintain that we have the right to copy, to infringe, and we respect patents having the character of *nouveauté and invention*; but here the case can be compared to that of a coach-builder, because he has made a cab of a particular form, prohibiting the use of all other carriages.

"The discussion which took place in the midst of the Photographic Society of France by their presentations had no other object in view than to prove that more sincerity is expected in such presentations."

This will prove to your readers that my communication was not insinuative and untruthful—rather softened down than otherwise: therefore Messrs. Edwards & Co. would have done wisely not to bark and promise to bite.—I am, yours, &c., PROF. E. STEBBING.

196, *Rue Legendre.*

AMATEURISM.

To the EDITOR.

SIR,—"A Photographic Chemist," in the most important and principal part of his epistle upon the "bumptious and secretive," quotes that nine out of ten professional photographers know very little of photography, and goes on to say that most do not know the whys and wherefores of anything they use, in fact, know nothing of photographic chemistry. Even where he just mentions that the professional is considerably under-educated, he shows that he had the speciality of photographic and chemical education in his mind. *Now*, presto! by a bold contradiction he avows that he is misquoted, and meant only general (I suppose University training. But how does this agree with his reference to the "cattle" Latin that he says the chemist's apprentice is bound to learn? That surely is not a very high aim.

It is, of course, easy to misconstrue any one's real meaning, especially if it is so very much hidden as "A Photographic Chemist's" seems to be; but I think it will not be difficult for the reader to define that "A Photographic Chemist's" reply is merely an excuse to beat an honourable retreat. I will not again trespass upon your valuable space in this matter, but allow me to conclude by mentioning that I happen to know many professional photographers who can boast of the highest educational attainments, whilst others of my acquaintance have not been behindhand in making up for lost time in after life.—I am, yours, &c.,

J. HUBERT.

EXHIBITION AT THE CAMERA CLUB.

To the EDITOR.

SIR,—Will you kindly allow me to announce that the Exhibition of Rejlander's photographs at the Camera Club will close on Thursday, January 30? Until that date the Exhibition will be open to visitors on presentation of card from ten a.m. to five p.m.

On and from Tuesday, February 4, there will be an Exhibition of photographs by members of the Amateur Photographic Field Club.

This Society is known as one of the earliest devoted to landscape work, and part of the Exhibition will be given up to showing results of the older processes. The collection will be open to inspection for about six weeks under the usual conditions.—I am, yours, &c.,

G. DAVISON, *Hon. Secretary.*

Camera Club, 21, *Bedford-street, W.C., January* 21, 1890.

PHOTOGRAPH OF AN EXECUTION.

To the EDITOR.

SIR,—In your issue of December 27 is an editorial comment (and denial) concerning the photographing of a poor fellow just as he was about to be executed. Now, seeing is believing. I have seen the aforesaid picture in the hands of Mr. Herbert Ward, the African traveller, who made the negative. The mistake was in attributing the circumstance to Mr. Stanley. Owing to the absence of Mr. Ward on a lecturing tour in the West I cannot secure a copy, but on his return, if he will permit, I will send you a photograph.

The picture showed the culprit tied down to a seat. A young tree or sapling had been bent over and fastened to the head of the victim by straps running under his chin. The executioner stood ready with a heavy sword to strike the blow, after which, if effectual, the head would fly into the air. The picture was so extraordinary in its nature, and so excellent in quality, that I studied it with great care, and know it was made from nature; and as the photograph will not, cannot lie, I believe the evidence of my own eyes.—I am, yours, &c.,

New York, January 10, 1890. GEO. G. ROCKWOOD.

STORED UP LIGHT.

To the EDITOR.

SIR,—Making a lantern slide the other day off a quarter-plate negative that had been in the printing frame, and which had had a number of silver prints taken off it, a cut-out oval mask having been used, but which was removed off the negative before taking off the lantern slide, the resulting slide shows most distinctly where the mask had been, having developed out much darker than the rest.—I am, yours, &c.,

WILLIAMS B. KENNAN.

35, *Dame-street, Dublin, January* 18, 1890.

RE PATENT OF EIKONOGEN.

To the EDITOR.

SIR,—There seems to be much doubt whether eikonogen was patented as declared by the makers and ourselves on the label to each package. Permit us to refer all those who are anxious to know that the patent dates from the 26th of March, 1889, and is No. 5207.—We are, yours, &c.,

Soho-square, London, January 16, 1890. MARION & Co.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange quick-acting cabinet portrait lens for armchair.—Address, J. JACKSON, Trafalgar Studio, Coventry.

I will exchange twelve 8½×6½ printing frames for a gas jet for limelight lantern.—Address, C. S. LEIGARD, 75, Dale-street, Batley Carr.

Will exchange set of gem lenses and camera for whole-plate rapid rectilinear or whole-plate studio lens.—Address, JOHN HAWKINS, 16, Huddart-street, Bow, E.

Will exchange 22—17 Ilford dry plates for repeating quarter-plate camera or good sea-scape background.—Address, 79, St. James's-street, Burnley, Lancashire.

Two and three-quarter inch Greenhall shutter, whole-plate retouching desk, whole-plate burnisher. Want two-inch shutter or wide-angle lens.—Address, WILLIAM C. CHUBB, 24, Highgate Hill, London, N.

Will exchange books on photography, electric lamp (Edison-Swan fifteen-candle power), and battery, for Ganot's *Physics* or Thompson's *Magnetism and Electricity*.—Address, J. BIDDY, Howick House, Burscough, near Ormskirk.

Three volumes of THE BRITISH JOURNAL OF PHOTOGRAPHY and sixteen volumes of the *English Mechanic* (both down to present date) in exchange for good glazier's diamond, or velvet studio curtain, or any useful photographic accessory.—Address, HORTON, Photographer, Caroline-street, Cardiff.

Will exchange three volumes (bound) of *Cassell's Illustrated Shakespeare* and four-chambered breech-loading pistol (picked up in the streets of Alexandria after the bombardment), for cabinet portrait lens or half-plate or whole-plate rapid rectilinear lens by good maker.—Address, W. I., 15, Church-street, Kingston-on-Thames.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL *including queries for* "*Answers*" *and* "*Exchanges*," *must be addressed to* "THE EDITOR," 2 *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

B. W. Bentley, Buxton.—*Four photographs of his Grace the Duke of Devonshire.*

BEGINNER.—One lens will work quite as rapidly as the other.

C. P. O.—Copal is not soluble in alcohol, hence the difficulty.

S. A. S.—The process is patented but the specification is not yet published.

W. SMITH.—If you send a letter to our care we will forward it to the writer.

R. D. SMITH.—The "Exchange Column" is intended rather for apparatus than current photographic journals.

EAST ANGLICAN.—Your previous letter was not retained. We must now trouble you to repeat your query.

INQUIRER.—You have an excellent studio. Provide two sets of spring blinds, one to run from top, the other from bottom.

G. B. H.—If the engraving has not yet been published twenty-eight years, then can it not be copied without special permission.

LUX (Paisley).—The best paraffin oil will answer quite well. To prevent glass chimneys breaking, turn the light up rather slowly.

B. B.—Shellac will answer very well, but, on the whole, paraffin wax is preferable if the wooden vessels are to contain silver solutions.

H. BRADSHAW.—Send the transparencies, which will be returned within two days. We shall then be able to state our opinion of them.

CARBON.—Apply to the Autotype Company, Oxford-street, London. Their *Manual of the Carbon Process* is a very useful and practical one.

M. N. O.—Try the acetate of lead method of eliminating the hyposulphite. Some have employed also the nitrate of lead with alleged great advantage.

B. NORMAN.—We cannot say any more concerning the Denier method of producing prints than what has been said in the article recently devoted to it.

G. B. D.—From your own description, we should say your lens is a very good one. For your purpose, one that is not quite so well corrected might answer better.

T. W.—We do not tnink that the imprint on the face of the mount could prove at all injurious, but we observe on the face a few spots of bronze which might possibly prove so.

OLD SUBSCRIBER.—The principal defect in the photograph taken with the wide-angle lens is the violent perspective arising from certain portions of the view being too close to the point of sight.

BETA.—From the description given, the lens is a triplet, but minus the centre lens. If you take it to the maker, who still manufactures that form of lens, he can, doubtless, replace the missing glasses.

SERENO.—The paraffin wax ought not to separate in the manner described. Repeat the experiment, using different samples of the materials. Different samples of commercial "petroleum" vary greatly.

O. GREGSON.—We know of no effectual remedy for the stained negatives. If hypo has been spilled in the toning solution the best plan will be to make up a new bath. The formula quoted is a very good one; indeed, it is as good as any.

F. GARDNER.—Quite admitting that your tent is all that can be desired for practising the collodion process, it does not at all follow that it will be suitable for the development of gelatine plates, or even as a shield by which they can be changed.

ANXIOUS INQUIRER will find quite as much difficulty in obtaining employment in America as in this country. Instead of trying Philadelphia or similar large cities, he might find it more conducive to ultimate success to establish himself in a small, rising town, and grow up with it.

CHARLES G. BOATH.—There are two photographic societies in Glasgow. You should join one or other or both of them. It is probable that the Glasgow Photographic Association would suit your requirements. Write to Mr. J. Craig Annan, 153, Sauchiehall-street, the Secretary, for particulars.

THE ANGLER.—We cannot say where you have gone wrong. If the instructions had been followed implicitly there should be no failure. The two solutions must be mixed in the way given, when the precipitate will be redissolved. We never had such an experience as that you detail. Is the sulpho-cyanide at fault?

X. X.—The arrangement of lenses described *ought* to answer the purpose, but as it does not there is something wrong either in the focus of the lenses or of the placing them. A diverging cone of rays is bound to cover a large lens provided it is properly placed. Not knowing the foci of the lenses we cannot give a more definite reply.

A. Z.—It is impossible for us to account for the markings unless we know something as to the conditions under which the prints are made. By merely being shown a print, without being furnished with any particulars whatever, we cannot say the cause of the spots, except that they are, doubtless, due to carelessness in the manipulations.

R. C. P.—If the portrait is copyright you certainly cannot legally reproduce it, notwithstanding that it may be for the journal of a scientific society, without permission. If the photographer who publishes the portrait says it is copyright, no doubt it is. If you doubt his word in the matter, why not search the register at Stationers' Hall? This is the only way to obtain the desired information with certainty.

MECHANIC inquires the difference between a heliotype and a collotype.—The two are identical; both are prints in a fatty ink made from a gelatine surface, though the method of working is somewhat different. In the collotype process, as generally worked, the gelatine film remains upon the glass upon which it is made; in Mr. Ernest Edwards's heliotype process the film was removed from the glass and remounted on a metal plate before printing.

S. G. R. says: "A few months back I oiled the working parts of my instantaneous shutter with olive oil. I have not used it through the winter, and on trying it yesterday it would not work, even when assisted with gentle pressure. When taken to pieces, the oil appeared to be like varnish, and could only be partially removed by scraping with a penknife. Why is this, and how can the oil be cleaned off and the shutter again made usable?"—Evidently the oil used was not olive oil, or it would not have behaved in the manner indicated. It was, doubtless, cotton or some other oil, which is sometimes sold as, or mixed with, genuine olive oil. The best plan will be to clean off the old oil with benzole and then lubricate the working parts with pure almond oil, or, better still, with watchmakers' oil, which may be had at any watchmakers' tool warehouse.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, January 28, at eight p.m., at the Gallery, 5A, Pall Mall East.

PHOTOGRAPHIC CLUB.—Wednesday, January 29, Annual Lantern and Musical entertainment. Subject for discussion, February 5, *The Intensification and Reduction of Negatives.*

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—An international photographic exhibition will be held in the Central Exchange Art Gallery, Newcastle-on-Tyne, from April 18 to May 3, 1890. The charge for wall space will be 2*s.* 6*d.* for each fifteen square feet, or fraction thereof. The charge for lantern slides will be 1*s.* in each class. Exhibitors who require the use of separate screens can have terms for same on application to the Hon. Secretaries. The exhibitor's name or address must not appear on the face of any picture. Carriage must be paid both ways by the exhibitor. In the amateur classes the work must be entirely the production of the exhibitor. All enlargements must be accompanied by a print from the original negative. Several medals will be awarded, the Judges being Messrs. William Lang, Glasgow; Paul Lange, Liverpool; and J. W. Wade, Manchester. A supplementary exhibition of photographic apparatus and appliances and photo-mechanical printing processes will be held at the same time and place, under the auspices of Messrs. Barkas & Son, Art Gallery, Newcastle-on-Tyne, to whom application for space in this section must be made.

NORTH LONDON PHOTOGRAPHIC SOCIETY.—Annual Exhibition of Members' Work.—Preliminary notice.—The Council have made arrangements in connexion with the above exhibition to hold a *conversazione* at Northampton House, St. Paul's-road, Canonbury, on Tuesday evening, March 4, 1890. An excellent programme of music, &c., will be provided, and refreshments will be supplied, at moderate charges, in a separate room. A special lantern will be employed for the exhibition of members' slides. Tickets will be supplied free to members and their friends upon application. Full details will be forwarded later on. This preliminary notice has been sent out in order that each member may have ample opportunity for preparing some work which may be exhibited during the evening, and so add to the enjoyment of all. The following has been suggested as a guide for the classification of the work exhibited:—1. Landscapes printed in silver, any size; 2. Landscapes printed in platinotype or any other process, any size; 3. Portraits; 4. Instantaneous pictures; 5. Lantern transparencies; 6. Enlargements; 7. Opals, opalines, or any similar pictures. It is particularly requested that all work intended for exhibition may be forwarded to Northampton House, directed to Mr. G. J. Clarke, at least one week before the date of the exhibition. If any member would like and is able to assist in the musical part of the programme the Secretary would be glad of an intimation at as early a date as possible. Any member who is willing to read a paper or give a demonstration, or who can induce a friend to do so, during the session, *i.e.*, any Tuesday evening before August, is requested to communicate with the Secretary as soon as possible. All communications to be addressed, 52, Queen's-road, Brownswood-park, N.

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FATAL BURSTING OF AN OXYGEN CYLINDER.

A FEELING somewhat akin to the pain experienced by the untrustworthiness of a friend seems to be pervading some of those in the North by the as yet unaccounted for explosion of an oxygen gas cylinder, some account of which will be found on another page. Although a week has scarcely yet elapsed since the sad accident took place, yet do we learn from two entirely different sources that already has the faith of lantern exhibitors in the safety of the gas bottle received such a severe shaking that the employment of gas bags instead of cylinders may in many cases be expected until, by the lapse of time, and the gradual restoration of confidence, the cylinder with its compressed contents will again resume its place in public favour.

So far as our information at present extends, this latter accident is the first of its special nature that has yet occurred. It cannot properly be compared with the Dublin accident of nearly a year ago, because *that* explosion was the result of igniting a mixture of oxygen and hydrogen which possesses terrific explosive powers, whereas, from what we learn of the Polmadie accident, it was simply a bursting of the steel vessel in which the oxygen was contained, owing to the gas being under such an enormous degree of compression that the steel walls of the cylinder were unable to withstand the strain.

It may turn out upon investigation that the cylinder was defective in some respect, while an alternative cause of the fatality may have been the forcing into it of more gas than, if good, it could reasonably have been expected to contain. This latter will probably never now be ascertained. But be the cause what it may, an uneasy feeling may be generated in the minds of the large numbers who now use oxygen stored up under pressure. If such things can happen to the experienced foreman of a factory in which the gas is thus made ready for sending out, may it not also happen to the consumer, even when surrounded by his friends and family?

The accident happened not while the gas was being compressed, but, presumably, some little time afterwards. Suppose that "little time" to be extended to a day or two, or even a week, by which time the cylinder with its contents might have been in the hands of consumers situated at a distance of many miles, it is unpleasant, if not appalling, to speculate upon the consequences. Those familiar with the technics of watchmaking say that when the mainspring of a watch breaks, it seldom if ever does so until one or more hours have elapsed after its being wound up; and in the case of a gas cylinder with highly compressed contents a similar law in physics may prevail. We do not say that it does do so—experience in this direction is happily limited—but it is one of the possibilities that have to be faced.

Polmadie, where the factory is situated at which the accident occurred, is situated at no great distance from Glasgow. The works are those of the Scotch and Irish Oxygen Company, Limited, and they consist of a series of buildings lying 300 yards south of Messrs. Dube's locomotive works. William Bow, the foreman who lost his life, was engaged laying out cylinders six feet long, six inches in diameter, and filled with oxygen ready for removal. These cylinders were made of cast steel about a quarter of an inch thick, and tested to stand a pressure of 3600 pounds to the inch. This surely must be admitted as a degree of strength which ought to inspire the highest confidence.

We shall, doubtless, know more about it after the examination by the Procurator-Fiscal.

EMANATIONS FROM THE DARK SLIDE.

It has often been noticed that plates placed in some particular receptacle have been known to undergo change, either in the form of a partial loss of sensitiveness, or in that of acquiring a tendency to give a weak and foggy image on development. This change in the condition of the plates has been particularly observed in those that have been kept for some time in dark slides. Several reasons may be given for this special proneness in dark slides to produce the evil complained of. The most obvious one is that it is more common to meet in the dark slide than in other plate receptacles—such as boxes—with such substances as are capable of causing the effect that has been noted. Another possible cause of the frequency with which the effects of which we are speaking occur in dark slides is that these present generally two varieties of surface, either of which may act as the cause of the mischief.

Yet another reason, not of the frequency of the effect with dark slides, but of the effect being recognised and so traced to the slide, is that the variety of surface to which we have referred, say a leather hinge and a wooden shutter, may show the origin of the mischief by the correspondence of the fogged or insensitive portions of the plate with one or other of the materials opposite to which the injured portion had been lying.

Thus, with a plate box a fogginess all over the surface, due to some emanation from the wood or stain, may be attributed to other causes, such as deterioration of the plate by the action of gas vapour, or by some want of keeping quality in the plate itself; whereas if there were in the plate box any such distinct separation of surface into two kinds, as are met with in dark slides, the different effect of the separate portions would show on the end plate, or possibly on the edges of all of those contained in the box.

Mr. H. Chapman Jones, at the technical meeting of the Photographic Society of Great Britain, held on Tuesday evening last, brought forward a case of deterioration of a plate that had been kept for a few months in a dark slide. The hinge, when made of leather, has more than once been found to produce an injurious effect, but in the present case the image was good opposite to the hinge but almost invisible everywhere else. The first suggestion was that the sensitiveness had been exalted opposite to the hinge, and that the rest of the plate was simply under-exposed. Another suggestion, and one that was more generally accepted by the members of the Society present who saw the plate, was that the wood of the slide had somehow acted as a desensitisor, and that the portion of the plate opposite to the hinge was really the only part of it that was in a normal condition. An experiment that would verify one or other of these theories, assuming that the slide is still in the state to produce an effect upon a sensitive plate, would be to cut a plate into two portions and leave one of these in the slide long enough for the characteristic effect to be produced, whilst the other half is returned to the plate box. At the end of the time necessary, if both halves are exposed and developed together, it will easily be seen whether there is a gain of sensitiveness in the one part, or whether a desensitising action has been going on in the other part. In the event of a sensitising action being proved, it would be well worth while to investigate and experiment, in order to discover, if possible, what is the agent which has thus had such a beneficial effect. On the other hand, it would be desirable to know more definitely than we do at present what are the substances that produce the emanations given off from either fogging or insensitiveness in our sensitive films—turpentine and some kinds of leather have an evil reputation, but the list of substances the emanations from which produce some effect upon gelatino-bromide of silver is, no doubt, capable of being considerably extended, and a systematic research into the nature of such substances, and the characteristics—whether fogging, desensitising, or possibly of enhancing sensitiveness—belonging to each, would be a valuable addition to the stock of photographic knowledge.

THE ACTION OF LIGHT ON CHLORIDE OF SILVER.

The question of the precise action of light upon the haloid salts of silver is one that has exercised the minds of chemists from the time that the darkening of chloride of silver by exposure to sunshine was first noticed, and, despite innumerable researches, we are at the present time in possession of little more reliable knowledge of the subject then before photography came into existence. It is not even definitely decided whether the ultimate results of the direct action of light and of development are the same, or whether development is a continuation of that action or possesses a distinct character.

Considering the nature of the elements acted upon and the forces involved, it may be readily conceived that the question is surrounded by immense difficulty when looked at from the point of view of direct analysis, quantitative or qualitative, and most of the theories put forward hitherto have been based mainly on hypothesis or deduction from indirect experiment. Briefly summed up, the question resolves itself into this: Whether by exposure to light the haloid salt is converted into metallic silver, into oxide, into sub-haloid, or into an oxy-haloid, the two latter being the alternatives now most generally accepted. In dealing with actual photographic films, as well as with developed images, the subject is, of course, considerably complicated by the introduction of organic matter, and fresh issues are raised; but before any definite conclusion can be arrived at in this wider field, it is essential that the simpler question of the direct action of light upon the pure haloids be first settled.

The interesting researches of our old contributor, Mr. M. Carey Lea, during the past two or three years on the so-called "photo" salts, have added much new information to that already possessed, without, however, affording any definite solution of the main question. Quite recently Professor Romeyn Hitchcock has been bold enough to take up the subject with the view of determining the question by direct quantitative analysis, a task which, as we have already stated, is so surrounded with difficulties that it has hitherto baffled all the efforts of the first chemists.

The one undisputed point in the whole matter is that the first action of light upon chloride, bromide, or iodide of silver is to loosen or disengage the halogen; but whether the ultimate result is to eliminate the whole or only part, or to substitute any other element for a portion or the whole of the halogen disengaged, is the crucial question that requires solution.

Mr. Hitchcock hopes to throw light on the matter by exposing accurately weighed portions of chloride of silver to the action of light under certain conditions, and by estimating the alteration in weight of the original haloid and the weight of chlorine actually evolved to arrive at a conclusion as to whether the effect is one of partial reduction only or of substitution. We cannot help expressing the opinion that the task is a far too delicate one to be satisfactorily approached in this manner, and the figures resulting from the first series of published experiments go far to bear us out in that view.

We do not intend to go, in detail, into the researches of others, but shall confine ourselves to a review of Mr. Hitchcock's experiments and deductions. Commencing with the discrepancies that already exist between the observations of different authorities on the simple question of the loss of weight on exposure, the author points out that while Von Bibra finds there is no loss, Professor Newberry, on the other hand, more recently finds a very considerable loss. It is obvious that if chlorine is evolved, and of this there is not the slightest shadow of a doubt, there must be a decrease of weight in the original chloride; what this loss amounts to will depend, of course, upon the completeness of the action, upon whether the whole or only a part of the chlorine is evolved, and whether oxygen is, as alleged by some, absorbed in place of the chlorine. In point of fact, the question of loss of weight is looked to to decide between the sub-chloride and oxychloride theories.

With regard to the former, it is a strongly disputed point whether the darkened salt left after exposure to light consists of a definite sub-chloride, or merely a mixture of unreduced chloride and metallic silver, some chemists going so far as to deny the possibility of the existence of such a sub-salt. In connexion with this theory, too, the anomaly is pointed out that, whereas in the moist condition chloride of silver instantly blackens in sunlight, in the dry state and *in vacuo* it undergoes no decomposition; this is taken to prove that moisture is in some way necessary in order to bring about the change, though, from a recent observation of Mr. Carey Lea, this does not appear to be the fact. The latter chemist finds that if pure chloride of silver be poured in a state of fusion into a purified hydrocarbon, where it may be

considered to be absolutely protected from contact with either moisture or oxygen, it still darkens rapidly upon exposure to light while in the liquid. Bromide of silver when fused will frequently retain its primrose tint, especially in the fracture, after solidifying and exposure to light, but almost instantly changes colour on being moistened. This, however, while it shows that moisture hastens the change, does not prove that it is a necessary condition.

Assuming, however, that moisture in some way assisted in the operation, most probably by supplying oxygen, the oxychloride or oxybromide theory was some years ago promulgated, the late Thomas Sutton being one of its chief supporters, though, speaking from memory, we believe his view only extended to the formation of the invisible image, and not to the visible colouration produced by the direct action of light. In this case, while the sensitive salt under the influence of light gives off a portion of its halogen, it is supposed to absorb in its place a certain proportion of oxygen, the precise quantity varying according to different views. But, while this gives a convenient explanation of the differences of behaviour in the presence and in the absence of moisture, the anomaly was long since pointed out of this absorption by silver of oxygen, an element for which it has comparatively little affinity, under the same influence that causes it to dissociate itself from chlorine or bromine, for which its affinity is naturally much more powerful.

Whether the question of loss of weight can be imported into the argument as proof, or otherwise, is open to very grave doubt, since, setting other matters on one side, the difficulties surrounding accurate observation in this respect are too great to render the results at all reliable, as proved by the discrepancies already quoted in the opinions of different observers. The chief of these difficulties, alluded to by Mr. Hitchcock in his paper, lies in the uncertainty as to the completeness of the light's action, even when the sensitive material is spread in extremely attenuated layers. There is also considerable doubt as to whether the halogen, or, at least, a portion of it, does not at once show a tendency to recombine with the silver it has just left, unless there be present some substance for which it has a stronger affinity, and thus necessarily introduces further complications and doubts. It has been shown by Morichini and others that pure moist chloride of silver hermetically sealed in glass tubes, *in vacuo*, rapidly blackens on exposure to light, but is gradually restored to its original condition if laid aside for some time in darkness. This decolouration, however, does not occur in the presence of foreign substances capable of absorbing or combining with the liberated halogen; hence, in any quantitative experiments we are met by alternative difficulties. In the case of pure chloride of silver, the result may be vitiated by the reabsorption of a portion of the occluded chlorine, which, in the presence of an absorbent, we are uncertain as to the precise effect of the foreign substance, which must, moreover, together with its combined chlorine, be eliminated before any conclusion can be arrived at.

Mr. Hitchcock's experiments were commenced with a view of determining by the loss of weight what might be the probable nature of the change; but if we carefully examine his published figures, they only tend to show the futility of the attempt. While the results of the four separate trials tabulated on page 9 of our present volume differ from one another sufficiently to suggest considerable variation in the conditions, their mean shows a loss of weight which does not even approximately agree with either of the theories mentioned, nor with any reaction likely to take place under the circumstances involved.

For instance, assuming the sub-chloride theory to be the correct one, and accepting the formula of the sub-chloride as Ag_2Cl, the theoretical loss in weight would be about three times that found by Mr. Hitchcock, and an almost identical result would occur if any oxychloride were formed by the substitution of an atom of oxygen for two of chlorine. But in his paper the author mentions as the possible explanation of Von Bibra's statement that no loss of weight occurs, the probability of two atoms of oxygen replacing one atom of chlorine, since, according to their relative weights, the two atoms of the former would be nearly equal to one of the latter. But to find two atoms of a diatomic element replacing one of a monad would be a sufficient departure from the ordinary laws of chemistry to render it deserving of the epithet applied to it by Mr. Hitchcock—namely, "a rather improbable hypothesis." In fact, each atom of chlorine would be replaced by four times the proper quantity of oxygen, which is most unlikely.

But for the sake of comparison with Mr. Hitchcock's figures, we may for a moment imagine an oxychloride so constituted, and having the formula Ag_2ClO_2, or $AgCl, AgO_2$; then the observed loss would be in excess of that required in theory by about three and a half times. So that, so far as these experiments have gone, they neither prove nor disprove anything.

But there are reasons, even granting the participation of oxygen in the reaction, for doubting the possibility of the ultimate action of light resulting in the formation of an oxychloride. For example, the first result of such action is to liberate sufficient electro-motive force to decompose the water in contact with the chloride of silver. The oxygen would replace two atoms of chlorine, which, in turn, would probably combine with the occluded hydrogen to form hydrochloric acid, and then, again, would gradually react upon the product of the decomposition to reproduce the chloride. So far, this is precisely what occurs according to Morichini's experiment; and except for the rather doubtful point, the decomposition of water, is fully credible. But if we examine Mr. Hitchcock's suggested replacement of one atom of chlorine by two of oxygen, we find a very different state of affairs, for in addition to the H Cl formed in the reaction, we should have three atoms of hydrogen set at liberty. Now, hydrogen in the nascent state, or at the moment of its liberation from some compound, is well known to be a powerful reducer of the haloids of silver—as witness the action of zinc or iron upon chloride of silver in the presence of dilute acid. The hydrogen then would at once proceed to reduce three atoms more chloride; and even if the oxychloride just formed were a sufficiently definite compound to resist reduction, which is doubtful, the ultimate result would be an indefinite mixture of oxychloride and metallic silver. Even in the case of the replacement of two atoms of chlorine by one of oxygen, in which circumstances only sufficient hydrogen would be liberated to combine with the chlorine set free, it is not beyond the bounds of possibility that a similar reducing action might take place before the H and Cl had time to combine; though it must be confessed that this does not seem probable when we consider that these two elements are themselves made to combine by the force of light.

If the action of light be powerful enough to decompose water and so bring about the darkening of silver chloride by the formation of an oxychloride, the change ought to take place far more easily in the presence of hydroxyl. We have never tried the experiment of directly exposing silver chloride under such circumstances, so cannot speak as to the result; but the action of hydroxyl and other oxidising agents upon the latent or

undeveloped image certainly does not seem to favour the idea that the image, visible or invisible, is the result of oxidation.

The subject might be followed much further, and we hope Mr. Hitchcock will continue his researches; but we fear that such quantitative methods as he has already adopted will only lead to disappointment.

At a meeting of the Royal Astronomical Society, held early this month, an interesting paper by Professor E. S. Holden was read, the subject being "The Photographic Apparatus of the Great Equatorial of the Lick Observatory." It appears that the photographic focus of the great Lick telescope is so much shorter than the visual as to necessitate the dark slide being placed so far away from the end of the main tube that a special expedient has to be adopted to place the plate in the required position. This is done by making a door in the side of the tube and introducing the plate through it. The actual variation in the two foci is nearly ten feet.

As will be readily seen, this telescope will give larger images of the moon than any refractor ever made; but even this extent of magnitude is to be increased by adding a second lens, or lenses, behind the principal focus to act as amplifiers. By this means Professor Holden anticipates being able to obtain enlargements of parts of the moon's surface which can be measured afterwards at leisure.

Some of our readers will not need to be reminded that we pointed out many years ago how ordinary photographic lenses could be utilised in this manner to obtain negatives of the moon, for example, on a scale sufficiently large to enable its prominent features to be seen without enlarging the negative itself. A very simple arrangement could be devised for placing two lenses, say a long-focus rapid symmetrical and a shorter focus of the slower type, with their optical axes exactly coincident, when a very little adjustment would enable the experimentor to obtain an image of considerable size. The sharpness of the image would depend upon correctness of focussing and the quality of the lenses themselves. If these are both satisfactory, an excellent negative might be taken, as sharpness would be obtained without any diaphragm in the first lens, and the rapidity of exposure would obviate the possibility of want of sharpness through the movement of the image by the earth's rotation.

To a certain extent this plan may be looked upon as a "makeshift," but it must on no account be looked upon as a curiosity only. It is a mistake to think that a particular instrument made for the purpose is the only suitable instrument for that purpose. It is true that for telescopic work the highest talent is concentrated on the task of making object glass of pre-eminent value for the purpose, but this, nevertheless, does not prohibit the satisfactory use of other lenses for telescopic work, though they were devised for other purposes. For example, let any one mount a lens of rapid symmetrical type in a telescope tube and apply an ordinary eyepiece, and he will be surprised at the definition and brilliancy of illumination he will obtain.

At the meeting we have referred to, special mention was made of the possibility of an error in telescopic photography which was of so simple a nature that an ordinarily skilled photographer would scarcely have mentioned it. We refer to the Astronomer Royal's allusion to the necessity for securing the plates being accurately at right angles to the axis of the telescope, as otherwise the image would not be truthful. Experience of the use of a swing back has shown an intelligent photographer that it is only when it is at right angles to the central pencil of light that a rectangular object would be photographed truly rectangular when the camera was pointed directly at it, that is to say, when the centre of the rectangle was in a line with the optic axis.

An article in the current number of *Nature* upon weather predictions is well worthy of perusal by all interested in the weather; and who, if not photographers, are? It points out that, on the whole, the forecasts throughout the land are by no means of the unsatisfactory character some would make them out to be, and gives an amusing example of how the idiosyncrasy of the observer comes into play in giving his report as to correctness or otherwise. Inquiries some time ago were made from all stations where signals were hoisted for information as to their correctness and general utility. From Tynemouth the answer was, "These signals have been, and will be, an inestimable boon to our seafaring population." Our readers do not need to be informed of the closeness of South Shields to Tynemouth, but they will be amused to hear the report from this South Shields station, which ran, "The warnings were not a ha'porth of use, and that no one minded them!"

ON THINGS IN GENERAL.

Without entering into any discussion upon the subject of fungi upon lenses—though a few remarks might not be *mal à propos*—I wish to raise a protest against the suggestion in a letter over the signature of John S. Gladstone, who, dealing with the subject, writes, "I think I have read somewhere that the above firm" (Messrs. Ferrier Frères, of Paris) "have a secret process of toning with sulphur, which though giving beautiful tones is not celebrated for permanency." The most beautiful sets of glass transparencies, either for lantern or stereoscope, ever produced in the early days of photography were made by that firm, and its predecessors—Messrs. Ferrier & Soulier; but judging from my own slides, and I have examined them this year, I should say that better examples of permanent photography do not exist. My slides must have been produced a quarter of a century ago, and yet they are as beautiful as the day they were first put into my hands; each is a thing of beauty and a joy for ever, I feel sure. Mr. Gladstone is quite right in saying that their process was secret (I believe a description of a process said to be the same as Ferrier's was sold some years ago by a gentleman who now finds more profit from the manufacture of a particular kind of dry plate), but as to the fugacity of its results he is quite misinformed. Ferrier & Soulier's transparencies were always a source of wonder to the uninitiated: there never even was any ground glass like that used by them in their slides, and when it was discovered that they employed a matt varnish, said to be largely composed of wax, no one ever practically competed with it.

Then there is the question of the action of the vapour of mercury upon glass. Mr. W. H. Davies and Mr. Haddon have utterly exploded that idea by reference to every-day experiences with thermometer and barometer tubes, none of which were ever seen by anybody corroded by the vapour of the enclosed mercury. The truth is, glass is too apt to be looked upon as a substance neutral to almost all chemical agents, instead of being, as it is, liable to be acted upon by many very ordinary compounds; for example, it is soluble in water, and many kinds are quickly decomposed by atmospheric influences. I do not think I am incorrect in making the statement that the difficulty of producing a glass that ordinary air will not act upon has been a prime factor among the causes leading to the non-introduction of certain otherwise very desirable forms of lenses, some of the heavier glass being especially readily acted upon in this manner.

With regard to mercury in the intensifier (discussed at the Parent Society), I think every one present would join in Captain Abney's remarks appreciatory of Mr. Chapman Jones's explanation of the rationale of the intensification of a silver image by bichloride of mercury followed by sulphite, but it is difficult to see why the cyanide process should be specially fixed upon for eulogium on account of the intensity being capable of being brought down to any extent. I look upon that process of photography which shall produce the maximum excellence with the minimum of labour as being most worthy of praise. For that reason a picture three feet high taken direct should lose in a competition if compared with one enlarged to the same size from a small negative and in every way equal. I don't say this is possible, nor the reverse. Similarly with equal results the simplest process of intensification is most worthy of praise. That some pictures intensified by simple solution of bichloride of mercury,

followed by ammonia, are capable of retaining their qualities unchanged is undoubted, though all do not exhibit permanency, and it is an open question whether they are not, in this respect, equal to those by the cyanide process. Equally are they capable of reduction if made too intense, for it is only necessary to place them in hypo to obtain any amount of reduction required.

In the discussion on the paper by Sir D. Salomons, there was much talk very wide of the mark. Mr. Debenham was perfectly right in his remarks upon the relative deviations permissible according to the focus of the lens, the point at issue being really a function of the focus and angular aperture. I speak under correction, but I believe Mr. Carey Lea in his chapters on optics (which contain many ideas subsequently rediscovered), in his *Treatise on Photography*, published about a score of years ago, was the first to make some attempt to state in a scientific manner the method of defining the distance from a particular lens beyond which all objects would be sufficiently in focus, his plan was to multiply the square of the focus by fifty, though he places no limit to the angular aperture in his calculation.

It is well-known to students of photographic optics that the designer of the original Petzval portrait lens laid down a particular amount of sharpness which it was undesirable to overpass, as other conditions would make their appearance to the average detriment of the lens. In this connexion it is interesting to note an old remark of Mr Ruskin's which was strongly controverted at the time it was written. He fixed upon an extent of technical power of draughtsmanship in the human hand including lineations far more minute than Petzval's standard—the thousandth part of an inch. His defence of his position is rather like special pleading for his contention; but its introduction here is *apropos* to Sir D. Salomon's standard, ten times as large—the hundredth part of an inch with mechanical means.

At the London and Provincial Photographic Association meeting, on January 16, the discussion on the result of various additions to the developer was as interesting as valuable. Mr. Haddon's promised paper will be most interesting, as the ideas generally held upon the subject of sulphites of soda are simply ludicrous. I have before alluded to the remarkable solvent powers upon it usually attributed to water; and as to its so-called purity that is a very suspicious quality, it is so difficult to free it from other salts, the carbonate for example. I have in my possession now a most excellent negative developed wholly with a sample of commercially "pure" sulphite, pyro, and water. No bromide and no other alkali or alkaline salt was added. The negative is scarcely to be detected as differing from a score of others done at the same time by the ordinary methods of alkaline pyro with bromide.

FRED LANGE.

THE NEW BENZOLINE LIMELIGHT.

V.—The Warm Bath Saturator.

Having discussed the theoretical principles of the new limelight, we may now proceed to consider the application of the theory to actual practice.

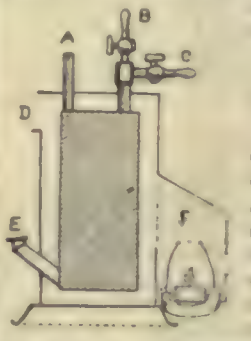
The first warm bath saturator, described in the second article of this series, consisted of a closed stuffed vessel placed in a bath of warm water heated by a spirit lamp. This apparatus was successful in its way, but was not perfect, at least for use with benzoline.

For *benzole* it is probably the best contrivance, as boiling water temperature is precisely that which is desirable for that fluid.

Benzoline, however, requires less heat than benzole, and, unless thoroughly drained, the heat of boiling water would be too much for it. The fluid does not boil over, nor give off steam, but it has a tendency to get into the air tubes, and thus cause the light to flicker by obstructing the free passage of the gas through the stuffing.

In starting the apparatus, the wick of the lamp was turned up so as to give a large flame. In about ten or fifteen minutes the water became of a suitable temperature, and it was then necessary to reduce the size of the flame considerably, so as to give just the small amount of heat requisite to keep the water warm. If the water became hot enough to scald, it was too hot; hence, it will be seen that the apparatus required watching, and, although capable of first-class results in skilled hands, it was not well adapted for the use of amateurs and unskilled persons, who have usually enough to do with manipulating the lantern. What was wanted was a saturator which could be easily and quickly started, and which would require no further attention during the exhibition.

Various patterns of warm bath saturators, very different in appearance, though working on the same principle, were successively made and tested. It was found that all were, more or less, practicable, but they were not equally advantageous. It will be unnecessary to describe the discarded forms, we may at once proceed to the plan finally adopted, which appears to satisfy every requirement.



The illustration gives a sectional view of the apparatus, which is extremely simple in its construction and also in its working.

The shaded oblong in the centre is a section of the saturator proper, a vertical copper cylinder, about three inches in diameter and seven inches in height. This is tightly stuffed and packed inside with a species of wool, capable of absorbing a large amount of fluid—nearly a pint. The lower part of the cylinder is packed solid, as it were; the upper part of the stuffing is perforated and traversed by the tubes through which the gas passes. These tubes are not shown in the sketch.

Three pipes—A, B, and E—are fitted to the outside of the cylinder; E is a short, wide tube, which projects at an angle from the lower end, and is fitted with a screw cap at the tip. This is used for filling the vessel with fluid. The object of having it at the bottom is to prevent over-filling; the liquid rises in the stuffing by capillary attraction, and when the stuffing has absorbed its due quantity, no more fluid can be put in. By this device the tubes in the upper part are always clear and open to the passage of the gas; there is no bubbling and no unsteadiness of the light.

After filling the saturator the vessel is tilted to let the surplus fluid run out of E back into the bottle. Very little will come out, only an ounce or two, and it is not absolutely necessary to drain the vessel. After draining, the screw cap, which should be provided with a good leather washer, is screwed down tightly to prevent leakage of fluid or gas.

The air tubes in the stuffing are in connexion with two pipes, A and B. The former, A, is a short tube, half an inch in diameter and two inches long; it is closed by a cork when the apparatus is not in use, but during an exhibition the cork is removed and one end of a short rubber pipe is slipped on, the other end of which is attached to the hydrogen nozzle of a jet or dissolving tap.

The third pipe, B, is connected in a similar way by rubber tubing to the oxygen nozzle of a jet or dissolving tap. It is furnished with a stopcock, which is shut off when the apparatus is not in use, to prevent evaporation of the fluid.

A branch tube, C, also furnished with a stopcock, is fixed permanently to B. The C nozzle is attached by a long rubber pipe, preferably not less than five feet in length, to a gas bag, though a short pipe will suffice if a cylinder of compressed oxygen is used. The stopcock on C should be turned off until the light is wanted in the lantern.

It will be observed that oxygen from a gas bag enters C and divides into two currents; one part goes through the stuffing, becomes loaded with vapour, and proceeds through A on to the jet, where it burns precisely as if it were coal gas with a smoky flame. The other part of the oxygen does not go through the saturator, but proceeds directly through B to the jet as pure oxygen.

The stuffed copper vessel has now been fully described; we may now consider the warm bath. This is simply a cylinder of sheet metal made larger than the copper vessel, which is placed in its centre, leaving a space between the two for water or air, preferably the latter. The air case has two openings or flues; one at D at the upper end forms the exit flue, the other, opposite F, admits a current of warm air, which circulates around the copper vessel, and is finally discharged from D.

By this means the upper part of the copper vessel is gently warmed; but the lower, to which loose liquid drains, remains quite *cold*. This is a great advantage, because there can be no boiling and no steam.

The upper part may be heated considerably beyond the boiling point of the fluid used with perfect safety, so long as the lower part, to which the fluid is driven by the heat, remains cool.

The source of heat is a large nightlight, having two wicks, known as Clarke's Fairy Light. This is held in a little ornamental glass cup and cover, called the Fairy Lamp. These lights are perfectly safe and sure; they do not flicker, cannot be blown out when in the lamp, and can be had of any grocer at a penny each, burning six hours. The fairy lamp is held in a little box, F, which is hung outside the air case in such a way as to be removeable in a second should anything go wrong with the light—an unlikely occurrence.

ALBERT W. SCOTT.

FATAL GAS EXPLOSION AT POLMADIE.

(*From our own Correspondent.*)

No little excitement, bordering, indeed, on consternation, was caused in photographic and lantern circles in Glasgow on Thursday night and Friday morning, the 23rd and 24th instant, when it became known that a most appalling accident had happened at the works of the Scotch and Irish Oxygen Works, Polmadie. These works are situated at Govanhill, on the south side of Glasgow, in a somewhat populous district, and, as stated, the neighbourhood was thrown into a state of great excitement by the occurrence of a violent explosion, attended with fatal results.

It appears that Mr. William Bow, the foreman, was in the act of removing oxygen cylinders from the workshop to the yard, when one of these, six feet long and six inches in diameter, and which, it is stated, was bearing a pressure of 3600 lbs. per square inch, exploded with frightful violence. We understand that just as Mr. Bow was in the act of placing the cylinder on the ground, to be ready for conveyance to Belfast, the cylinder exploded with a most violent report. A large number of people were attracted to the spot, and it was found that Mr. Bow had sustained most frightful injuries, and that much damage was done to the brick walls, windows, and doors of the building. Dr. McCubbin, of Govanhill, who was summoned to the scene of the accident, on examining poor Bow, at once saw that his injuries were of a fatal nature; the lower part of his jaw was shattered and forced up into the brains, which were protruding. Nothing could be done further than removing Bow to the Royal Infirmary, whither he was at once conveyed in the ambulance waggon, but where he succumbed to his injuries at 5.30 in the afternoon, the explosion having taken place about 3 p.m. Deceased was thirty-five years of age, and leaves a widow and young family to lament his sad and untimely end.

As to the cause of the explosion, in the meantime nothing definite can be said. A most searching investigation will, however, doubtless, be made by the authorities, who have taken possession of the portion of the cylinder that remained. We understand the end of it was blown away a distance of nearly two miles.

In the meantime there are all sorts of conjectures hazarded by those who are in the habit of using these cylinders as to their liability to deteriorate by age. Certain it is that faith in their safety has received a severe shock, in the West of Scotland at least, and several lecturers of known popularity will, in future, discontinue their use until some degree of absolute safety is assured.

SELECTING FOCAL DISTANCE WITH DETECTIVE CAMERAS.

(A Communication to the London and Provincial Photographic Association.)

THE expression forming the title of this paper may be used with two significations, involving either the choice of the focal length of lens that it is desirable to use, or, when the lens is decided upon, the use of it either at the distance from the plate which corresponds with its focal length for objects in the extreme distance, or at some distance which shall bring into more exact focus some object which is nearer.

There seems to be a good deal of misapprehension, not, perhaps, amongst the members of this Society, but amongst those who derive their principal impressions about photography from the statements of dealers, and from their happening, in their occasional reading, to come across what may be called pseudo-scientific papers, concerning the capabilities of a photographic lens for focussing simultaneously objects at different distances. Here it may be well to remark that, owing to curvature of field, almost any lens will focus simultaneously objects at different distances, if such objects fall upon parts of the plate—some nearer and others farther from the centre of the field of the lens. What, however, is meant is the capability of focussing at the same time objects which are either on the same part of the plate or at an equal distance from the axial line of the lens. As an illustration of the misapprehension referred to, may be cited a statement that has been the subject of comment at this Society, as to the advantage of some lens which was supposed to have a fixed focus. Another absurdity is that of setting up some standard of a permissible amount of confusion, such as that of one one-hundredth of an inch, and then proceeding on the assumption that all parts of the picture in which that amount of confusion is not exceeded are in focus. The falling off of focal sharpness is gradual, and there is no definite line of demarcation where sharpness begins, whether at the one one-hundredth of an inch or at any other limit. If, on the one hand, there were such a distinctive line of demarcation, and if, on the other hand, we were able in general work to avoid photographing all distances where confusion due to want of focus exceeds such limits—if both these conditions were fulfilled, a table showing distances with particular lenses where sharpness could be secured would be very useful. As a matter of fact, neither of the conditions is fulfilled. Sharpness does not begin at any measurable limit, and we are constantly meeting with subjects where any such attempted limit must be exceeded in some part of the picture. We must minimise our loss of sharpness as much as the particular circumstances will permit. There is, of course, a limit to the defining power of lenses, as well as, perhaps, to the power of the photographic film to register minute details, and of human observation to appreciate such details when registered. When these limits are reached, and any two objects, however much they may differ in distance, are rendered simultaneously upon the plate with such definition that no deficiency is discoverable in the one when the other is focussed, they may be said to be both in focus.

This apparent equality of focus of objects at widely different distances is always reached if the nearest of such objects is only removed sufficiently far. There is no photographic lens in the world (I am, of course, not speaking of telescopic objectives) which will show any difference of focus for objects, the nearest of which is a mile, whilst the others may include the moon at a distance of some hundreds of thousands of miles, and the planets at many millions, or the fixed stars at still greater distances. If a lens of twelve-inch focus could be made of such perfect defining power as to show a difference of adjustment required when focussing between these limits—that is, at a mile, and at the greatest conceivable distance respectively—the adjustment necessary would amount to about the one one-hundred and fiftieth of an inch. As, however, that amount of racking in or out makes no discoverable difference in the sharpness of the image given by such a lens, objects not requiring more than that adjustment may be considered to be in focus. When, however, we come to distances which have been mentioned as those beyond which all objects are in focus, such as one hundred feet, fifty, thirty, twenty feet, or even less, the case is very different. With a lens of five-inch focus, the difference of adjustment for objects at twenty feet and beyond will amount to about the one-tenth of an inch—a difference which, as a very slight amount of practice will suffice to show, produces a very appreciable difference of distinctness in the focus.

Since we cannot hope to focus truly at the same time near and distant objects upon the same part of the field of the lens, the question becomes, How shall we proceed so as to reduce the indistinctness due to imperfect focus to the smallest amount? What length of focus shall we choose for our lens, and shall the instrument be set so as to truly focus the extreme distance, or some nearer point? In answer to the first part of the question, both long and short-focus lenses have been advocated, and each with reason, if a particular class of subject is in question. The principal argument in favour of long-focus lenses for a given size of plate, is that as the field of definition is always more or less curved, the longer the radius—which means the less the curvature—the nearer to it will be the flat surface of the plate. Another argument relating to a consideration not now under discussion, is that with a long-focus lens any selected object will appear of larger size and assume greater importance in the picture. For the short-focus lens, it may be argued that objects differing in their distance from the instrument will be represented as less removed from the focal plane than with the longer-focussed instrument.

This is a very significant consideration, and one which is of the greatest importance in detective camera work for the most part. Let an object at, say, twenty feet distance be included in a view taken with two lenses, one of three-inch and one of six-inch focus, each stopped to the same rapidity, and each focussed for some object in the extreme distance. The

blurring of the near object will be double with the six-inch lens than it will be with that of shorter focus. It is not merely that the blurring with the lens of shorter focus will be reduced to smaller proportions because the whole photograph is smaller, but that when both are enlarged to one size, the enlargement from the short-focus lens will show only half the blurring that the other does—that is to say, the representation will be as distinct as if the longer-focussed lens had been racked half the distance required to suit the particular object.

Here, then, is a great advantage for the short-focus lens, against which must be set the disadvantage for the particular plate, but not for one of proportional size, of want of focus towards the margin, owing to curvature of field. There will also be further want of definition towards the margin from other optical causes; but taking the curvature of field alone, that may sometimes be turned to a positive advantage.

The most common case in which this is seen is in photographs of interiors, which are not generally detective work, and in street scenes, and such similar cases, where the side objects are much nearer than those occupying the centre of the field. The curvature of field of the lens is a matter that I think photographers, especially those who go in for detective work, would do well to study. If we are obliged to put up with the drawbacks attendant upon curvature of field, let us take advantage of any possible help which it may occasionally render. It will be found then, with any ordinary detective lens, that as we approach the margin of the field an object to be in the best obtainable focus must be much nearer to the instrument than the distance which has been focussed at the centre of the field. Suppose that we have a lens of five-inch focus used with a quarter-plate, we may find that when it is focussed for the distance at the centre, an object occupying a spot one and a half inch distance from the centre of the ground glass will be in focus when only about twenty-five or thirty feet off. If we are capable of judging distances tolerably, and have either previously noticed on the ground glass or with the finder what part of the scene will be occupied by an object which comes one and a half inches from the centre of the plate, we may succeed in catching a near object of interest when in focus without disturbing the general focus for the distance. This case is put as an illustration of what may be done. We may, for instance, note a place in a line of roadway along which vehicles travel, and by getting a horse, dog, or foot passenger there when passing a spot at a certain distance from the centre of the plate, get it just at the focus for that part of the plate, although at the centre it would be decidedly out of focus.

We now come in conclusion to the consideration of whether it is desirable for general detective camera work to have the lens focussed for the extreme distance, or some point at the distance, as near as may be, at which it is anticipated that objects of interest will appear.

Of course, the object of special interest should not be decidedly out of focus, and therefore it would be better to focus for that, if there is a ready means of adjustment, or if that probable distance is known beforehand. If such object come in the centre of the plate, the lens must be racked out and the distant background will be out of focus. It has, however, been shown that with a short-focus lens and tolerable wide angle of view, it is possible to get a rather near object in focus without movement of the lens, provided it is not very near the centre of the field. When it is desired to obtain objects of a certain size on the plate, and to cover a plate of given size as sharply as may be towards the edges, then a lens of long focus will be selected; but in this case, if near and distant objects are both included, one or other must give way in the matter of focus. When, on the other hand, actual size is not important, and it is desired to get objects at different distances all as nearly focussed as possible without diminishing the speed of the instrument, this will be accomplished by using a lens of short focus. The power of yielding a sufficiently magnified image may, however, as suggested before, be limited by the capability of the film of registering, without interference due to structure or coarseness of grain, details beyond a certain degree of fineness.

W. E. Debenham.

THE DISTANCE BEYOND WHICH ALL OBJECTS WILL BE IN FOCUS WITH ANY GIVEN LENS.

[A Communication to the Photographic Society of Great Britain.]

The author found a simple formula for ascertaining the distance beyond which all objects will be in focus with any given lens—it is $f+100\,f^2$ R inches—where f and R have the same meanings as usual. This formula is very useful to ascertain the most suitable lenses for detective cameras and for other purposes. It is assumed that if points in the object are represented in the image by circles having diameters of $\frac{1}{100}$ inch and less, the picture will be sharp.

A special instance will be given to show its use:—$100\,f^2$ R inches may be written $8\frac{1}{3}\,f^2$ R feet, since 100 inches = $8\frac{1}{3}$ feet. The addition of f in the formula may be neglected, being small compared with $100\,f^2$ R. Most of the rapid landscape lenses work at f-8, so the formula reduces itself to f^2 feet approximately. This shows that with any lens f-8 all will be in focus after a distance expressed by the square of its focal length in feet. Putting the formula in words, $100f^2$ R inches reads:—100 multiplied by the ratio, multiplied by the square of the equivalent focal length of the lens, expresses in inches the distance beyond which all objects will appear in focus. To give an example:—After what distance will all objects be in focus with a lens stopped f-12 (*i.e.*, $\frac{1}{12}$), the equivalent focus being 10 inches? *Answer*:—$100 \times \frac{1}{12} \times 10 \times 10 = \frac{10000}{12} = 833\frac{1}{3}$ inches = 69 feet $5\frac{1}{3}$ inches. To be strictly accurate, add $f\,(=10)$ to this, and distance becomes 70 feet $5\frac{1}{3}$ inches from optical centre of lens.

It is a good plan to mark the stops for the distance, after which all will be in focus, as well as the standard number. In practice this is valuable, for when a subject is to be taken requiring a particular stop to get the focus right, and it is found that this stop has a number requiring too long an exposure, a plate is saved.

The following table will be found useful for many purposes, some 1200 calculations having been made to compile the results given:—

FOCUS TABLE FOR DETECTIVE CAMERAS AND OTHER SPECIAL WORK.

Focus of lens in inches.	Decimal Standard Stop Numbers.								Ratio Marked on Stops.														Focus of lens in inches.
	5	10	15	20	25	30	35	40	*f*-7	*f*-8	*f*-9	*f*-10	*f*-11	*f*-12	*f*-13	*f*-14	*f*-15	*f*-16	*f*-17	*f*-18	*f*-19	*f*-20	
	Number of feet and inches after which all in focus.								Number of feet and inches after which all in focus.														
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	
4	19·4	13·8	11·5	9·10	8·9	8·0	7·5	7·0	19·4	17·0	15·1	13·8	12·5	11·5	10·7	9·10	9·2	8·8	8·2	7·8	7·4	7·0	4
4½	21·10	15·4	12·10	11·1	9·10	9·0	8·4	7·10	21·10	19·2	17·0	15·4	14·0	12·10	11·10	11·1	10·4	9·9	9·2	8·8	8·3	7·10	4½
4½	24·5	17·3	14·5	12·5	11·1	10·1	9·4	8·9	24·5	21·5	19·1	17·3	15·8	14·5	DF3	12·5	11·7	10·11	10·3	9·9	9·3	8·9	4½
4¾	27·3	19·2	16·0	14·0	12·4	11·3	10·5	9·9	27·3	23·10	21·3	19·2	17·5	16·0	14·10	13·9	12·11	12·1	11·5	10·10	10·3	9·9	4¾
5	30·2	21·3	17·9	15·3	13·7	12·5	11·6	10·10	30·2	26·5	23·6	21·3	19·4	17·9	16·5	15·3	14·3	13·5	12·8	11·11	11·4	10·10	5
5¼	33·3	23·4	19·6	16·10	15·0	13·9	12·8	11·11	33·3	29·1	25·11	23·4	21·3	19·6	18·1	16·10	15·9	14·9	13·11	13·2	12·6	11·11	5¼
5½	36·5	25·8	21·5	18·5	16·5	15·0	13·10	13·0	36·5	31·11	28·5	25·8	23·4	21·5	19·10	18·5	17·3	16·2	15·3	14·5	13·8	13·0	5½
5¾	39·10	28·0	23·5	20·1	17·11	16·5	15·2	14·3	39·10	34·11	31·1	28·0	25·6	23·5	21·8	20·1	18·10	17·8	16·8	15·9	14·11	14·3	5¾
6	43·4	30·6	25·6	21·11	19·6	17·8	16·6	15·6	43·4	38·0	33·10	30·6	27·9	25·6	23·6	21·11	20·6	19·3	18·1	17·2	16·3	15·6	6
6¼	47·0	33·0	27·7	23·9	21·2	19·4	17·10	16·9	47·0	41·2	36·8	33·0	30·1	27·7	25·6	23·9	22·2	20·10	19·8	18·7	17·7	16·9	6¼
6½	50·10	35·9	29·10	25·8	22·10	20·11	19·3	18·1	50·10	44·6	39·7	35·9	32·6	29·10	27·7	25·8	24·0	22·6	21·3	20·1	19·0	18·1	6½
6¾	54·9	38·6	32·2	27·8	24·8	22·6	20·9	19·6	54·9	48·0	42·9	38·6	35·0	32·2	29·9	27·8	25·10	24·3	22·10	21·7	20·6	19·6	6¾
7	58·11	41·5	34·7	29·9	26·6	24·3	22·4	21·0	58·11	51·7	45·11	41·5	37·8	34·7	31·11	29·9	27·9	26·1	24·7	23·3	22·0	21·0	7

Sir David Salomons, Bart.

ON CONTROL IN THE DENSITY OF NEGATIVES.

[A Communication to the Photographic Society of Great Britain.]

It is universally allowed that the practical density of the deposit obtained in a gelatino-bromide negative is difficult to estimate during development, probably on account of the variable printing value of negatives that have the same apparent densities, and certainly because of the opacity of the film. This last difficulty is increased when the sensitive salt is in suitable quantity to prevent light passing through the film so as to make the best possible gradation and avoid the evils of halation.

The photographer who aims at something higher than to simply take what comes on his plate and make the best of it in printing, has a choice of three principles of action in controlling the densities of his negatives. He may get as close as he can to the desirable condition by development, and trust to processes of reduction if his plate is too dense, and to intensification if it is not dense enough; or he may get density at all risks, and endeavour, if necessary, to reduce his negatives to what he wants; or, lastly, he may take care that the density got by development shall never be too great, so that the error may be corrected by intensification alone. Each method has its advocates, and is doubtless occasionally useful; but the amount of control obtained by the usual processes is so small, and the uncertainty of the various operations so great, that many expert workers prefer to either print from or else altogether reject their negatives as produced by simple development. It is the aim of the author to do away with this uncertainty, and to show how—what is for all practical purposes—a perfect control may be realised in the densities of negatives.

It has been shown by Captain Abney that in all probability the amount of silver deposited in a film by development, after exposures within the ordinary limits, is proportional to the actinic power of the light acting upon the sensitive salt, though the opacity is not strictly proportional. It will be convenient to speak of the gradation in such negative as "normal." In methods for altering the densities of negatives it is important that the gradation shall remain normal, being either increased or diminished throughout the scale in a proportional manner. An alteration of the gradation may sometimes be good, but it will be allowed by all that a standard process working with exactness is desirable, if only as a point from which departures may be made.

In seeking for methods by which the control of density may be obtained without destroying the normal character of the gradation, it is necessary to remember the very appreciable thickness of the sensitive film, and that in almost every case the reagent employed begins to act at its outer surface. This demonstrates at once that to get with certainty a normal alteration of density, the changes produced must be such as may be allowed to work thoroughly and through the film. A thorough reduction by any of the usual processes would lead to a complete removal of the image, and methods of reduction are, therefore, useless for the normal control of density. It may, perhaps, be possible, by employing a very dilute reducing solution, to get the reagent to work so slowly that it penetrates the film before it appreciably acts, and so by beginning to produce its effect on the whole image at the same time to work normally; but there can be no guarantee that the action is not irregular. It may, perhaps, in a somewhat similar manner be possible to get a normal intensification by the use of a reagent that first intensifies and then reduces, but in practical work it is not possible to be sure that the reducing effect has not begun at the surface before the intensification has reached its maximum in the high lights that extend deep into the film. Such irregular processes may have their uses in which their characteristic irregularities are taken advantage of, but as standard methods of work, in which certainty is important, they can only be regarded as treacherous and unsuitable.

It remains, therefore, in getting control of density with certainty, and without producing abnormal results, to take care that the negative as developed is not too dense, and to seek for methods of intensification that shall give increase of density in easy stages, and are free from the faults above-named. Taking into consideration also such matters as permanency of result, it appears that by the use of mercuric chloride, sodium sulphite, and ferrous oxalate, in the manner hereafter described, the control sought for may be realised.

It will be convenient to consider the subject under the following divisions:—

HISTORICAL REFERENCES.

CHEMISTRY OF THE CHANGES.

Action of Mercuric Chloride.

Action of Sodium Sulphite.

Action of Ferrous Oxalate.

PRACTICAL METHODS.

HISTORICAL REFERENCES.—In a letter addressed to the editor of the *Photographic News* in 1878, Mr. J. W. Swan stated that "ferrous oxalate advantageously replaces the nitrate of silver, Schlippe's salts, or other of the chemicals now commonly used for blackening the image after treatment with bromide of copper." In 1881 Messrs. C. I. Burton and A. P. Laurie described before the Edinburgh Photographic Society (*Photographic News*, xxv., 269) some experiments with intensifiers. After bleaching with mercuric chloride, they sought to blacken the negative by exposure to light, and failed. They therefore used mercuric bromide in saturated solution instead of the chloride, washed the plate, exposed it to sunshine for about a minute at least (the longer the better), and then applied a developer. They preferred ferrous oxalate as developer, but stated that pyrogallic acid was also serviceable. They found that the process might be repeated several times on the same negative. Scolik's method of intensification, by treatment with mercuric chloride or bromide, followed by sodium sulphite, was introduced in 1881 (*Photographische Correspondenz*, xxi., 265), and Dr. Eder, in the *Year-book of Photography for* 1885 (page 100), states that "the white and insoluble mercurous chloride which is deposited upon the plate is rapidly reduced to the metallic state by the sulphite." He says, in addition, that mercury forms a stable image.

CHAPMAN JONES, F.I.C., F.C.S.

(To be continued.)

AMATEUR PHOTOGRAPHIC EXHIBITION, CASTLE WEMYSS, WEMYSS BAY.

In the way of exhibitions, the one that has just taken place at Castle Wemyss is quite unique in its character, and illustrates in a marked degree the wide-spread interest that is taken in matters photographic. Away on the banks of the Clyde, far from the busy crowd, in a corner of a corner of the world, so to speak, Miss Burns arranges to get up an exhibition of amateur photographic work. This she makes known by circular, and the response to her request proves a success so great that in the Tennis Court, Castle Wemyss, there was an exhibit of 350 pictures, and that in the most unpropitious of seasons and the worst of weather.

Miss Burns issued her prospectus, in which it was stated that such an exhibition was to be held at the Castle on January 17 and 18, and that two prizes would be given—a silver and a bronze medal—to each of the following various classes of work:—

To those who have photographed under two years:—For the best Portrait or Group; for the best Landscape or Seascape; for the best Instantaneous Picture—all these in silver printing; also for the same classes of work prizes were given to those who had photographed over two years.

The next class was for any other process not silver—platinotype, bromide, &c.

Then followed awards for the best enlargements by any process; and, finally, for the best set of six lantern slides by any process—one condition being that all the pictures sent in must have been exposed, developed, and printed by the exhibitors. Also, should the Judges consider the standard of work in any class not of sufficient merit to warrant the award of a prize, they can withhold one or both as seems to them right.

The Judges were Mr. W. Lang, Mr. George Mason, and Mr. W. Young, artist; and the following were the successful competitors:—

For those who had photographed under two years:—In the Portrait and Group Silver Printing Class: 1st, Dr. Woodburn; 2nd, Mr. Cunningham. In the Landscape or Seascape Silver Printing Class: 1st, Miss Burns; 2nd, Miss Macnair.

No awards were made for Instantaneous work, none being of sufficient merit.

For those who had photographed over two years:—In the Portrait and Group Silver Printing Class: 1st, Mr. D. R. Clark; 2nd, Mr. Cunningham. In the Landscape or Seascape Class: 1st, Mr. Dove; 2nd, Mr. Taylor. In the Instantaneous Class: 1st, Mr. Turner; 2nd, Mr. Hinshlewood. For the Best Prints, any other process not silver: 1st, Mr. Dove; 2nd, Mr. Clark. For the Best Enlargements: 1st Mr. Clark; 2nd, Mr. Cunningham. For the Best Set of six Lantern Slides: 1st, Mr. Turner; 2nd, Miss Collier.

The prize medals for this competition have been specially designed, and form in themselves quite works of art. On the one side is engraven the name of the successful competitor, &c., and on the reverse side is a relief representation of Castle Wemyss and grounds, very perfectly executed.

We hope that this very successful initial show may only be the first of many such exhibitions, for we feel sure, if fair time were given, and the intended competition were more fully ventilated, the walls of the large hall would be covered with pictures.

For this first Exhibition there was also a feeling abroad that special invitation was necessary before one could send in pictures. This misapprehension, to some extent, kept back the work of some good amateurs who did not know that the competition was open to all comers.

Such small drawbacks when found, however, can be easily obviated; and this knowledge gained and used on any other occasion, along with the art-loving enterprise shown by Miss Burns in the conducting of this Exhibition, we feel, assures the success of future ventures.

NOTES FROM NEWCASTLE.

It was scarcely to be expected that our Society's prospectus would please every one, therefore I was prepared for sundry growlings; certainly I think the amateurs have very little to grumble at, they not only have several classes to themselves, but can compete if they wish in the open sections. It is a question in my mind whether the professional exhibitor is not rather handicapped in our numerous competitions where the well-to-do amateur, in all but portraiture, is allowed a look in. I imagine the time may come when it will be necessary to protect the professional!

I believe the local committee had considerable difficulty in keeping down the number of medals for award by the Judges to what should be considered reasonable limits. Business firms and editors are so lavish of their gold, silver, and bronze, that the difficulty appears to be not so much to *provide* medals, but how to curtail the number without offence.

The usual annual meeting was postponed to make room for the lantern slide display at the Literary and Philosophical Institute. I very much question the wisdom of postponement, which means really, I expect, in this case, an amalgamation with the February meeting. Surely there would have been something to talk about, and in any case members require constant reminders and regular meetings, otherwise they are apt to forget the existence of the Society.

The lantern display was, as usual, a success; the hall was crammed with interested spectators, mostly juveniles. The ordinary member was not very conspicuous—in fact, on these occasions, he is a very unimportant personage; he has ostensibly the privilege of introducing a friend, or six, but is fortunate if he succeeds in finding a seat or standing-room for himself. The fact is these shows are made "too cheap," and I should strongly recommend the Executive to make some small charge for admission to non-members.

Mr. Stevenson, J.P. (brother of the member of Parliament for South Shields), the President, occupied the chair, and started the proceedings successfully with a capital speech. Mr. Stevenson makes a splendid chairman, no matter whether at a political, parochial, or photographic gathering, and the Newcastle Society is to be congratulated upon securing his presence at their meetings. Chairmen have it in their power to make or mar the meetings of an association, and no society knows this better than the Newcastle one.

Our veteran photographer, **Mr. P. Maitland Laws**, has been lately seriously ill. His numerous friends, personal and otherwise, will be glad to hear of his complete recovery.

Rumour has it that we are to have another high-class studio in the neighbourhood of Northumberland-street. It will have to be, I imagine, a very superior affair indeed to disturb the serenity of our friends Bacon and Lyd. Sawyer, but I am hoping that rumour is all wrong in this matter. As a Northumbrian I am a firm believer in "canny Newcassel" and the superiority of the North Country, consequently every time I see the names of our men figuring in the prize lists, I feel inclined to crow. Most of us are content to take our medals one at a time and be thankful, but Mr Lyd. Sawyer takes them in by tens. Drawing a line from Tynemouth, through Shields, Newcastle, Hexham, and taking in the Lake district, I should say a very hand-some proportion of medals come North.

How many of your readers have been down a coal mine? Very few, I expect, and fewer still have ever ventured to photograph down there. It is now some little time since, having procured the necessary permission and made suitable arrangements, I started off, accompanied by the manager of one of our best and cleanest and *safest* mines and several officials, on an expedition of this kind. I chose a fine day, though what a fine day had to do with the matter I don't know, and took with me a large camera with the idea of getting a "medal picture;" there was to be a startling effect of light and shade, and an arrangement of pose and figure not often seen on the walls of our exhibitions. The descent was made in good company, and though my position was a novel one, and it was unpleasant to feel as if the stomach was coming upwards to the mouth, I experienced no discomfort whatever. We took a rest and a refresher on arrival at the bottom, and then commenced operations by photographing the bottom of shaft with an ascending loaded cage, and overmen and pit lads grouped round about in picturesque, if not picturesque, attitudes. There was sufficient gaslight to focus by, and a few yards of magnesium ribbon helped matters considerably. Presently apparatus was sent forward, and we followed leisurely, making a complete tour through the cleanest parts of the mine, visiting the stables and engine house on the way, and admiring the excellent arrangements for ventilation. Coming to a convenient part "in by" where were standing a "loaded tub" and a pit pony, with the lad in attendance, I made an exposure, and was not much astonished to find the animal come out with only *two* heads! Soon after this we got into a coal waggon and were driven off rapidly to the portion of "face" of coal where my *chef-d'œuvre* was to be obtained, here two miners were set to work with pick and shovel, and another plate exposed. We returned by another route, making two or three exposures on the way, and then were brought safely to bank. After an enjoyable repast, I hastened home to ascertain my success or otherwise. I may say at once that the proofs were never considered up to exhibition form; the negatives themselves were certainly interesting, but from a *technical* point of view detailed failures. I have been always rather dissatisfied with the criticisms these photographs received. My friends evidently expected to see the detail all over and round about as clearly as if I had been photographing the groups in my studio—it was no use arguing that there was very little detail visible in a coal mine. My negatives displayed a scene very much as it actually was—dark, weird, and ghost-like; figures ill-defined; here and there bright glimmers of light, and round about dense shadows. What more would you have? It was a new experience for me all round, and I am glad I did not miss it. There are many pictures to be had underground, and I intend at an early date making another attempt—this time with a smaller camera, a lens of undoubted reputation, and, what is of great importance, *a much smaller party*.

D. D.

Foreign Notes and News.

The publishers of the *Amateur Photographe* have decided this year to issue a new photographic journal which is to make a speciality of reporting the meetings of the French Societies, and will bear the title, *Bulletin des Sociétés Photographiques de France*.

Many of our readers were probably a good deal entertained at the time by Mr. G. R. Sims's account in the *Referee* of how he was invaded by an interviewer and a photographer with a hand camera, and photographed by main force against his will. The last issue of the *Bulletin Belge* reproduces the whole passage, and very amusing reading it makes in its excellent French translation. The *Bulletin*, however, insists on regarding Mr. Sims as the editor of the *Referee*, but then it always speaks of the *Photographische Mittheilungen* as an Austrian publication. It really would seem as if a knowledge of the French language rendered its possessors impervious to any perception of the internal affairs of other countries.

What the outside press can do in the way of muddling things photographic, when determined to do so, is very well instanced by some extracts given by the *Bulletin* from a report on the Brussels Exhibition in a leading Belgium paper. "M. Campo," we are there told, "is a colourist who succeeds in managing the effects of light in such a way as to obtain tints of the most varying and delicate shades. These prints are produced by the platino-gelatine process (!). The new *apparatus* is so sensitive (*sic*) that the photographic artist is able to reproduce personal expression as well as the painter!"

Dr. Max Müller, of Brunswick, has just published a valuable and comprehensive work on the employment of magnesium light in photography. The work contains in an exhaustive manner nearly everything that can be said on the subject, and is interesting on account of the detailed description given of the plant employed in the well-known flash-light studios of Van Deldon in Breslau, and Gottheil in Konigsberg. Professor Max Muller also mentions some interesting experiments he conducted on the combustion of magnesium powder in oxygen, which, it would appear, caused a great increase in the amount of light produced. Professor Muller's method was to fill the indiarubber ball employed for blowing the magnesium through the flame with oxygen, and in this simple way to effect the combustion of the metal in an atmosphere of that gas. He also gives a new receipt for a flash powder, which would appear to be of considerable value. This is as follows:—

Chlorate of potash	3 parts.
Perchlorate of potash	3 ,,
Magnesium powder	4 ,,

The perchlorate of potash gives off its oxygen much more readily than chlorate of potash, and consequently causes a quicker and more complete combustion, and it would seem to be much preferable to the sulphide of antimony employed by Gudicke and Miethe, which is *supposed* to assist combustion, but very certainly produces decidedly injurious fumes.

In Berlin where, as in Hamburg, photographs are made and kept of all the criminals who get within the clutches of the law, flash-light apparatus is provided in a special apartment for the convenience of the criminals, so that they need not be kept waiting if captured at night; and they further enjoy the advantages of being photographed on Schlenssner plates and developed with eikonogen!

The current number of the *Photographische Mittheilungen* contains an illustration (a portrait of a young lady) which is an excellent example of the perfection to which the reproductive processes of modern photography have been brought. The negative was taken by flash light and reproduced ten times. These ten negatives were fixed in a printing frame with Eastman paper behind and flashed. The whole process of insertion,

flashing, and removal occupied only two minutes, 300 prints being thus turned out in an hour, and a little over half a day sufficing to produce the whole number required for the issue of the *Mittheilungen*.

THE Breslau Exhibition, arranged by the "Silesian Friends of Photography," opened on the 15th. It ought to be a success, for in Breslau no charge will be made to exhibitors for the space they occupy, and the carriage of any articles sent will be paid both to and from Breslau by the "Silesian Friends of Photography," who, it would thus appear, certainly deserve their name. Lest, however, readers of the JOURNAL should be tempted to send exhibits, and then prosecute us if the carriage be not paid for, we hasten to point out that this liberal offer only applies to the works previously exhibited at Berlin, and which their owners may feel disposed to send on from there to Breslau.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 964.—"Camera Fittings." W. C. CHIPPER.—*Dated January* 20, 1890.

No. 1098.—"Improvements in and relating to Photographic Apparatus." Communicated by E. Kipper and E. W. Perry, jun. Complete specification. H. H. LAKE.—*Dated January* 21, 1890.

No. 1155.—"Improvements in Camera Stands." W. R. BAKER.—*Dated January* 22, 1890.

No. 1203.—"Improvements in Photographic Cameras with New Finder and Shutter." D. CARTER.—*Dated January* 23, 1890.

No. 1267.—"An Improved Method of Obtaining, from Ordinary Photographs, the Linear or Stippled Effect necessary for Photo-block, Lithographic, or other Mechanical Printing." W. T. WATSON.—*Dated January* 24, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 12,860.—"Magic Lanterns." WRENCH.—Price 8*d*.

No. 15,289.—"Photographic Shutters." Communicated by Kändler. BROWN.—Price 8*d*.

PATENTS COMPLETED.

IMPROVEMENTS IN OR APPLICABLE TO OPTICAL OR MAGIC LANTERNS.

No. 12,860.—ALFRED WRENCH, 50 Gray's-inn-road, London.—*January* 4, 1890.

THIS invention relates to improvements in or applicable to optical or magic lanterns, whereby both mounted and unmounted slides can be more conveniently and easily exhibited than hitherto, the unmounted slides being automatically registered. By these improvements also a curtain or screen is operated between the exhibition of the slides, as hereinafter more particularly described.

In carrying out my invention I form the lantern with two compartments in the stage or receptacle for the slides. One of these compartments is adapted for the reception of mounted slides, and the other compartment is provided with guides in which works a carrier operated by a rack and pinion or other arrangement, and adapted to receive and exhibit unmounted slides, and to register such slides automatically. The guides are furnished with spring lugs which yield to the upward pressure of the slide, and immediately it has passed them they spring outwards and hold the slide in position for being exhibited.

The said carrier also actuates a screen or shutter in such a manner as to produce the effect of a curtain falling after the exhibition of one slide and rising to exhibit to view a new picture.

In a modification of my invention I employ a shifting stage operated by a rack and pinion, or other arrangement, whereby mounted slides and mechanical slides can be exhibited and registered automatically in the same way as unmounted slides, and which shifting stage also actuates a screen or shutter to produce the curtain effect hereinbefore mentioned.

CAMERA CLUB NOTICES.—Monday, February 3, eight p.m., Opening of Exhibition of Photographs by members of the Amateur Photographic Field Club; half-past eight p.m., smoking concert. Thursday, February 6, eight p.m., Paper by Sir David Salomons, *Rule for ascertaining Size of Disc at a Given Distance for Lantern Work*, and lantern exhibition of Dutch views by Messrs. Elder and W. A. Greene, and of slides by other members. Thursday, February 13, eight p.m., Mr. Graham Balfour, *Landscape*. Thursday, February 20, five p.m., Annual General Meeting; eight p.m., Paper communicated by Mr. W. K. Burton, *On One or Two of the Tenets of the "Naturalists,"* with Notes in reply by Mr. G. Davison. Thursday, February 27, eight p.m., Dr. C. S. Patterson, *The Camera as applied to Medicine*. Monday, March 3, half-past eight p.m., smoking concert.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 4	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 4	North London	Myddelton Hall, Islington, N.
,, 4	Holmfirth	
,, 4	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 4	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 4	Paisley	Paisley Museum.
,, 4	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 5	Coventry and Midland	The Dispensary, Coventry.
,, 5	Edinburgh Photo. Society	Professional Hall,20, George-street.
,, 5	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 6	Bolton Photographic Society	The Baths, Bridgman-street.
,, 6	Leeds	Leeds Mechanics' Institute.
,, 6	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 6	Glasgow Photo. Association	Religious Institn.,177, Buchanan-st.
,, 6	Sheffield Camera Club	Whiteley's Institute,Newsurrey-st.
,, 6	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JANUARY 28.—Technical meeting.—Mr. T. Sebastian Davis in the chair.

Mr. H. CHAPMAN JONES read some observations on the effect upon the sensitiveness of the plate of the contiguity of certain materials of which a dark slide was made. The effect was, he said, sometimes seen as fogging and sometimes as absence of the image. He now found that it might take the form of increase of sensitiveness. A plate had been left in a certain slide for about four months, and he had used it for making an enlargement on a December afternoon lately, when the light had waned considerably. The plate appeared to be under-exposed, except opposite the hinge of the dark slide, and there the image had come out fairly well, looking as if it had received two or three times the exposure of the rest of the plate. The history of the particular slide was that it had originally a leather hinge, but it had been repaired, and the hinge replaced by a material—a particular kind of jean—which the manufacturers had adopted in consequence of the fogging which had occurred from the use of leather. Other plates which had been kept for two years in slides fitted with similar hinges had shown no mark, and the manufacturers assured him that they had never known a case of injury to the plate from this material. There was, however, an alternative proposition to that of the plate having gained sensitiveness opposite the hinge, and that was that the sensitiveness had decreased over the rest of the plate.

Mr. A. COWAN thought the last proposition to be probably the correct one. The late Mr. J. C. Collins found that some kind of black used in slides caused insensitiveness of the plates.

Mr. A. MACKIE said that turpentine black did so; the wood of some slides had also that effect. He recommended treating such with paraffin.

Mr. COWAN then referred to a developer recently recommended in an American annual, and consisting of two grains of pyro, twenty-five grains each of sulphite of soda and Rochelle salt, and one grain of carbonate of lithium, to the ounce of water. He was of opinion that it was an advance in pyrogallic development. He had tested it with plates of fair rapidity, giving 19 or 20 on Warnerke's sensitometer, and tried against the usual pyro, bromide, and ammonia, two grains of each of the former, and four of the latter, to the ounce. The ammonia plate came out first, but the other continued to appear, and reached a number on the sensitometer which could not be obtained with the ammonia mixture unless it was pushed to the extent of losing clearness in the shadows. From his experiments he thought that any organic salt of potash or soda acted similarly to Rochelle salt. He had tried acetate, citrate, Valerianate, phosphate, and other salts with very similar results. He had also tried one grain of the lithium carbonate in conjunction with pyro, and no other addition but water, and obtained a very fine image.

Mr. MACKIE said that acetate of soda was one of the ingredients in Mr. Brooks's formula for developing collodio-bromide. He had tried it, but could not find that in that connexion it made any difference to the developing action.

Mr. COWAN added that he had tried ten times the amount of carbonate of potash and did not get anything like the power that he did with the one grain of lithium.

Mr. W. E. DEBENHAM remarked that an additional use of the specimens that Mr. Cowan showed, was that they indicated the very great variations of intensity that might be obtained with the same plate and same exposure, the greatest contrast being between one developed with carbonate of potash and that developed with lithium, and no other alkali or salt.

Mr. MACKIE, referring to Mr. Chapman Jones's recent paper on intensifying, asked whether he had tried the effect of a solution of sulphate of iron before putting the plate into the hypo bath. He had noticed a considerable increase of intensity from that practice.

Mr. CHAPMAN JONES had not tried it, but the plan appeared to him to resemble Mr. Howard Farmer's method of intensifying.

Mr. MACKIE would have thought so too, but that the increase of density could be completely taken out by an acid bath, from which he inferred that it could not be reduced silver.

Mr. CHAPMAN JONES had been informed by a photographer of experience that he reduced intense images, although developed with ferrous oxalate, by immersing in an acid bath, and that this might go on until a negative originally too dense became very flat.

Mr. HOLLYER had never found that acid produced any difference in negatives developed with ferrous oxalate.

Mr. W. BEDFORD added that he had not found any reducing power when negatives had been developed with hydroquinone.

Mr. MACKIE had visited works where development of bromide prints was carried on on a large scale, and the chief operator had told him and shown him

by experiment that a ferrous-oxalate developed print was considerably reduced if placed in the hypo before the acid was well washed out of it. With a pyro-developed negative there was a reduction of intensity when treated with acid, owing to the colour being changed.

Mr. J. DESIRE ENGLAND inquired how it was that a yellow stain that was removed by acid returned after washing.

Mr. MACKIE believed that the compound forming the yellow stain was not removed by acid, but only changed in colour, and that it regained its original colour when the acid was all removed.

With reference to eikonogen development and the strong formula for its use introduced by Mr. Warnerke, some of the members spoke highly, but Mr. Cowan said that he thought there was no advantage in using more than five or six grains of eikonogen to the ounce.

The CHAIRMAN could not get density with eikonogen, but he had found it very useful in practice to begin developing with that substance, and when the details were out, to add hydroquinone solution, by which means density and a fine quality of image were obtained.

Mr. MACKIE had found that hydroquinone had a very great tendency to start chemical fog in a particular place, and to cause the plate to acquire density there before the rest of the picture was properly out.

Mr. CHAPMAN JONES had never liked hydroquinone; it always gave him more stains than any other developer.

Mr. COWAN, referring to the large proportion of sulphite of soda and Rochelle salt used in connection with eikonogen in the American formula, said that the mixture was just as good for eikonogen and for hydroquinone as for pyro.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 23.—Mr. A. Haddon in the chair.

Mr. F. P. CRESWELL showed a binder for lantern slides, made of thin sheet metal, and resembling the "processes" formerly in use for glass positives. He then said that he had made a few experiments with developers in the same direction as those described by Mr. Cowan at the previous meeting. He had developed four hand-camera plates with mixtures, the first containing pyro, sulphite, and ammonia; the second, eikonogen; the third, pyro, Rochelle salt, and sulphite; and the fourth, with a developer called Anglo, which appeared to be the same as eikonogen under another name. The results were passed round, and the general opinion was that the pyro and ammonia plate was rather the richest of the set. Having found that eikonogen was particularly useful in bringing out under-exposed negatives, he had made another series with the hand-camera and a smaller stop. The first plate was developed with pyro and soda, and the others with the same eikonogen, Anglo, and Rochelle salt mixtures as before. This time the eikonogen plate had a decided advantage over that developed with pyro and soda, and therefore, he inferred that whilst eikonogen had no effect in apparently exposing to ordinary users, it did bring up an under-exposed image better. His experiments did not corroborate Mr. Cowan's as to speed of development. He could not develop either a slow or quick plate in the same time with Rochelle salt as with the ordinary developer.

Mr. W. E. DEBENHAM said that it did not seem natural that pyro should bring up faint details better than eikonogen in a properly exposed plate, but that eikonogen should reverse this state of things with an under-exposed plate. Perhaps the apparent anomaly was due to the different composition of the pyro developer in the two cases, ammonia having been used with the first and soda with the second set.

Mr. W. H. PENNETHORNE said that in his experiments with eikonogen against pyro he had used uranic potash, or soda with both agents. He thought eikonogen had slightly the advantage.

The CHAIRMAN thought that Mr. Creswell's second set of experiments showed an advantage for eikonogen in the case of under-exposed negatives, whilst for those of normal exposure he thought there was also an advantage in detail in the lights due to the transparency of the deposit.

Mr. CRESWELL said that if one were opposed with eikonogen the image lacked very much, but it always gave a fair result.

Mr. F. EVERETT said that there was an extraordinary difference between Mr. Warnerke's manifestoes and those of Mr. Cowan. He thought it was not fair to put one developer against another when using equal parts of the ingredients. The best formula for each developer should be ascertained and then they might be compared.

Mr. [illegible] then read a paper on *Selecting Focal Distances with Detective Cameras* (see page 77).

Mr. CRESWELL did not like the use of the word "detective" as applied to cameras; he preferred to call it a hand camera. The word detective suggested something not above board. As to the length of focus for lenses for hand cameras, if one went in, as most people did, for general work, a compromise should be adopted. For the greater part of his work he used rather a long-focussed lens, one of about six and a half inch focal length; for architectural work, however, he could not get far enough away with this lens, and the same difficulty occurred if photographing a place that was at all crowded. He had been out with a friend who got better work than he had himself obtained, from the fact of his using a lens of shorter focus. On the other hand, distant subjects came out better with a long-focussed lens; it was also useful in getting such subjects as large and feeds of a better size than they would be if taken with a lens of short focus, when one would have to go very near, which was often impracticable. Another point was whether the picture was wanted for enlargement or for lantern slides; in either case a lens of four inch focus was preferable. He thought that he should go in for a lens of five or five and a half inch focus instead of the one of six and a half inch that he had used; many of his pictures he found came too big.

Mr. W. COWAN agreed that the use of the word detective was objectionable. If the public got the idea that they were liable to be snapped up under unfavourable or undignified aspects, as a writer in one of the annuals appeared to object to having done, or if the idea got about, as was suggested in one of the society papers, that a good deal of blackmailing was done with detective cameras, it would be the worse for photographers doing legitimate hand camera work. He suggested also that two lenses of different foci should be carried, with a ready means for changing them.

The CHAIRMAN said that the construction of the camera would be very complicated if it carried two lenses with a changing arrangement.

Mr. PRESTWICH said that the great point with makers of hand cameras had been to reduce size and weight, but he thought that difficulties would be overcome by the use of a larger plate. If one could choose one's distance, would it not be better to use a long-focus lens and get farther off?

Mr. DEBENHAM assumed that the standpoint was the same with any lens and the size of the plate proportioned to the focus. In this case every optical advantage was in favour of the lens of shorter focus.

Mr. EVERETT said that the centre of the picture was said to be the weakest part of it, would it not be better, therefore, when using a lens of round field, say one which at a certain part of the plate (where it was desirable to have the principal object) required to be racked in one-sixteenth of an inch compared with its focus at the centre, to focus beforehand for that part of the field rather than for the centre?

Mr. DEBENHAM replied that if focussed at that part of the field for distant objects, near objects there and all objects near the centre would be out of focus; whilst if focussed for distant objects in the centre, a nearer object, at what Mr. Everett considered the strongest part of the picture, might come into focus at the same time. This was one of the points that he had especially wished to make plain in the paper. Of what length of focus was the lens Mr. Everett had in his mind when asking the question?

Mr. EVERETT replied that it might be a lens of five-inch focus.

Mr. DEBENHAM continued, that the distance, one-sixteenth of an inch, assumed to be required for adjustment owing to curvature of field, was the one-eightieth part of the focal length. The distance, therefore, at which an object would come into focus when the lens was focussed for the centre would be 80 × 5 feet, or four hundred and five inches, or about thirty-four feet.

The CHAIRMAN, in moving the usual vote of thanks, said that the discussion had enabled Mr. Debenham to emphasise the points which he wished to bring out in the paper, which was a very useful one, as showing how to take advantage of conditions which occurred in practice.

CAMERA CLUB.

ON Thursday, January 23, Rev. T. Perkins, M.A., read a paper on *English Church Architecture as a Subject for Photography*. Rev. A. B. Whatton, M.A., occupied the chair.

The lecturer commenced by pointing out that all could not be artists, but suggested that in church architecture work the photographer might, by proper choice of point of view, turn out results which would merit being called pictures. He considered that there was a large class of work possible between the purely scientific and the artistic. He then proceeded to give an admirable [illegible] history of ecclesiastical architecture, and concluded by illustrating, by means of a large number of his own lantern slides, the changes and development in the styles of the different periods. A large proportion of the photographs were of Somerset churches, Mr. Perkins's pictures of, and remarks upon, the various beautiful towers being especially interesting. In addition to the lantern illustrations, Mr. Perkins handed round an album of prints bearing upon the subject of which he treated.

In the discussion, the CHAIRMAN referred to the great scope offered by such work as Mr. Perkins had undertaken, and he mentioned some of the good effects likely to flow from the prosecution of the study of church architecture in connection with the use of the camera.

Mr. J. GALE complimented the lecturer upon his inclusive and interesting summary of the characteristics of church architecture in successive periods. He remarked that very few churches were produced from the time of Henry VIII. to about the time of Wren, and referred to some points of resemblance between the towers of Somerset churches, as shown by Mr. Perkins's pictures, and some he had studied in Brittany.

Mr. J. S. WHATTON alluded to some matters not touched upon by the lecturer, and especially the subject of old wooden churches. He believed there were some where in the eastern suburban district of London, the name and situation of which he should much like to discover.

Mr. A. ENT remarked that this was Greenstead Church, near Ongar.

Mr. G. DAVISON urged that all photographers of a practical bent should devote themselves to some connected work with a definite aim, as Mr. Perkins had done; but he maintained that such work, admirable in itself, led in quite a different direction from that in which the art student would find his development and pursuits his study. In regard to the City churches which had been mentioned, he drew attention to the good work done by Mr. S. H. B. Salmon, of East Putney. In treating of the practical points raised, he stated that a lens of focal length equal to the longest side of the plate used would not give a natural angle, the perspective would be unnaturally violent.

A hearty vote of thanks to Mr. Perkins concluded the proceedings.

On Thursday, February 6, the lantern will be employed to exhibit some Dutch views by Messrs. Elder, W. A. Greene, and others; and some general subjects will also be shown.

WEST LONDON PHOTOGRAPHIC SOCIETY.

JANUARY 24.—Mr. Charles Bilton (President) in the chair.

The adjourned discussion upon *Hand Cameras* was proceeded with. Mr STEIN, in summing up his previous remarks, said a perfect detective camera must be unobtrusive in appearance, have some mechanical means of changing plates, and at the same time be as simple as possible; the shutter must also be a good one, and work without jar or shake. In regard to the lens, he preferred one of short focus. With a six-inch lens everything beyond thirty feet was in focus, but it was often necessary to get nearer to the object, and with a three-inch lens everything beyond eight feet was practically sharp. He used in his

detective a three and a quarter inch wide-angle lens by Wray, and found it worked well.

Mr. LESLEY SELBY, in explaining the artist's hand camera, said that it could scarcely be called a detective, because it was not what Mr. Stein had called unobtrusive; however, all he wished to do with it was to get views, and for that it answered admirably, as it could be very easily and quickly manipulated; moreover, it was light, though strong, and would stand a lot of rough usage. He had taken it up Scafell Pike without experiencing any fatigue.

The following question was then read:—"Will the Secretary's arrangements allow any facility for discussion by the members upon the recent exhibition, the Society not having any journal, that is the only way in which the members can express their opinion?"

After some discussion it was agreed that the Secretary should convene a special meeting and notify the members the date thereof.

The PRESIDENT said he had just been informed by the Secretary that two members of the Council, Mr. Wyndham Rickford and Mr. Garner Richardson, had presented the Society with a lantern and screen, with accessories for using the limelight.

Thanks having been accorded the donors, the lantern was put into operation and found to work admirably. The slides shown being those sent in for competition were of great excellence, some flash-light views of the exhibition taken by Mr. S. T. Chang being much admired.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JANUARY 21,—Mr. J. Douglas in the chair.

The SECRETARY informed the members as to the arrangements that had been made for the *conversazione* on March 4 at Northampton House, and stated that the Ilford Company had promised the loan of some lantern slides, also pictures for exhibition; in addition to which they would give a demonstration on *Bromide and Alpha Paper Printing* on February 18.

Mr. L. Medland exhibited an ordinary brass taper holder, which, by pinching one end nearly flat, he used for burning magnesium ribbon for lantern slides, &c.

It was thought by the members to be a most simple and useful instrument, as by its means any length of ribbon, from half an inch to a foot, could be exactly measured.

Mr. A. MACKIE then proceeded to give a demonstration on *The Manufacture and Uses of Collodiobromide Emulsion for Lantern Slides*. He said he would commence by making a lantern slide with some emulsion of his own manufacture. This was done most successfully, the different steps of cleaning the glass, pouring on the emulsion in the same manner as collodion was poured on in the wet process, the exposure of the plate to about half an inch to an inch of magnesium ribbon, the development, fixing, drying, and mounting of the slide being described at each stage. The lantern was then lighted and the slide thrown on the screen. The result was perfect and the slide of a beautiful colour. The whole process, from beginning to end, occupied less than ten minutes. Mr. Mackie then proceeded to make an emulsion, showing and describing each detail. He had brought with him about three ounces of collodion made according to the following formula:—Twenty-four grains of pyroxyline (that kind known as high temperature); one ounce of methylated alcohol of the highest strength; and one ounce of methylated ether, really good. About three to three and a half times these quantities will be required to produce sufficient clear liquid. He said when this was first made it must be well shaken, then put away for a day or so to allow the insoluble particles to sink to the bottom, then decant five ounces of the clear liquid. He said the articles required for making the emulsion were some ammonium bromide freshly made, some methylated alcohol, some nitrate of silver, and some nitric acid. Weigh out sixty-five grains of ammonium-bromide and dissolve in a test tube by heat with the smallest quantity of water, then add six drachms of methylated alcohol; pour this bromide solution to the five ounces of collodion by degrees, shaking vigorously at each addition. We then have a bromised collodion which requires sensitising, and all subsequent operations must be performed in the dark room. Dissolve one hundred grains of nitrate of silver in one hundred minims of water by heat in a test tube, then add three minims of nitric acid; add this little by little to the bromised collodion, shaking between each addition. At this stage, if a little of the emulsion is poured on a clean glass and the glass held up to the light, if the operations have been successful, the colour seen through the emulsion should be a bright ruby. Wrap the bottle containing the emulsion in brown paper and put aside in a dark place for twelve to twenty-four hours, then pour into a clean dish (an ordinary pie dish will do), cover the dish up and put it into a convenient place for the ether and alcohol to evaporate. Mr. Mackie stated that his custom was to place the dish in an ordinary rough box in the dark room, covering it to exclude the light, then to place the box in the open air for the solvents to evaporate. When the emulsion has set so that a pellicle remains of about the consistency of leather it must be thoroughly washed. This is best done by cutting the pellicle into small pieces and putting it into a vessel, covering it with water, which must be constantly changed for about twelve hours, or put it into a dish and let the tap run on it for the same time. The pellicle must now be dried, and it is important to get out all the water. This may be done by first wrapping the emulsion in a piece of clean linen and squeezing it in an ordinary lemon squeezer; the remainder of the water may be abstracted by leaving it for three days in a jar, covering it with methylated alcohol, which must be changed three times. The emulsion is now dried again between linen, and redissolved in four ounces of methylated alcohol and four ounces of methylated spirit. Now bend a piece of notepaper into the shape of a cone, place a tuft of cotton wool lightly in the apex, moisten the wool with a little ether, and filter the emulsion through the wool. It is now ready for use. This emulsion, if kept from the light, will keep indefinitely. To prepare the glasses for coating, cleanse them first with water and then with a dilute solution of nitric acid, and polish. To prevent frilling during development, either edge the plates before coating with a little indiarubber dissolved in benzole or rub the plates with a little French chalk on a clean piece of rag, dusting off all superfluous powder. The coating must be done in the dark room, which should be free from dust, flow the emulsion on the plate as in the ordinary way with wet collodion, then stow the plates away in a suitable box to dry, standing each plate on end, and not too close together, or they may be dried by artificial heat. (Mr. Medland stated that he dried his on an ordinary hot-water plate.) They dry quickly. The surplus emulsion while coating the plates should be poured into a separate bottle and filtered again before use. When it becomes too thick it can be diluted with ether. The exposure required for a negative of ordinary density will be about correct if one inch of magnesium ribbon is burnt at a distance of two feet from the printing frame. The following developers may be used:—Fifteen grains of sub-carbonate of potash, two and a half grains of bromide of potassium, four grains of pyrogallic acid, and sixteen grains of sodium sulphite, to each ounce of water; or, two grains of bromide of potassium, three minims of liquid ammonia, four grains of pyro, and sixteen grains of soda sulphite, to each ounce of water. Flow some methylated spirit over the plate before commencing to develop, and wash under the tap till the greasy appearance has disappeared. Hold the plate by one corner in the hand during development, as the image comes up very rapidly and the density can only be judged by transmitted light. The plate fixes very rapidly in the ordinary hypo bath, and requires only a short washing under the tap, and can be dried in a few minutes, if necessary, by heat. Great care must be taken in placing the plate in contact with the negative in the printing frame and in removing it. The plate and negative must not be slid over each other in the slightest, as the film differs from the ordinary gelatine film in being very tender.

Many questions were then asked of the lecturer, which were most courteously responded to.

Mr. Mackie concluded by showing a number of beautiful transparencies made by this process on the screen, all of which were of a most pleasing tone, and it was generally agreed that the results were far superior to what most members had been enabled to obtain on ordinary gelatine plates.

A hearty vote of thanks was accorded to Mr. Mackie for his able and instructive lecture.

The next meeting will be on Tuesday, February 4, when Mr. Medland will lecture on *A Day at the Zoological Gardens*, illustrated by about two hundred slides. Mr. Mackie will take the chair.

Members are requested not to forget to send in their pictures for exhibition at least a week before the *conversazione* on March 4.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

ON Monday, January 27, MR. L. MEDLAND gave a lecture entitled *In Northern Latitudes with a Camera*, illustrated by lantern slides made by himself from negatives taken during his tour.

The following gentlemen have been elected honorary members:—Messrs. S. Herbert Fry, Charles W. Hastings, and E. F. C. Damant, the late secretary and promoter of the club.

The following gentlemen were elected officers for the ensuing year:—*President:* Mr. J. Humphries, F.S.A.—*Vice-Presidents:* Messrs. H. Beckett and W. T. Goodhew.—*Council:* Messrs. C. Beadle, F. Cherry, T. C. Lathbridge, W. A. Lavanchy, F. L. Pither, J. Saville, J. Steuart, H. Walker, E. T. Hiscock.—*Curator:* F. Davall.—*Treasurer:* E. Seymour Paul.—*Hon. Sec.:* George R. Martin, Harringay Park Granary, Green Lanes, Finsbury Park.

On Monday, February 10, Mr. Humphries will open a discussion on *Dark-room Illumination*, and illustrate by several practical tests. Any gentlemen having lamps which they consider especially safe, while giving a maximum of light, are invited to bring the same for the purpose of experiment.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

ORDINARY meeting held at the Club Rooms, Grand Hotel, January 23, Mr. E. H. Jaques (Vice-President) in the chair.

The CHAIRMAN announced that the President, Mr. J. B. Stone, J.P., had offered a prize for the best set of six views taken within a radius of ten miles round Birmingham.

Mr. Godfree exhibited a very handy bichromate battery for producing an electric light suitable for developing by.

Dr. W. W. J. NICOL, D.Sc., then gave his paper on *Iron Printing*, which was illustrated with interesting chemical experiments. Mention was made of the different forms of iron printing, the blue and dusting-on processes, sepia-type, platinotype, and particularly his new process, the "kalotype." This is as follows:—The paper is coated with—

Ferric oxalate	5 per cent.
Ferric tartrate	5 ,,

and, on exposure, the ferric salt is reduced to ferrous salt, and is then developed with—

Potassic oxalate	10 per cent.
Nitrate of silver	1½ to 2 per cent.
Ammonia	Sufficient to clear.

The print is developed by *floating*, the same as in platinotype. It is then washed in three baths of—

Ammonia	1 ounce.
Citrate of soda	½ ,,
Water	1 gallon.

Specimen prints were distributed and were much admired. A great advantage of this process is fixing without hypo, thus securing greater permanence.

NEW YORK CAMERA CLUB.

THE first annual meeting of the New York Camera Club was held on Wednesday, January 8, 1890.

The reports of the different officers were read, and that of the Trustees regarding the condition of the club was very gratifying.

On suggestion of the Trustees a change was made in the bye-laws, allowing members of other incorporated photographic societies to become members of the Club without paying the initiation fee.

The following members were elected to serve this year:—*President:* Mr. David Williams.—*Executive Committee:* Dr. H. G. Piffard, and Messrs. W. J. Clossard and W. Townsend Colburn.—*Trustees:* Dr. E. P. Fowler, Messrs. Pach, Manning, H. J. Harder, Bergh, C. Volney King, and Franklin Harper.—*Treasurer:* Dr. Robert J. Dering.—*Secretary:* Mr. H. T. Dutfield.

A vote of thanks for the efficient and courteous manner in which he discharged the duties of his office was unanimously given to the outgoing President, Mr. W. Townsend Colburn.

On Friday, January 10, Professor ROMEYN HITCHCOCK, of the Smithsonian Institute, and formerly a member of the Japanese Imperial Board of Education, gave, at the Rooms of the Club, a lecture on Japan, illustrated by the optical lantern. Some of the slides were of scenes that had never before been photographed—in fact, several of them had never been seen before by a foreigner. The lecture was exceedingly interesting, and was listened to with pleasure and attention by an audience of ladies and gentlemen which completely filled the Rooms.

Dr. H. G. PIFFARD, a member of this Club, has proven that ammonia can be used as the alkali in the silver-gun developer, and that it works beautifully. A number of the members are using his formula, which is as follows:—

Boiling distilled water	1 quart.
Sulphite of soda, crystals	2 ounces avoir.
Hydrogen, crystals	1 "
Bromide of potassium	8 grams.

To one ounce of above solution add from one to two drops of liquid ammonia, but the latter quantity should only be used in case of decidedly under-exposure. From one to one and a half drops will be sufficient for a properly exposed plate.

Dr. PIFFARD says, "Instead of ammonia, from one half to one drachm of a ten-per-cent solution of pot-ammonia may be employed. With this latter a little more density can be obtained than with the ammonia. In developing with ammonia it is well to carry the density considerably beyond the point that we would consider proper with pyro or ferrous oxalate, as the plate appears to lose more in fixing than with the other developers, and after it is dried and dried its printing density is not as great as that of a pyro negative of apparently the same strength. Should an exposure negative prove too weak when finished, it responds very perfectly to the usual mercurial intensifier."

MYSTIC CAMERA CLUB, MEDFORD (MASS.).

THE annual meeting of officers of the Mystic Camera Club of Medford took place on Tuesday evening, January 7, when the following officers were elected for the ensuing year:—*President*, George E. Davenport; *Vice-President*, A. F. Bradford;—*Executive Committee*, Messrs. George E. Davenport, A. F. Bradford, George L. Stone, E. H. Russell, E. D. Brooks, and L. Cochrane;—*Secretary and Treasurer*, George L. Stone; *Assistant-secretary*, Arthur Cochrane. Arrangements are being made by the Club for a public exhibition of photographs of the past season's work of the members.

Correspondence with Boston clubs solicited.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

SOURCES OF UNEVEN DEVELOPMENT.

To the EDITOR.

SIR,—I have never seen in any of the books any warning against lifting the plate out of the developer and holding it up to the lamp with the fingers, but I am sure it is a frequent source of failure. One reason is that impurities, often greasy, get on to the edge of the plate and affect development. Another is that the edge is thereby warmed, and, rather oddly, development retarded. Some people have much hotter hands than others, and so cause more mischief. In four individuals holding the bulb of a glass thermometer I find the following variations:—1. 80° Fahr.; 2. 84° Fahr.; 3. 85° Fahr.; 4. 75° Fahr. No. 1 tells me that he has been for years troubled with markings and irregular bands at the edge of his plates, and has always attributed them to defects in his slides, and is quite pleased to get a new light thrown on the subject.

The remedy is not far to seek. There are plate lifters sold, but the bearing surface is too small, and makes a hole in the gelatine; if the clip were made larger they would be very useful. But if the developing dish is clear glass, when it is necessary to ascertain density the developer can be poured off, and if the light is placed low the negative can be examined by looking through it and the glass bottom of the dish at the same time.—I am, yours, &c.,

DEAL.

PATENTS.

To the EDITOR.

SIR,—I am very glad to see the letters respecting patents in the current number (January 17), for these patents and patentees are a perfect pest. Half these latter-day amateurs seem to think that there have been no brains brought to bear on photographic apparatus until their advent, and that if they bend their intellect to its consideration they can very soon get a valuable patent. I am not an amateur of long standing, but I am not conceited enough to suppose that I can give those who have been connected with photography a quarter of a century or so a start, and then to beat them.

My private opinion is that few of the patents now held for photographic apparatus could sustain a searching investigation. I myself know of two which have received some attention during the last year or two as novelties, and both of them I can show to have been anticipated, should they crop up in these columns.

Quite recently I thought it would be a convenience to have a turntable fixed in the tailboard of my camera. On my applying to a camera maker he declined to have anything to do with it, as it was covered by a patent. I had the same answer from two others, one of whom had been served with a terrible notice, warning him from infringing ——'s patent. Surely a simple contrivance like this has been described before 1884. If not, I shall do without it rather than pay the stiff price required by the patentee.—I am, yours, &c.,

CHARLES ELLIOTT.

"*The Hollies*," *Solihull, January* 23, 1890.

PHOTOGRAPHY AS AN ART.

To the EDITOR.

SIR,—Now that the dispute between amateurs and photographers has subsided for a time, I beg to offer a remark or two as between the parties.

I would say, then, that it matters little whether a man is a professional photographer or amateur; if either produce artistic work, that one is an artist.

I suppose there is nothing that has been so much misused and abused as photography. It has been the last resort of the butler, the schoolmaster, the carpenter, and the ne'er-do-well. Strictly speaking, artists have too often ignored it; since they have delighted in it, it has brought forth abundant good fruit.

I look upon the camera and lenses as mere instruments to produce the highest or the lowest results. To an artist, he would never think of bothering his head about chemicals; they are all ready to his hands if he goes to the best market for the article he wants. And of one thing I am certain (considering this)—the more there is of the true *artist* the higher class his work will be.

As a photographer of thirty-five years, and brought up as an artist, one of the principal things I had to deplore was, and now is, the want of permanence and its very fugitive character.

If the "Photographic Chemist" wishes to confer a boon to the art, let him set his wits to work to discover a substitute for hypo. This useful but most destructive article has been the curse of photography, and ever will be.

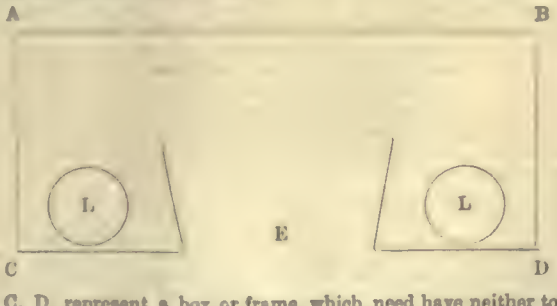
So let us for the future drop jangling, produce artistic work, and the "Photographic Chemist" do *his* part by removing this blot in *his* department.—I am, yours, &c.,

AN ARTIST PHOTOGRAPHER.

A COPYING CHAMBER.

To the EDITOR.

SIR,—I do not know anything of the illuminating chamber about which Mr. T. N. Armstrong writes, but I am strongly reminded of the old "cosmoramic" chamber which used to be such a feature of old Polytechnic days, and also of the optical arrangement known as the "Aphengescope," which is closely akin thereto. A simple application of the old idea, which has been found useful for copying purposes, may easily be constructed as follows:—



A, B, C, D, represent a box or frame, which need have neither top nor bottom, and may be made of any convenient size; E is an opening in the front, having the borders returned inwards to screen the direct light from passing outwards; L, L are the sources of light, which may be gas-burners, paraffin lamps, electric or oxyhydrogen lights, or whatever may be convenient. The box is lined with white paper, or painted white, in order that no more light may be lost than necessary, and the picture to be copied is fastened to the back, the camera being placed opposite the

front opening. If the opening be closed by a door with a long-focus lens inserted in it, an image of the object may be projected in well-known fashion on a screen in front; or a transparency placed in the opening, and screened from surrounding light, is in a favourable position for being either viewed or copied.

When copying a picture of large size the arrangement may be made by a couple of folding screens, or a pair of domestic clothes-horses, with white paper or folded sheets (at least double) to reflect the light.

There is one point in Mr. Armstrong's curren. article which arouses curiosity: When two Argand burners are giving their maximum of light—*i.e.*, doing their best—how can increasing the pressure of one by turning down the other make the increased one do better? Every one who has studied lighting knows that every burner, whether oil or gas, has its best point—that at which it gives its best light—which is its maximum power, and any variation of pressure, of ventilation, or of wick, from this point means diminution of light by imperfect combustion.—I am, yours, &c., AN OLD HAND.

January 28, 1890.

CAMERA CLUB CONFERENCE.

To the EDITOR.

SIR,—I am requested by my Committee to ask your assistance in announcing the following outline of the Camera Club Conference for 1890:—

The 1890 Conference will be held in the theatre of the Society of Arts (by kind permission of the Council) on Thursday and Friday, March 20 and 21, under the presidency of Captain W. de W. Abney, C.B., R.E., F.R.S.

On Wednesday, March 19, at 8.30 p.m., there will be a special smoking concert at the Club Rooms, and the members' Annual Exhibition of Pictures will be opened.

On Thursday, March 20, at 2 p.m., the President will open the Conference and Exhibition of Apparatus at the Society of Arts, and papers will be read from 2 to 5.30 p.m. In the evening a lantern-slide exhibition will be given in the theatre of the Society of Arts, for which special tickets may be obtained.

On Friday, March 21, the apparatus will be on show from 10 a.m., and at 2 p.m. the Conference will be renewed. At 7.30 the annual dinner for members and friends will take place.

A complete programme will be issued later and distributed. All photographers will be cordially invited to the Conference.—I am, yours, &c.,

GEORGE DAVISON, *Hon. Secretary.*

EXHIBITIONS IN GENERAL, AND THE BIRMINGHAM EXHIBITION IN PARTICULAR.

To the EDITOR.

SIR,—A visit to the Exhibition of the Birmingham Photographic Society has suggested some considerations to which it may perhaps be well to call attention, especially as I venture to think that they are applicable to most exhibitions of the same kind, of the general character of which the Birmingham Exhibition may probably be taken to be fairly representative.

The matters that struck me were (1) the absurdity of the classification of the various kinds of work shown; (2) the low average standard of the work; and (3) the perversity with which, in some instances, the medals and prizes had been awarded to works which, according to any rational standard, were inferior to many others in the same class which were not distinguished even by an honourable mention.

The classification was partly according to subject (landscape, *genre*, &c.), and partly according to method (prints from film or paper negatives, developed contact prints, prints on Obernetter or Aristotype paper, landscapes on albumenised Obernetter or Aristotype paper, &c.). The former system of classification, with the addition of a class for lantern slides, seems right enough, but the latter does not appear to serve any useful purpose. An unnecessary multiplication of classes is mischievous, and the double system of classification leads to this absurdity, that in Class A an exhibitor is restricted as to subject but not method, while in Class B he is restricted as to method but not subject. It is, of course, desirable to encourage various processes, but this encouragement is amply secured by the freedom which each has in the subject classes to adopt the process he thinks best.

The low average standard of the work is due partly to the selection of uninteresting and commonplace subjects, and partly to faults of manipulation. Many of the exhibitors appear to have no adequate idea of what a good photograph ought to be. Anything serves for a subject, and all principles of composition are ignored. The prevailing fault of manipulation is, of course, under-exposure, with the result that the photograph is frequently a dull and dismal mass of murkiness relieved by a few patches of light; that a photograph should be a thing of *light* and shade and not of shade merely; that it should have the fullest possible range of gradation, from the extreme dark in only a few points to the extreme light; that the shadows should be transparent, and that even in the lighter parts there should be gradation—seems to be a thing unknown. In many cases the shadows, and even in some parts of a landscape which must have been fairly illuminated appear as blotches of soot darkness in which all detail is lost, and the highest lights are mere blurs of white. The remedy is, of course, longer exposure with careful and proper development. Amateurs should bear in mind the advice given by Captain Abney and others, not to deem it the sign of a good photographer to take a picture in a fraction of a second. It is the simplest possible operation to "snap" a shutter and afterwards immerse the exposed plate in some regulation developing mixture, but often the result is not worth even the small amount of trouble it has cost. There are many instantaneous subjects on which skill and trouble can be expended with advantage, as, for example, seapieces, animals, &c.; but why vulgarise the seashore by setting lads to play leap-frog, or "slither" down a sandhill, in order that they may be taken in the act; or why photograph a moving railway train, which no one would think of taking when it is still?

There are, it is true, some works against which the fault of under-exposure cannot be alleged, but in these for the most part no regulation of the development has been attempted, and they consequently have the appearance of scenes taken in a thick November fog. Many of the foggy and muddy-looking pictures are platinotypes, and it must vex the soul of Mr. Willis to see some of the work that is presented to the public under the name of his beautiful process. I cannot help thinking, however, that the Platinotype Company are somewhat to blame in the matter. I imagine that most amateurs buy their paper ready sensitised, and I believe that the paper sent out is of one uniform quality as to sensitiveness, at any rate for the black prints. It is unquestionable, I think, that this fails to do justice to a good many negatives, and it is much to be desired that two or more qualities of paper should be supplied, including some which would give a greater range of gradation with a comparatively thin negative. The defect could, however, easily be remedied if photographers would procure the sensitising materials and would take the trouble to master the theory of platinum printing, and then it might even in time be discovered that a platinum print is not necessarily black or neutral grey, but that it may be of any shade of brown, or purple, or warm black.

As to the judging, it would be useless to attempt to criticise it in detail. The decision of the Judge is final, however ridiculous it may be; but unfortunately when it is ridiculous it is also mischievous, as it sets up a wrong standard, and beginners naturally aim at following, so far as they can, the example to which has been awarded a medal or a prize. Why any one should want a medal or a prize is not very intelligible to me, but so long as the prize system is maintained, it seems to me that some reforms might well be introduced. What I would suggest is, that a certain number of pictures in each class—not exceeding twenty or twenty-five per cent. of the whole number in the class—should be selected as the best, and that in the case of each prize picture—which would, of course, be among the selected ones—the Judges should, in making their award, specify the special merits of the picture which had, in their judgment, entitled it to a preference. This would be a very considerable safeguard against caprice. If the merits of a selected picture had to be stated, it would *primâ facie* seem necessary that the picture should, at least, have some merits, and this is not always the case under the present system. The awards would, moreover, be likely to command more respect if there were two or more Judges in each class.—I am, yours, &c,

J. R. H.

[We know the Judges, individually and collectively, sufficiently well to feel that, in making their awards, they knew what they were about, and we have faith in the *bonâ fides* of their verdict.—ED.]

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

To the EDITOR.

SIR,—The Committee beg to call your attention to the accompanying report of the future policy of the Photographers' Benevolent Association, and would feel exceedingly obliged if you will kindly insert it in your next issue.—I am, yours, &c., H. HARLAND, *Secretary.*

181, *Aldersgate-street, E.C., January* 25, 1890.

P.S.—A copy of the proposed new rules may be seen at the office of Mr. W. Benham, Hon. Solicitor to the Association, at 4, Great James-street, W.C.

Your Committee, in submitting their report for the past year, consider that it is desirable on the present occasion to give something more than the customary abstract of receipts and expenditure. It would be idle to contend that the Association has, at any period of its existence, completely fulfilled its mission, and the problem which has at several previous epochs of its history confronted its management, has, during the past year, again presented itself and appealed for solution.

It will be within the knowledge of all but recent members that in 1885 the roll of membership had become reduced to such meagre dimensions that the Association became unworkable under the then existing system, and it was thereupon resolved to reduce the subscription to 2*s.* 6*d.* per annum, with a view to encourage the poorer members of the profession to join the Association. At the end of the following year the number of members had certainly increased, but the greater part of the increase consisted of persons who would never be likely to require assistance from the funds. At the annual meeting in 1887, two notable alterations were made in the rules:—Amateurs were

allowed to become members, and the Committee was empowered to consider applications from non-members if the case had been recommended by a donor of 1*l.* 1*s.* Under the new conditions the number of members rapidly increased, but a vast majority of the increase consisted of amateurs, who were never likely to require aid, even if they were eligible to receive it; the class which the Association was designed to benefit still held aloof, and practically ignored its existence. One of the chief difficulties your Committee has to contend with is the fact that the good effected through the Association is of necessity very little known, those who receive benefit being, perhaps naturally, the last to talk about it; many recently acquired members seem to have taken a mere passing interest in our benevolent aims, and have suffered their subscriptions to fall into arrear, or perhaps have never really looked upon themselves as permanent subscribers at all. Owing to these circumstances the success of the Association has been materially hindered; and, although it will be recognised that this is no new difficulty, **one of the first points your Committee had to determine was** whether it was worth while for the sake of a score of members who practically constitute the Association to carry it on almost solely for their benefit! They have come to the conclusion that something more than this is expected from them, and that they should rather seek for powers to enable them to extend its scope and sphere of beneficence still further in the direction of such as have not hitherto been in a position to contribute to the funds. The old members, who have all been consulted on this point, are quite willing, for the general good, to sink their individual claims, and your Committee have now formulated a new set of rules, embodying the principle on which they propose that the Association should in future be conducted. Thus, while reserving to old members a preferential claim on the funds, will afford a larger discretion in administering assistance to any deserving cases of distress, irrespective of membership, and will consequently give your Committee a better standpoint when appealing for funds for the general purposes of the Association. The serious attempt now for the first time made to initiate an independent Annuity Fund will be kept prominently in view, and it is with some confidence anticipated that it will before long very largely exceed the sum of 200*l.*, at which the new scheme will start it.

It has, from time to time, been brought as a reproach against the Association that the expenses of management have been too heavy in comparison with the amount expended in relief. Your Committee fully recognise the justice of this contention, and it has several times been considered whether the work might not be efficiently performed by an hon. secretary; but while they could report upon retaining the services of Mr. Harland, whose energy and experience have been of material service to them in the past, they have not thought it expedient to recommend so radical a change. Mr. Harland has, however, now seen fit to resign his office, and in response to an appeal which was thereupon inserted in the photographic papers, a gentleman has come forward and tendered his services as Hon. Secretary to the Association, and your Committee have without hesitation accepted his generous offer. They confidently trust that a new era in the affairs of the Association, marked by economy as well as efficiency of administration, will thus be ushered in, and they hope that the time is not far distant when the Association will take its proper position as the recognised channel for the benevolence of the profession.

Referring to the balance-sheet for the past year, it will be seen that the funds show the substantial increase of 67*l.* 5*s.* 1*d.*, and now stand at 1,704 12*s.* 11*d.* Members' subscriptions show a considerable falling off, being 206 16*s.* compared with 308 11*s.* for 1888; this has been already alluded to. **The donations amount to 71*l.* 18*s.* 5*d.*, fully 10*l.* more than in 1888, but of this** sum 50*l.* 10*s.* 11*d.* was transferred from the abandoned Orphans' Fund. The Publications of the Photographic Society of Great Britain produced 12*l.* 5*s.* 0*d.* against 14*l.* 3*s.* in 1888. The grants by way of relief, which in 1888 amounted to 98*l.* 14*s.*, during the year under review amount only to 18*l.* 4*s.*, and this is **the fact which has given your Committee most reason for proposing to reconsider the position of the Association, with a view to extending its sphere of usefulness, and the result of the long and anxious consideration they have given to the subject has been embodied in the new draft of rules which they now intend to submit for your approval.**

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange a first-class safety bicycle, ball bearings throughout, including pedals, in perfect condition, for a good portrait or view lens.—Address, G. A., 96, Lonsdale-street, Hulme, Manchester.

Will exchange one interior, one exterior (one circular plain) flatted oil backgrounds, and one to extend and protect 1, for 5×4 rapid rectilinear lens.—Address, H. M., 4a, Ashfield-road, Stockwell, S.W.

Hand exchange a valuable kit of carpenter's tools for a modern half-plate (or larger) photographic set or a large-size portrait or doublet lens.—Address, Watchman, 1, Highstreet, Shanklin, Isle of Wight.

Burton's *Photographic and Photo-mechanical Printing* in exchange for recent work on chemistry or chemical analysis of approximate value.—Address, H. C. Parlow, 16, Victoria-street, King Edward-road, Hackney.

Will exchange Optimus detective camera, with Euryscope lens and six double slides, perfect condition, for Shew's Eclipse detective camera and lens, with three or more double slides.—Address, W. J., 161, Queen-street, Glasgow.

Exchange Demon camera and electro-motor, also a few cabinet photographs of steamships, for Ganot's *Book of Physics* or Thompson's *Electricity and Magnetism*.—Address, J. Rigby, Howick House, Burscough, near Ormskirk.

Exchange Vols. IV., V., and VI. of the *Boy's Own Paper* for Hepworth's *Photography*, and *Picture Making by Photography* by H. P. Robinson, or *The Studio and What to Do in It*, by the same author.—Address, C. Hall, Little Heath House, Little Heath, Old Charlton, S.E.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to "H. Greenwood & Co.," 2, York-street, Covent Garden, London, W.C.*

All matters for the text portion of this Journal including queries for "Answers" and "Exchanges," must be addressed to "The Editor," 2 York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

Photograph Registered:—
G. Taylor, Bishop Auckland.—*Photograph of the late Bishop of Durham.*

J. H. Jewell.—"Wait a little longer." We are arranging for a complete and exhaustive series of articles on the subject.

Provincial.—Three weeks appears to be an unusually long time to wait for an enlargement by any process. We do not see how we can assist you.

W. D. M.—1. We cannot tell by what means the silver stains may be removed from the negative. 2. Give a longer exposure and a quicker development.

Albert Towers.—Mr. Carey Lea's manual is out of print in this country, but copies may be had from Messrs. E. & H. T. Anthony, New York, who are its publishers.

Detective.—A lens that requires stopping down to *f*-22 before it will give good definition is quite unsuited for instantaneous work. Better obtain a lens of the "rapid" type.

G. Boyd.—For enamelling silver prints a colourless and transparent gelatine should be employed. Collodion made with methylated solvents answers quite as well as the other.

M. D.—1. There is no satisfactory way of removing the stains from the negatives.—2. To obtain soft grey tones on bromide paper, give a very full exposure and develop with a weak developer.

Hamish.—The yellow stains on the back of the piece of sensitive paper arise from careless handling. Some of the spots are clearly due to something being splashed on the paper and others are decidedly finger-marks.

R. S. J.—Several formulæ for the hydroquinone developer are given in the Almanac for the current year; you cannot do better than refer to them. Hydroquinone answers very well as a developer for bromide paper.

J. Wilson.—Ferroprussiate paper may be obtained from Messrs. Marion & Co., Soho-square; Mr. Gotz, Buckingham-street; or, indeed, from most photographic dealers. Those who do not keep it in stock will, doubtless, procure it to order.

A. & Co.—The mount enclosed is not printed with gold, but with bronze powder, though, apparently, of somewhat better quality than usual. However, there is little doubt but that the particles of bronze will in time act deleteriously on the pictures.

Lt.-Colonel Nicholl asks: "Would any of your readers kindly inform me if good and pure photographic chemicals are to be had in Florence, and whether they are dear or cheap? Also if there is any Custom-house duty on photographic apparatus, dry plates, or chemicals in Italy?"

H. W. (Belgrave).—Give the dog a good dinner and then try to take him immediately afterwards. Failing this, you can make sure of him by flashing from five to ten grains of magnesium, which, with a quick-acting lens, ought to give a well-exposed negative. Either of the lenses mentioned will answer.

S. Gardner.—The difficulty is owing to the camera not being long enough. To copy a picture the same size as the original it must be capable of extension to twice the focal length of the lens. As the lens you are trying with has, probably, an equivalent focus of about twelve inches, the camera must extend to twenty-four inches, and nothing shorter will suffice.

T. B. writes asking for a remedy for the moisture condensing on the lenses. He says they are removed from the studio every night into a safe in a lower room. In the morning when they are taken back to the studio they become covered with moisture, both inside and out, so that they cannot be used without the glasses being taken out and wiped.—The condensation may be avoided by keeping the lenses in a warmer place. If the glass is of a higher temperature than the surrounding atmosphere, no moisture will condense on it, however damp the air may be.

D. MORRIS.—If the negative be as described, and the silver print goes to prove that it is, it will be impossible to get rich-toned platinotypes from it. For this process a vigorous negative is essential. However, good prints of a black tone may, no doubt, be obtained from the negative on bromide paper. With this process it is possible to obtain strong prints from a feeble negative.

EAST ANGLICAN.—1. As our time will not permit of us making the necessary experiments, make them for yourself. Read Mr. Foxlee's paper to the Photographic Club, which will be found on page 709 of our volume for 1888, and follow the test there described.—2. If the red light is so injurious to you, try a couple of thicknesses of canary medium, with a piece of pale cathedral green glass.

A. G. W.—If the wind has wrought such damage to the studio as you describe, you should lose no time in calling in a surveyor or builder, as it must be decidedly dangerous. A similar gale might even blow it into the street, to the manifest danger of passers-by. As you know the dangerous condition of the building, we imagine you would be liable for any damage that its wreckage might cause to adjoining property.

MAY MORTIMER.—To remove the candle spots from your paletot, after scraping off as much as you can, lay upon them two thicknesses of blotting paper, and then apply a hot iron, by which the paraffin wax will be melted and absorbed by the paper. Should any be left after this treatment—which we think will not be the case, at least, to any visible extent—apply slight friction with a pad of cambric well moistened with benzole.

S. BARKLAY writes: "I have a bromide opal enlargement, finished in black and white, which has got soiled with dust and finger-marks. Would you kindly inform me how to clean the same?"—It is rather doubtful if the picture can be very satisfactorily cleaned. The best plan, however, will be to carefully wash it over with something in which the colour or gelatine is not soluble—say, a pledget of cotton wool charged with alcohol or benzole.

COL. GUBBINS.—If your enlarging lantern has a very large condenser it will be better to have a supplementary condenser of smaller diameter—say four inches—in order to its employment as a magic lantern; but if the condenser be only, say, six inches in diameter, it will answer as it is, provided the slide be placed a little distance in front, so as to ensure all the light of the cone passing through it. The most convenient way would be to have a proper optical lantern.

C. W. writes as follows: "A gentleman brought from Italy, some ten years ago, large photographs of himself and two relatives, also of Leo XIII. Though hung in a rather dark part of the room, all have faded, so that a large white band runs horizontally across the centre of each picture. Pictures made in England twenty years ago, and hung in the same room, show no signs of fading. Could you kindly give the reason of this?"—The fading is probably due to the pictures being imperfectly fixed or washed. It is, however, curious that the fading should take the form of a band across the centre of each picture. Many pictures produced in England show signs of fading long before they are ten years old.

MANCHESTER writes: "1. *Re* cutting prices, &c. What think you of the enclosed cutting from a local paper, given me by a friend who has in response sent his *carte* to have returned with it a pastel portrait, life-size, *free of charge!* I suppose the profit is to come out of the frame, for which they are charging him 15*s*. The portrait without frame is to be worth 2*l*., as you see.—2. What is a pastel portrait?—3. Does a saturated solution of hypo deteriorate with keeping? I think I have read somewhere that it does.—4. By what process is the enclosed portrait produced? It was sold here for a penny in the streets."—1. We suppose that a profit is made somehow.—2. A pastel portrait is a portrait painted with pastel colours.—3. It is advisable not to keep the solution very long in stock.—4. The portrait is an ordinary silver print.

CARBON writes:—"1. I am about to put a new shop-front in, and wish to introduce carbon transparencies, fifteen-inch circles, and am doubtful as to their being permanent for such a purpose, considering heat of sun and condensation. But with outside sun-blind, and carbon surface inside shop, and well varnished, would they not be all right?—2. Can you tell me how to blacken some brass stops—cabinet lens—which are bright by wear? Dead-black varnish wears off so quickly.—3. Can I make up some really good dead-black varnish for lenses, &c.? I tried a formula in the ALMANAC for 1889, but it is somewhat granular." In reply:—1. The carbon transparencies will, no doubt, be permanent. They should be hermetically sealed between two glasses, so that moisture cannot condense on the gelatine surface.—2. Thoroughly clear the stops, and then immerse them in a weak solution of bichloride of platinum.—3. The granularity of the varnish is doubtless due to the black pigment not being in a sufficiently fine state of division, or not being intimately mixed.

INSTANTANEOUS inquires: "Would you kindly inform me in the 'Answers to Correspondents'—1. What are the most rapid make of dry plates in the market? My object is, if possible, to take instantaneous portraits (as, for instance, babies, animals, &c.), indoors on a dull day, when necessary to employ such a day, for this I have not yet been able to do. Also, should I obtain them at any ordinary photographic material dealer's depôt?—2. Would they require a special lens, if so, what would be necessary; or would a single achromatic meniscus of about *f*-6 be rapid enough?"—1. We are quite unable to say whose are the most rapid plates in the market, as we have not tried all the different brands. All makers now turn out special plates of great rapidity, and it is against our rule to recommend any particular manufacturer's goods.—2. The quickest lens—and that best suited to the purpose—is one of the extra rapid portrait or baby lens series. It works with an aperture of about *f*-2½. There is very little chance of success in a bad light in an ordinary room with any other for instantaneous pictures.

H. B.—1. That lens which has the widest aperture compared with its focus will give the most brilliant image, both lenses being equally well corrected, but it does not follow that by giving a suitable exposure the other will not produce an equally brilliant negative.—2. The distant object will, with a definite stop, require less exposure, because the angular aperture of the lens is greater than when the position of the plate is farther removed from the lens.—3. See reply to No. 1.

CANARY BIRD writes: "I am thinking of taking up stereoscopic photography, and, as I have never done anything in that way, I should feel much obliged if you would answer the following in your 'Answers to Correspondents':—1. Is it best to have two 5×4 cameras or one 5×8?—2. Would the following lenses, in pairs, be sufficient for landscapes and architectural subjects:—(*a*) Dallmeyer's 5×4 rapid rectilinear of 6 in. focus; (*b*) the same maker's wide-angle rectilinear, 7¼×4¼ of 4 in. focus? I should like one of shorter focus, but I see none mentioned in his list.—3. Would any other lenses be necessary, or more suitable?—4. Would the rapid rectilinear lenses work accurately together when using them with the front combination removed and as single lenses?—5. If only one camera is best, would one of Hare's 8×5 'improved pattern' be suitable?—6. Which is the best shutter to use with a stereoscopic camera—one which would act on the two lenses at the same instant?—7. Is it possible to take good stereoscopic pictures with one lens on a sliding front, the objects being stationary?"—In reply: 1. One 5×8 camera is greatly to be preferred.—2. The rapid rectilinears will prove much more useful for this purpose than those of four inches focus.—3. These will answer every purpose.—4. They will work accurately, but it will be well to insert the diaphragms at the outer end of the tube, the front lenses being, of course, removed.—5. This camera will be quite suitable.—6. The shutter reviewed in our issue of November 29, 1889, if constructed for stereoscopic cameras, ought to answer well, but there are doubtless many others equally effective. We have used a Kershaw binocular with satisfaction.—7. Perfectly good stereoscopic pictures may be taken by a single lens as described.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, February 5, *The Intensification and Reduction of Negatives;* February 12, *Illuminants for the Optical Lantern.*

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Annual meeting, Tuesday, February 11, 1890, at Mosley-street Café, Newcastle. Subject for discussion, *Various Printing Processes.*

THE next annual dinner of the Photographic Society of Great Britain will be held at the Café Royal, Regent-street, February 10, at half-past six. Early application for tickets, price 6*s*. each, should be made to Mr. W. England, 7, St. James'-square, Notting Hill, W.

HONOUR TO A PHOTOGRAPHER.—Mr. W. J. Harrison, F.G.S., the Science Demonstrator of the Birmingham School Board, has just received intimation from the Secretary of the Geological Society that the Council have awarded him the proceeds of the "Barlow-Jameson Fund" in recognition of his "valuable contributions to geological science," and he is invited to attend the anniversary meeting of the Society, on February 21 next, to receive the award. The former recipients of the "Barlow-Jameson Fund" were—in 1882, Dr. James Croll; 1884, Baron von Ettingshausen; 1886, Professor Leo Lesquereux; and in 1888, Dr. Johnston-Lavis. The income of the Fund is "to be applied every two or three years, as may be approved by the Council, to or for the advancement of geological science."

CRYSTAL PALACE EXHIBITION.—A NEW DEPARTURE: A CHALLENGE CUP.—The Manager of the Crystal Palace has addressed the following circular to the various Photographic Societies:—"With the intention of securing for this Exhibition a thoroughly national character, the Directors have decided to offer a valuable Challenge Cup, to be retained for the current year by that Photographic Club or Society which, in the opinion of the Judges, sends the best collective exhibit of not less than fifty pictures. Appended you will find the conditions of this National Club Challenge Competition, and we shall be much obliged if you will kindly bring the matter before the members of your Society without delay." The conditions are as follows:—1. All pictures entered in the competition will be subject to the general rules of the Exhibition, as published, where applicable. 2. There will be no entry fee charged for the club challenge cup competition. 3. The pictures included in a joint club exhibit are equally eligible for awards in their several classes; but a separate application form must be filled up by the individual exhibitor, and, in the case of professionals, the stipulated fee enclosed. 4. The challenge cup will be handed over to the Mayor, or other public functionary of the town or district in which the headquarters of the successful Society are located, to be held by him, in trust, for a period of one year, at the expiration of which it shall be returned to the Crystal Palace Company. 5. The name of the successful Society will be engraved upon the cup or pedestal, with the date of the award. 6. The challenge cup shall be confined to Societies within the United Kingdom.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1553. Vol. XXXVII.—FEBRUARY 7, 1890.

MATT OPAL GLASS.

There is perhaps, at the present time, a larger demand for opal glass with a matt surface than has ever been known to the manufacturer of this important basis for pigment and silver printing, and this has been followed by the usual result—a cheapening of the price, such as once would never have been believed possible. A really good carbon print on a piece of opal glass with a bevelled edge can be bought retail nowadays for a smaller sum than once had to be paid for a plain piece of ordinary opal glass with the edges rough as left by the diamond. The "flashed" opal, that is, the clear, colourless glass with a thin face only of opaque white, at one time the most important article of trade in this direction, appears now to be quite a thing of the past, and the beautiful translucency of the pot metal is so superior to the opaque looking "flashed" glass, that the change is in every way an advantage. But, like every other cheapened article, there is with opal glass the possibility of a lowering of quality in the material, and some samples which have lately come under our notice have been so very defective that we have thought it worth while to draw attention in a general way to this material and its substitutes.

In the earlier days of the employment of this particular kind of glass, the roughening of the surface, called, strangely enough, by the trade "smoothing," was done by means of gritty powders applied with pressure and rubbing until the required grain was given, emery being the substance employed. So long as there was a distinct matt surface, the finer the grain the better for pure photography; but, as this particular sort of surface is one much affected by those who paint in water colour upon photographs, we may say that some grades of fineness of surface are far superior to others for such painting. Carbon prints, for example, are much used as the photographic basis; excellent opportunity is offered by them for taking out or reducing with ink-eraser or penknife any portion of the picture it is desired to alter or remove. If, however, a sample of glass be used in which the grain is excessively fine, it will be found that very little friction will make the roughened surface smooth and polished, and when this occurs in patches, say at the edge of a vignette, the effect is very bad; while, if it occur in the face, for example, the difficulty of executing satisfactory work is almost insurmountable. It will thus be seen that according to the requirements of the photographer so should the glass be chosen. Another drawback is here liable to occur: it is not every plate upon which a picture is developed that turns out successful, and pictures have often enough to be removed when good work is looked upon as essential. To effect this removal a certain amount of rubbing is usually necessary; and, again, with the finely ground matt surfaces this slight friction may result in producing bright patches upon the once dead surface, and these are fatal to fine work. Again, for coloured work, glass roughened in the opposite directions too coarsely is inimical to all fine and delicate execution.

To remove rejected carbon pictures it is better, if possible, to start before the print is dry; if that cannot be done, a little solution of caustic soda poured over the print will so soften and loosen it, that a minimum of friction is required.

Some glasses by merely keeping them for a time will develop strongly marked yellow stains most difficult of removal. Strong nitric acid is effective usually, while the less deeply marked ones will disappear by exposure to light. Opal glass is one of the very few photographic bases which improve in whiteness when exposed to light; yet the truth of this statement is readily seen by referring to any opal photograph that has—under glass that dust may be excluded—been exposed to a fairly strong light. It will almost always be found that the portion protected by the mount, although not touching it, is darker than that part entirely exposed to light. We have seen pictures that had been stored in the dark for some time become conspicuously marked with yellow stains, which yet regained their pristine purity after a few months' exposure to the light.

We have said that a process of roughening by emery has for long years been employed for producing the "smoothed" surface, but of late a much more expeditious mode of roughening the surface has been employed—the well-known sand blast. We have been shown surfaces so made which were equal, if not superior, to the very best examples of smoothed pot metal of the older kind. It is to be admitted that glass which is apparently of an initially inferior description is liable to be employed for this kind of surfacing, glass which would have been rejected as unfit for the hand-rubbing process. The examples that have come under our notice have been—sometimes so largely as not to leave a space three inches square—deeply pitted with what looked like bubbles whose surface has been removed by the friction and the hollows thus laid bare. The disadvantages of such a surface need not be pointed out, but users of glass should specify when ordering that it should be free from such pitting.

Originally, we imagine, opal glass was looked upon as a substitute for slabs of real porcelain, and it is much more convenient to use. We have, however, been asked by a photographer how to obtain real porcelain for delicate work, as it would not discolour, and was not near so brittle as glass. After consulting with a few dealers most interested in such matters, we were informed that, perhaps, the readiest and

cheapest way to obtain flat porcelain slabs would be to purchase the so-called "porcelain slates," which can be bought at most stationers' shops at a price not much exceeding that of a piece of opal the same size. Whether the whiteness and purity of the surface would be sufficient we are hardly in a position to state.

In concluding our remarks, we may point out one very simple plan of treatment which is sometimes a real improvement to a picture: it is well enough known to most professionals. It consists simply in backing the opal with a piece of orange or other coloured paper; the extent to which a piece of "white" opal can be altered in tone according to the colour of this backing material being remarkable to those who have never before attempted the experiment.

THE TRANSFORMATION OF PHOTOGRAPHS INTO LINE WORK.

The application of photography to illustrative purposes is, as every one is aware, not only increasing annually, but, it may almost be said, daily. We are not now alluding to such well-recognised processes as the half-tone block, collotype, Woodburytype, photo-lithography, or other familiar methods, but to ends to which it is applied and yet receives no recognition whatever, although but for its aid the work would be an impossibility. We here refer to the use made of the art by the different illustrated journals and periodicals in such a way that the general public, or even photographers themselves, frequently do not suspect that it has taken any part whatever in the matter, while, as a matter of fact, the whole of the work may be, and very often is, due entirely to photo-chemical processes. Here is one method which is commonly adopted in every-day practice:—

An artist makes a sketch in tolerably bold line on paper, which is then copied in the camera. The negative thus obtained is afterwards employed to produce a typographic block by the zinc-etching or other methods. In the finished result photography is in no way recognisable. Often—more often than not—the sketch, in the first instance, is actually made from a photograph, but being in open line and of a sketchy character, it is not recognised as being from such a source. Sometimes even the photograph is really traced on a translucent material and a negative then made from the tracing to produce an etched block from it in the ordinary course.

There is a very simple method of transforming a photograph into an outline sketch for block work which has frequently been published, and is now extensively employed, although those who use it seldom acknowledge the fact that they do. The plan is this:—A print is made from the negative on albumenised paper in the ordinary way. It is fixed, but without toning, when it will be of a light reddish brown colour. The photograph is then traced over in line, either with pen and ink or with a blacklead pencil, so that a lined picture is obtained on the pale photograph. The next operation is to remove the photograph. This is accomplished by immersing the picture in a solution of bichloride of mercury. This bleaches the photographic image, when of course a pen-and-ink or pencil drawing only is left on white paper. This, if neatly made, is admirably adapted for producing a typographic block.

It is manifest that when the photograph is of small dimensions, as in the case of most instantaneous pictures, for example, the work must be delicately executed, otherwise the block, when finished and printed from, will appear coarse and heavy. Particularly will this be the case if the picture has been enlarged in the copying, as is frequently necessary. It goes without saying, when a print has to be made on albumenised paper, and the drawing, or, rather, tracing, has to be finely done, that much time must necessarily be consumed. This is sometimes a great inconvenience, for usually this class of work has to be executed at a short notice.

The work may, however, be much expedited, and, at the same time, a better result secured, by adopting the following system:—Instead of taking a print direct from the negative on albumen paper, an enlargement is made on bromide paper. This may be made fifteen or eighteen inches, or even of larger size. The enlargement can, of course, be made by artificial light; consequently, if necessary, it may be finished off within a very short period from the time the negative is developed and fixed. The negative for this purpose does not require washing or even drying, as the enlargement can be made quite as well while it is still wet, whereas when a direct print is made the negative must be both washed and dried before it can be utilised.

An enlargement can more quickly be converted into a suitable drawing than a small direct print, inasmuch as far coarser and bolder work will suffice, because, when the picture is reduced in the copying, the lines will appear equally as fine as they would have been if they were very delicately drawn on the small original, as, in the case of an albumen print, the enlarged image is bleached with the bichloride of mercury.

It need scarcely be mentioned that when the drawing is executed by an artist the picture can be very considerably modified; fresh objects may be introduced at will, while others can be left out if desirable. As a matter of fact, the original may be, and frequently is, altered to such an extent that the photographer who took it does not, in the finished result, recognise that it is a piracy of his own work. This is a very common occurrence in connexion with many of the illustrated periodicals, both as regards portraits and landscapes.

A good deal has been heard from time to time of the uncertainty arising from variations in the character of eikonogen as first introduced, and the superiority of the newer form. The earlier product consisted of a sandy powder, possessing more or less colour, and subject to very rapid darkening, whether kept in its original package or transferred, as in our case, to a stoppered bottle. So far as our own experience has gone, the colouration produced little or no ill-effect on the development, though the solution of the salt, especially if made without sulphite, is unsightly in appearance and calculated to raise fears of stained films. Other observers have, however, stated that irregularity in development results from the presence of indefinite or varying proportions of the oxidised material.

Those of our readers who possess any of the discoloured eikonogen will be glad to know a means by which all elements of uncertainty and other inconveniences may be eliminated. Make a solution of sulphite of soda; the strength is not very material, provided it be not too strong. Take, say, half the weight of the eikonogen to be treated; dissolve it, neutralise if alkaline, and raise to the boiling point in a glass flask; then throw in the eikonogen, and continue the heat until it is dissolved, or nearly so. The quantity of water should be such as to make a saturated solution and leave a little of the salt undissolved, say about one ounce of water to ninety or one hundred grains of eikonogen. When the water has taken up as much as it seems likely to do, let it be cooled rapidly by immersing the flask in cold water, and keeping it in motion to prevent crystals forming on

the sides of the flask. In this manner by far the greater portion of the eikonogen will be precipitated in fine powder, from which the dark-coloured solution may be closely poured; and one or two rinses in *cold* alcohol, drained off closely, followed by gently heating the flask until dry, will leave the precipitate in an almost colourless condition.

On the subject of staining with eikonogen there seems to be some doubt, at least as to the conditions under which discolouration does occur. That the plain solution, without sulphite, will stain the gelatine film badly is, however, an undoubted fact, though the stain is not necessarily a permanent one. Having developed a plate with a very much discoloured solution, containing eikonogen and sodium carbonate with a trace of potassium bromide, it was found on fixing to be deeply marked with an opalescent brown stain, equal to the worst pyro stain. Placed to soak in a dish, it was found in an hour or two's time that the shadows of the negative were beautifully clear and colourless, while the water had assumed a muddy yellow tint.

A good lubricating material for the sliding parts of cameras, tripods, &c., and similar purposes, is frequently a desideratum. Soap is objectionable on account of its hygroscopic nature, and plumbago is dirty. Powdered talc is good, but wants frequent renewal. If, however, the latter be intimately mixed with sufficient vaseline to form a solid but friable mass of about the consistency of putty, it will be found a most useful lubricant for all purposes where wood is concerned.

In the course of his article on *The New Reliable Film of the Eastman Company*, in our issue of 24th ultimo, Mr. Lyonel Clark mentions incidentally the non-reversal of the image of the sun in one of his negatives, a fact which he attributes to the paucity of actinic rays. This is certainly a natural conclusion to arrive at, but we are by no means sure that it is necessarily the correct one. We recollect very well that amongst Colonel Stuart Wortley's Tahitian negatives, taken on the occasion of his trip round the world in 1880, there were several in which the sun's disc appeared. In some it was represented by an opaque circle, in others it was transparent, while in one or two it was surrounded by a detached halo, separated from the body of the sun by a clearly marked zone of different opacity.

So far as we remember, Colonel Wortley, in pointing out this peculiarity to us, was unable to offer any explanation of the phenomena, there having been nothing to specially distinguish one exposure from another, all being made with great rapidity. It is not by any means improbable, however, that a variation in the exposure, that would prove inappreciable in the case of terrestrial objects, might be more than sufficient to produce the effect of reversal when the direct image of the sun's disc came in question. Yet, on the other hand, in Mr. Lyonel Clark's case, if the light were so poor that an unreversed image of the sun resulted, it is surprising that any picture of more feebly luminous objects should have been secured.

Apropos of the halos mentioned, we had a curious experience some years ago with a wet plate. The subject was a sunset view with houses in the foreground and mid-distance, and the opportunity was seized when the sun, which was directly in front of the camera, was hidden behind a stack of chimneys, beyond one side of which a luminous glow extended, though the disc of the sun was quite hidden. Upon development this glow was represented not merely as seen on one side of the chimney-stack, but as a complete circle showing as it were *through* the chimneys, while in the centre was an intensely black but gradually softening disc, much larger, however, than the sun itself would have been rendered, then a zone of nearly transparent glass, and outside that again a detached halo as observed in some of Colonel Wortley's negatives.

The boundaries of the halo, though to the eye only visible on one side of the chimneys, extended in the photograph over both sides, and this fact suggests a possible explanation. Though invisible to the eye, or at any rate unnoticed, the circle of luminosity was complete, so far as the sensitive plate was concerned, and, acting with great intensity, produced a circular impression on the plate, which, spreading laterally in every direction by internal irradiation, produced the effect described. The central zone of nearly clear glass would represent the circle of highest intensity, the action being there reversed, the inner disc and halo being merely the transmitted secondary effect.

Photographers now seem to be realising the fact that hitherto they have been paying at too high a rate for the insurance of their premises against fire. This is a topic we have been dwelling upon ever since the general substitution of gelatine for collodion. At last, however, some of the more enterprising insurance companies are modifying their premiums on photographers' risks, though several of the older and more conservative ones—who almost appear to form a ring and work in unison—still adhere to their old tariff.

There is no question that some twenty years or so ago the insurance offices did experience serious losses with photographers' risks, and this led to a general rise in the premiums previously charged. With a few exceptions, however, the number of fires that then occurred were in no way attributable to the combustible materials used in the business. But the companies did, nevertheless, suffer severe losses. With regard to the premiums, one thing should be borne in mind by those who complain that they are still too high, namely, that when a fire occurs on photographic premises it usually spreads with great rapidity, particularly if it reaches the studio, where the blinds and curtains lead the flames in every direction; hence a fire usually means total destruction. One fact is pre-eminent in connexion with insurances, and that is the salvage from a photographer's plant is seldom of any value whatever. This is a fact that has always weighed heavily with insurance companies in compiling their rates.

Those who are now, or recently have been, collecting their residues are fortunate in the price of silver. It is now being quoted on the market at a higher figure than it has been for some time past. Our older readers can look back and see what a contrast there is between the return made for residues now and formerly. At one time standard silver was five shillings and more per ounce; then the paper was sensitised on baths of double, and even more, the strength of those now employed, to say nothing of the spoilt wet plate baths, which were frequently converted into chloride to augment the value of the residues.

Last week we replied to a query through the "Answers" column with reference to the probable stability of carbon transparencies when exposed for a lengthened period to light, the heat of the sun's rays, and the condensation of moisture. Since answering our correspondent we have seen a large carbon transparency which has apparently been exposed to these influences, and it has succumbed. In parts the carbon film has left the glass, and also frilled, showing clearly that it had been subjected to moisture as well as heat. The picture was backed with another glass, and the edges of the two plates were bound together with paper, which had become slightly damaged in places. As it was one of a recognised master's work in sea and cloud studies, we may assume that in its production every care was taken to ensure its permanency. Of course, we have no particulars of the manipulations, or what (if any) substratum was used. But there is little doubt, that one was employed—either collodion or gelatine. When a carbon transparency has to be subjected to such a trying ordeal as alternating heat and moisture, a substratum of insoluble gelatine is preferable to one of collodion by itself. Furthermore, the edges of the two glasses should always be bound with a waterproof material—varnished paper for example. Also care should be taken that the carbon film is thoroughly desiccated before it is sealed up.

For a long time past photographs have been looked upon with distrust in the Law Courts, and in the Divorce Court in particular they are refused as evidence of identity. But this, apparently, only applies to the London Court, for, according to the newspaper reports, in a divorce suit recently tried in Scotland photographs were admitted as proof of identification. Scotch and English judges evidently hold

different opinions with regard to the integrity of photography. There can be no question that since retouching—or what passes by the name—has been carried to its present extent, the public are decidedly losing confidence in the truthfulness of photography, so far at least as portraiture is concerned.

THE unusual mildness of the season has given photographers but little opportunity of obtaining winter effects. However, there is plenty of time yet for both snow and frost. And, what is more, as the light is daily improving, the pictures may be taken under more favourable conditions than they could have been a month or two back. Those wishing to secure hoar-frost pictures now need be on the constant watch, for a few minutes' sunshine at this time of year is sufficient to entirely destroy the beauty of the scene. Trees and shrubs covered with frost when illumined by the sun make most glorious pictures. But the very element that confers the chief beauty destroys it in a very brief period. Last year we had a very vivid experience of this. One morning, when the trees and hedges of a picturesque lane near home were covered with hoar frost, the sun suddenly burst forth, and the scene was glorious in the extreme. But by the time the camera was got out and the slides filled the picture was gone for ever. What had but a few minutes before appeared as a mass of sparkling jewels were by the sun's rays transformed into a mass of dripping twigs, ugly in the extreme.

Now that large direct portraiture is so much engaging the attention of amateurs, inquiries are frequently made as to the best form of inexpensive lens to employ. Just now the taste appears to run more in the direction of diffused or pictorial than on crisp definition; therefore, for these effects large and expensive combinations with gelatine plates are no longer necessary. Single lenses worked with a tolerably large aperture answer all requirements. The old form of landscape lens, with its aperture opened out to *f*-8 or *f*-10—according to the degree of diffusion desired—makes a very useful instrument. The front lens of a portrait combination also forms an excellent tool for the purpose when used with a similar aperture. The front lens of an old-fashioned, whole-plate, portrait combination in our possession has a focus of about twenty-two inches, and this, with a moderate aperture, will cover a 15 × 12 plate with fair pictorial definition. Our readers scarcely need telling that in utilising the front of a portrait lens the back combination must be discarded and the front one put in its place, with its *convex surface next the focussing screen*. The stops as fitted may not, theoretically, be in their best position, but still they will answer well for pictorial definition without alteration.

THE NEW BENZOLINE LIMELIGHT.

VI.—ENRICHED COAL GAS.

THE warm bath saturator described in the previous article can be used in two ways: either oxygen may be forced through it and coal gas altogether dispensed with, or coal gas may pass through the vessel in order to have its illuminating power increased. In the latter case very little gas is required, one quarter of the usual quantity being sufficient; hence the saturator, used in this way, saves seventy-five per cent. of coal gas—an important economy when compressed-gas cylinders are used.

The most powerful limelight is obtained by passing *oxygen* through the saturator, dispensing with coal gas and using nipples of about one-fourteenth of an inch bore on mixed gas jets. Under these conditions the following results were obtained:—With oxygen in a ten-foot gas bag, placed under two cwt., the light was equal to about 700 standard candles; when the pressure was increased to three cwt., it amounted to 900; and with a gas bottle the maximum light was 1350 candles. These are, of course, [illegible] great lights for lantern work, and for most purposes a lower [illegible] of gas would suffice: one cwt. on a large oxygen gas bag wil[illegible], with benzoline, a light that would be termed "splendid" by most lanternists, although possibly not more than 500 candles.

Benzoline will give as much light with one cwt. on the pressure board as coal gas would give with two cwt.; hence, a lighter pressure board can be used for general work, the wear and tear of gas bags is lessened, and the labour and nuisance of procuring heavy weights is diminished.

If benzoline is compared with coal gas, when both are arranged to give an equal brilliancy of light, it will be found that the benzoline limelight uses considerably less oxygen than does the coal-gas limelight, so that not only is coal gas dispensed with, but even the supply of oxygen is diminished. However, it should be borne in mind that one cannot have the full light of benzoline without giving as much oxygen as would be required for coal gas. If the two are arranged to consume an equal quantity of oxygen, and the conditions are such that the coal-gas limelight is equal to 500 candles, it will be found that benzoline gives about 700 candles.

If absolute silence is required with a limelight the limit with coal gas is about 500 candles; with benzoline, 700 candles. If a slight hissing, inaudible at thirty feet distance, is not objected to, the limit with coal gas is about 600 candles; with benzoline, 900 candles. The noise increases with the pressure.

When light volatile benzoline is used in the warm bath saturator, dissolving can be accomplished without coal gas with ease; but it is desirable to dissolve *slowly*, a period of at least three seconds being allowed for the movement of the dissolving handle from one position to another. If the handle is moved with a jerk so as to change the view on the screen quickly, there is a chance of getting a pop, especially with large-bore nipples; and although benzoline is less liable to give pops than ether, it is not quite so safe in this respect as coal gas.

There is, however, a simple means of rendering these pops impossible, viz., by passing *coal gas* through the warm bath vessel instead of oxygen. This saturation of coal gas with vapour of benzoline is known in the gas trade as "enrichment," that is, the gas is rendered richer in carbon.

Enriched gas has been applied to ordinary fishtail and batswing burners for many years—the albo-carbon system of gas lighting being founded on the same principle; but I believe I am the first to point out its value in connexion with the limelight, both for economising coal gas and for increasing the brilliance of the light produced by large-bore nipples. With small nipples of one-twentieth of an inch bore, such as are often fitted to commercial jets, there is little or no gain of light produced by enrichment, and with these the advantage consists solely in the lessened consumption of coal gas.

The percentage of economy obtained by enrichment varies according to the amount of vapour imparted to the gas. The warm bath saturator is capable of adding more vapour to gas passed through than any form of cold saturator; hence, it produces a correspondingly greater saving of gas and increased brilliance of illumination.

The limelight obtained with enriched coal gas is not quite equal to that produced by enriched oxygen; it is, however, considerably brighter than that of ordinary coal gas. Speaking roughly, it may be said that, with a nipple of one-fourteenth inch bore, and with a certain fixed pressure of oxygen, coal gas gives 400 candles; enriched gas, with the warm saturator, produces a little over 500 candles; and enriched oxygen, without coal gas, gives about 600 candles.

The consumption of coal gas when enriched being so small, it is obvious that the expense and inconvenience of large bags and cylinders is diminished. One cylinder of coal gas will suffice for three or four similar cylinders of oxygen; or a twelve-foot bottle of coal gas would be a suitable size to go with a forty-foot oxygen cylinder.

Safety.—Letters are now reaching me by every post containing inquiries about the new limelight. Most of these ask the question, Is it safe? To such I answer that they can hardly have an accident if they tried. One gentleman last week inquired whether I would advise the use of a cage with iron bars to put the saturator into, with the view of preventing the destruction which might be caused by the flying fragments of *wool* in the event of an explosion. As the saturator is already protected with armour, as it were, in the outer casing forming the air bath, I did not think the cage necessary. If an impossible explosion caused the *inner* vessel to burst, it is in the last degree unlikely that the *outer* vessel, made of stout sheet metal rivetted together, would also give way.

The same ingenious gentleman suggested that the saturator could be placed outside one of the windows of the hall, just below the

window-sill, or on the ground, and connexions made with the lantern by means of long pipes. He considered that this arrangement would be fairly safe. The idea is so clever that it is worth mentioning, for the benefit of those who have old, unstuffed, ether saturators in their possession. It would be as well to add the cage also, in case any stranger might be near the saturator when it burst.

To those who are at all nervous, and who wish to be absolutely safe, even from the smallest "pop," I can with the utmost confidence recommend the enriched gas limelight with the warm bath saturator. Enriched coal gas is as incapable of exploding as the air we breath.

ALBERT W. SCOTT.

THE PROBABLE PERMANENCE OF PLAIN PAPER PRINTS.

Of late, through the experiments of Mr. Lionel Clark, and the entrance into the market of Mr. Valentine Blanchard's paper, the subject of silver printing on plain salted paper—*i.e.*, paper which has the silver haloids in a substratum of gelatine or arrowroot on the surface instead of albumen—has come to the front.

Probably this would not have been had not first the platinum process and afterwards the gelatine-bromide prints educated the photographic amateurs', and at the present time are rapidly educating the public, taste to the beauties of a matt-surface photograph.

To judge from our photographic exhibitions one would almost think that printing on albumenised paper is a thing of the past, and so it probably is, as far as prints from the class of negatives suitable for exhibition purposes are concerned. But how about the prints from ninety per cent. of the negatives produced? If one prints until the high lights are right, the shadows are possibly dull and heavy, and if the shadows are right the light tints are absent. How seldom one comes across a negative perfect in its lights and shadows! And while this is so, photographers, both amateur and professional, will not be able to do without a *printing-out* process, in which they can see to correct any deficiencies there may be in their negatives.

One of our leading professional photographers was saying only a short time since, in reference to both platinum and silver bromide printing, "that he got the most experienced workers he could obtain, and yet to turn out good work he found the waste something enormous." If it is so with men of experience, and who are working with every advantage, what must the waste be to the ordinary amateur?

In connexion with this subject the question of permanence, of course, is of great importance, and the amateur, judging from the faded albumen prints which come before his notice, is easily impressed when he is shown a silver print and another in platinum which had been put into, say, chlorine water, and he goes away with the idea that a photograph, in which the image, or the basis of the image, is formed of silver must *necessarily* fade, as fugitive colours do on exposure to light and air. I do not think we have authority for thinking this if certain necessary precautions are taken; besides, are we quite sure that either carbon or platinum pictures can be said to be permanent under every condition, if by that word we mean *unchangeable by time*, as the public are led to believe is meant?

What is the use of an image being composed of a permanent substance if it flakes up from the support as I have seen in carbon prints, or if there is some substance which combines with the fibre of the paper, or the substratum, and which in time is acted upon by the sulphuretted hydrogen in the atmosphere, producing a yellowing of the whites in the picture?

If we could get a *printing-out* process without these drawbacks, the more permanent the substance forming the image of course the better; but until we can, the practical question is, in taking prints from the generality of negatives, does the additional permanence (or, as far as we can say at present, the power of withstanding certain destructive tests), when the image is formed in platinum or carbon, outweigh the enormous advantages we obtain in certainty of results from printing-out in silver? and, further, cannot a silver image be produced which will be sufficiently permanent for all practical purposes? I will say at once that I do not consider that an albumen print will meet these requirements, but I believe we have far greater authority for thinking that it is possible to obtain plain paper silver prints, toned with either gold or platinum, which will.

Lately I have been fortunate in obtaining some evidence which, to my mind, is of the greatest importance in deciding many points in connexion with the question of the relative stability of silver prints done by different processes, and from this evidence I have endeavoured to trace the reasons for the varying results as regards permanence, and the lessons to be gathered from them for future work.

Probably many old photographers will remember that about the year 1855 the Council of the Photographic Society, finding that the confidence of the members in the permanence of their work was weakening, appointed a Committee to thoroughly investigate the question of the causes producing the fading of photographic prints. How grand it would be if we could get our aged grandmother, "The Parent Society," to wake up from her doze and spend a little of the money put by in her stocking in employing a permanent staff in experimenting and thoroughly investigating this and kindred subjects! At present, all we can do is to either accept the statements in the advertisements of the dealers as gospel, or, often without any proper convenience, and in many cases without the necessary knowledge or scientific training, have to flounder about for weeks in trying to find out a point that an experienced chemist with suitable appliances could find out in as many hours.

But to return to that very wise proceeding on the part of the Council of the Photographic Society thirty-five years ago. The gentlemen forming the Committee which they appointed were Messrs. Hardwich, P. H. De la Motte, T. A. Malone, H. Pollock, G. Shadbolt, and Drs. Hugh Diamond and Percy. A short time since I had the pleasure of carefully examining a large number of prints produced by these gentlemen, and by others equally noted in the photographic world at that time. These pictures were done shortly after their investigations were completed and their report published; but what made these photographs especially valuable was the fact that particulars were given as to how they were produced, so that I had not only pictures done by the very men who best knew, and would be most likely to carefully carry out the precautions necessary to take to obtain the greatest permanence, but from the similarity of results (after being subjected for thirty-three years to the only conclusive test, viz., time) shown by prints produced by the same process by these different workers, I was enabled to come to some definite conclusions as to the advantages and disadvantages of each process used.

All the prints had evidently been mounted by one person on similar mounts, and were bound in volumes, so that all the prints had been subjected to the same variations of atmospheric action, as well as being liable to the same injury due to impurities in the mounts, or the cement used for mounting. No extra care appears to have been taken of the volumes, as there were constant signs of damp or mould marks on the mounts.

The first point that strikes one in looking through these volumes is the grand work they often did in those days, and photographers of the present day, with all the improvements in apparatus, &c., would have to sit up straight before they could beat some of them; and one begins to wonder whether, after all, the twenty-five sensitometer dry plates, and the ease in which photographs can be produced in the present day, entirely make up for the scientific and chemical knowledge, to say nothing of the patience and care those early workers had to exercise in every stage of their work. Does not the comparative simplicity of photograph making in the present day tend to carelessness in the matter of small details, both in the selection of the subject as well as in the practical work? and if photography were more difficult would we not give more careful study to the composition of the picture before we exposed the plate, and thus gain in quality what we lose in quantity?

I need hardly mention that silver was used in some way to form the image in all of the prints; and when I say that in one method of printing I could not see the faintest trace of fading of the image, and, what is more singular, there was not the slightest apparent yellowing of the whites in any of the pictures done by that process, though done by different men, I think we may conclude after thirty-three, and with one volume thirty-five years' existence, that that process can be said to be a practically permanent one.

These prints were done on Toogood's paper, salted, and then sensitised with ammonio-nitrate of silver, and they appeared to be as

perfect in every way as they probably were the first day they were done.

The plain, salted, paper prints, sensitised with the ordinary form of silver nitrate, had stood almost equally well, the whites were very pure, and with the exception of two or three of them there was not the slightest trace of any fading even in the lightest tints. In those cases it is most probable the fading was due to sulphur toning, because it was so difficult to say, with the single fixing and toning bath used in those days, when the action of the gold had reached its limit and the toning action of the sulphur commenced.

In the case of the albumen prints the results varied very much. *In every one* the whites of the picture had distinctly yellowed, though in many cases the images had not faded, whereas in others, especially in those done by professional photographers, there was not only the faded image, but there was much more of the well-known lemon-yellow colour in the whites of the pictures.

It is generally thought that this is due to an albumenate of silver; but if it is nothing but that, why is it that this albumenate is much more perfectly converted into a sulphide in some cases than others when all are mounted in the same album? After a careful examination of a large number of albumen prints, I am beginning to think that we have been overlooking several important points that undoubtedly are answerable for many of the faded prints we see, and which will explain several mysterious results that I have produced that I could not understand could be caused by the chemical combination of albumen and silver.

I do not think that we have ever quite realised the important part that the physical protection of the coagulated albumen must hold over the silver chloride (not acted upon by light) against the dissolving action of the hyposulphite of soda in the fixing bath; or, in other words, after the physical binding up of the silver particles by the coagulation of the albumen during the sensitising of the paper there is the difficulty that the hypo must have in eliminating every particle of silver out of that film after its conversion into an hyposulphite of silver.

It is very singular the properties that different vehicles have in controlling the time taken in dissolving the silver haloids by the hypo bath. If we take a film of collodio-chloride of silver on glass (the old Simpsontype process) we find that if we just put the plate into the hypo bath and take it out, all the silver haloid is at once dissolved away, but if we take a similar chloride in gelatine, we know it takes much longer to fix out. We get the same physical property of the vehicle in its protection of the silver haloid from the alkaline developer; if it were not for this property the silver haloid would be reduced all over the film, whether it had been acted upon by light or not, and we find that in withstanding the action of the developer that collodion has also less power than gelatine; or, in other words, the former is more easily fogged than the latter.

Returning to the case of albumen, we know that the addition of ammonia to the fixing bath is an improvement: is not this because the ammonia partially destroys the physical protection of the albumen and allows the hyposulphite of soda to more perfectly dissolve away the unreduced silver chloride embedded in the coagulated albumen? because we know that albumen is not coagulated by *ammonio*-nitrate of silver.

The next point is, Why had the prints done by the professional photographers faded more than the others? They would probably have used the same formula for their fixing bath, and would no doubt have left their prints in it as long as the others, and would have equal if not better convenience for thoroughly washing the prints. I believe it would be due to them having a greater number of prints in the fixing bath at one time that the small amount of hyposulphite between each print was rapidly weakened, and that there was not sufficient free hypo to dissolve out of the film the hyposulphite of silver first formed. There is no doubt that each print requires to be thoroughly rinsed in plenty of hypo before the whole of the silver can be eliminated from the film.

I had a curious instance of this a short time since. I was trying some destructive tests on bromide of silver prints, and I found that some of the small prints printed by contact did not stand so well as some enlargements done on the same paper and developed by the same formula. I have no doubt now that it was because each enlargement was fixed in a bath by itself, whereas the small prints were fixed a number at one time, *and the dish was not rocked* to cause the fresh hypo to wash over the surface of the prints; of course I kept turning them over, but that would not be equal to a wave of fluid passing over them.

The fact that in every case with the albumen prints (although they were done by men who would undoubtedly have used every care in their production) there was a distinct yellowing of the high lights (though in some cases the lightest tints in the pictures had not faded) proves, as far as permanence is concerned, that albumen as a vehicle cannot be depended upon, because it is evident that it is almost impossible to dissolve out the whole of the hyposulphite of silver out of the film, and that this in time gets converted into the yellow form of sulphide of silver.

The fact that the whites in the plain paper prints had not yellowed in the same manner showed that the silver is much more easily and perfectly dissolved out of gelatine than albumen, and this is one most important point in favour of the permanence of plain paper prints.

There was one most interesting print done by Mr. G. B. Gething—plain salted paper toned with gold in old hypo bath. The whites had kept pure, but the lightest tints, though they had not faded (by faded I mean they were not invisible), had changed to a light lemon-yellow colour, *i.e.*, the deposit of silver had been converted into a sulphide. But the fact of the whites of the picture not having coloured showed that the whole of the silver unreduced by light had been eliminated by the fixing bath, even after the action of the sulphur upon the silver chloride in the toning bath.

We have been advised to use sulphide of potassium in toning gelatino-bromide developed prints, but I am afraid it is not safe to use, because sulphur will be combined with the silver and in time the lightest tints will probably be changed to the yellow sulphide of silver colour similar to the print I have just been describing; I do not mean that the image will be destroyed, because sulphide of silver is permanent enough, but when in a very fine deposit, and there is sulphur in combination with the silver, as in a sulphur-toned print, the sulphurretted hydrogen in the atmosphere seems to readily convert the deposit into the yellow sulphide, though the same atmospheric conditions do not apparently have any action upon an equal deposit of silver when there is no sulphur in combination with the silver to start with.

I may say that a print done by Mr. Sutton by his development process (if I remember right he used an iodide salt) had slightly yellowed in the lightest tints. This would seem to show that a developed print gave no advantages as regards permanence over some of the printing-out processes of that time.

I think that we may fairly conclude, from the examination of these old prints done over thirty years, that for practical purposes a plain salted paper print, expecially when sensitised with ammonio-nitrate of silver, may be considered a permanent picture; and as probably platinum as the toning agent would possess advantages over gold, therefore we are justified in carrying out extensive experiments with different samples of paper and formulæ in order to obtain the best artistic results, especially when we take into consideration the enormous advantages that a printing-out process gives us.

HERBERT S. STARNES.

THE ILLUMINATION OF NEGATIVES FOR TRANSPARENCY PRINTING BY ARTIFICIAL LIGHT.

III.

IN a previous article I described a series of experiments which I had conducted with an illuminating chamber of my own invention, and gave a short description of its construction. Being so successful with it in the copying of opaque and transparent objects, with the aid of rapid and slow gelatino-bromide plates, I felt somewhat curious to know how it would perform when a wet collodion plate was brought into requisition as the means for copying a line engraving or such-like picture when the same was placed inside the chamber and the maximum amount of light from both Argand burners employed to illuminate the object.

When looking around for a suitable subject to copy, my little boy

came to the rescue with a book illustration of Pears' soap, which he just happened to have in his hand at the time; this picture was a pretty severe test, for, in point of colour, it was of a decided brown tint; the same, however, was placed in a whole-plate printing frame having a clean sheet of glass, upon which the picture was laid and pressed into contact with the ordinary backing and springs of the frame, the frame was then placed inside the chamber, and at once appeared most beautifully lit up, being absolutely free from reflections and flare spots. A 5×4 sheet of glass was then coated with collodion and duly sensitized in a thirty-grain silver bath.

A whole-plate camera carrying a rapid symmetrical lens was then brought into operation, and with a lens carrying a stop equal to *f*-8 the picture was focussed, the same being nearly the full size of the 5 × 4 plate. An exposure of just three minutes was given, and the plate afterwards developed with a twenty-grain iron solution; the image came up in nice time, and after a little strengthening with intensification, an almost perfect negative was the result. This operation I performed three times in succession with similar results.

Having clearly satisfied myself as to the capabilities of my chamber working wet collodion, I next turned my attention to the production of lantern transparencies from collodion negatives, and here also I met with entire success; exposures ranging from three to four minutes gave most excellent results when working with a liberal stop. It was originally my idea to confine my chamber to the production of negatives from opaque or transparent objects, or transparencies from negatives, but no sooner had I satisfied myself as to its capabilities for this work then I turned my attention to its suitability for producing enlarged prints on bromide paper from small-size negatives. My first experiment in this direction was made with a small Kodak film negative: this negative was placed between two 3¼ × 3¼ cover glasses, the edges were bound round with gummed paper, so as to cause the negative to lie flat, or, in other words, to avoid warping. This done, the negative was placed in position and a whole-plate camera carrying a *carte-de-visite* portrait combination stopped down to *f*-6 was employed, the camera was then adjusted and racked out till the picture just covered the full size of the ground glass of the camera; the Argand burners were then lit up to their full power, and an exposure of just four minutes given. Not having any available oxalate developer at hand, I proceeded to develop the print with the same hydroquinone developer as I had used for the development of the lantern plates, and which was described by me in my previous articles when treating of that part of my experiments. The print developed up with full density, and a somewhat liberal exposure was judged to have been given, perhaps half a minute less would have been better—however, the result was very good. Another Kodak negative was now taken which was somewhat more dense, and which I judged would require a somewhat longer exposure, the same enlargement given and the same illumination employed: in this case four minutes was also the time given, the result being a very nice enlargement. I must not forget to mention that the paper I employed was the Eastman Company's paper. I am shortly going to experiment somewhat further in this direction, and mean to employ paper of the Ilford bromide with the view of enlarging up to 12 × 10 and 15 × 12 through an ordinary camera in the same way as described. The result of these experiments I hope to give my readers on a future occasion.

When conducting some experiments I was forcibly struck with the appearance very thin negatives possessed when lit up with the full blaze of light from the chamber, and at once saw that such was fraught with much that was instructive in the way of printing. We all know that when it is desired to produce the best prints from very weak or thin negatives, recourse must be had to some means for preventing the full blaze of strong daylight from passing through them, therefore tissue paper or some such means is employed to keep down the amount of light to such a pitch as will not drown out the negative. When operating with very weak negatives in my chamber, I found that the best results were obtained when the lights were so regulated as not to drown out the printing quality of the same. There is evidently with all weak negatives just the right amount of light to print them with, and when for some reasons, such as an over-desire to get a print in a hurry, this be exceeded, the resulting print is sure to suffer. In my practice I frequently cover weak negatives to what some would consider an exceedingly ridiculous extent, and for this purpose I find nothing better than the Eastman stripping skins; it is wonderful what an improvement a couple of these films will produce when printing a weak negative by ordinary daylight. I know of cases where such have so improved negatives that some amateurs deemed so hopelessly poor as to entirely discard them, but when such were printed with these skins laid over them, the results were deemed good enough for exhibition.

Into the suitability of my chamber for printing ordinary bromide paper or xylonite films by contact I need not enter. I mean to try the latter sheets shortly in the way of placing the same in the ordinary dark slide of my camera, and reducing large and enlarging small-size negatives on the same through the camera, the results of which I hope to duly chronicle.

T. N. Armstrong.

THE EXPLOSION OF A GAS CYLINDER.

The lamentable catastrophe which occurred at the Rosehill Works of the Scotch and Irish Oxygen Company is of so much concern to all lanternists and users of the limelight, that anything that can be added to the particulars published respecting the cause of the explosion of the cylinder, or as to additional precautions to be observed to prevent accidents when using compressed gas, will no doubt be read with interest just now.

In most of the reports the statement is made that the cylinder "unaccountably" exploded. If what I have learnt on apparently good authority is correct, the first impression as to bursting through weakness of the vessel is not the cause, but it can be looked for in the fact that there were "*mixed*" gases in the cylinder. At Brin's London Works, for some time past, it has been the rule to empty *every* cylinder by opening the valve in the open air, and allow any gas therein to escape; but I believe I am right in saying that it was not invariably the case at the Rosehill Works, Polmadie. Then, again, the plan of painting hydrogen cylinder red is not quite universal yet, and some cylinders may be a dark brown or green, which with use will get rubbed and dirty, and look like black or could be mistaken for black. Before the Brin's Oxygen Company arranged with their agents to open every cylinder that came to the Works and let the gas escape, a curious incident occurred that led to an explosion while using gas bags for a lantern exhibition. It came about in this way: A gentleman had a steel cylinder containing oxygen, and thinking it looked dingy beside his nice apparatus painted it red, not knowing that this colour had already been adopted for hydrogen cylinders, and when the entertainment was over, or before he gave another, he thought he would have this one filled and another cylinder in reserve, and so sent to London for the purpose. Seeing the cylinder painted red, the Company naturally thought it contained hydrogen, and so filled it with that gas. For some reason the next time gas was wanted it was used from a gas bag, and the gas from this red cylinder helped to fill up a partially filled bag of oxygen, and as a result mixed gases where in the bag. The lantern operator put his apparatus in position some time before the entertainment was announced to commence, and thinking he would see all was in order, lit up. He soon found something was not quite as usual, for there was a bluish light about the flame, and before he could realise his position and get to turn the gas off, an explosion occurred, and he was thrown with considerable violence some distance up the room, the weights flying about and doing considerable damage, besides the concussion breaking the glass in the building. After recovering himself and looking carefully into matters, he found the red cylinder contained hydrogen, and so he had *inadvertently* mixed the gases. Here was an accident with *bags* that, by the merest fluke, was not of a fatal or very serious nature to the operator or audience (if the lighting up had been delayed until the assembly of the latter), and therefore it points to the conclusion that there is an *absolute necessity* for a test always to be applied before using any gas, no matter what receptacle contains it. This test is so simple, and takes so little time, that it ought not to be missed, and can be performed with perfect safety by Professor Fleming's explosive gas tester. Some of the tests suggested—such as indiarubber tubing with stopcocks at each end—*might* be dangerous owing to the great resistance offered for a fair substance of rubber tubing and the liability of the stopcock being blown out with violence. The resistance must be very slight, such as in the Fleming tester, viz., the thinnest tissue as supplied by the child's toy balloons. Of course one of the latter would do, but then it is not supplied with the necessary pressure to deliver the gas properly, and there is a liability for it to contain too much gas for a test explosion, should the gases be mixed. Any one who has heard the explosion from an air balloon, six inches or so diameter, containing mixed oxygen and hydrogen in the most explosive proportions, will bear out what I say, that the test

should be with a *small* quantity. The advantage of Fleming's test is that members of photographic societies or audiences on lantern nights can be reassured, if necessary, before the views are exhibited that the gases in the vessels, cylinders, or bags, are unmixed.

To sum up, I say that: (1) Every cylinder should be periodically tested to considerably more than the pressure to which it will ever be filled, and that pressure and the date of testing put on the vessel. (2) That all companies and private fillers of gas vessels should empty every one as soon as they arrive on the works, the same as Brin's London Company do. (3) That besides painting the vessels a distinctive colour—viz. hydrogen, red; oxygen, black—they should bear in most legible characters a label showing the nature of the gas—"Ox." or "Hy." (4) Every cylinder should be tested prior to dispatch from the works or agents, and a label, *sealed* and over the nozzle, bearing the words, "Tested and containing "Hy." or "Ox.," as the case may be, with the date. Given these precautions, I think we should feel perfect confidence in a light that is so convenient and has been so successful, and helps so largely to popularise optical lanterns and make high-class dissolving view entertainments possible in the drawing room as well as in the largest hall.

I sincerely hope that the inquest on the poor foreman, Bow, who lost his life at the Scotch Works will bring to light without doubt the cause of the explosion, and that the above precautions, or some others that answer the same purpose, will be universally adopted to reduce the risk of similar occurrences to the minimum. It is, perhaps, a little premature to hazard an opinion as to the cause of the firing in the cylinder, but it may have been from the heat generated by compressing the gas raising oil or some inflammable particle in the valve to such a temperature that it took fire, and being fed by the oxygen contained in the cylinder, the gas became rarified and exerted a pressure beyond the resisting power of the cylinder, and hence the explosion. This surmise is based on the assumption that the cylinder had been tested to the regular test pressure (hydraulically) of one and a half or two tons per square inch. If it had *not* been tested, then of course the explanation is more simple, and the vessel might have *burst* at any time during filling, or some little time after. It is chemically proved that *mixed* hydrogen and oxygen will fire under great pressure with platina or particles of iron.

I trust something will be done for the widow and children of the poor man who lost his life in the execution of his duty, and if what the Scotch Company have to pay as employers' liability compensation is not sufficient to meet the case, and you will open a fund, I shall be pleased to subscribe.

G. R. Baker.

ON CONTROL IN THE DENSITY OF NEGATIVES.*

Chemistry of the Changes. *The action of Mercuric Chloride.*—As mercuric chloride is the first reagent employed, it appeared to be important to discover the change that it brings about. It is generally stated that when mercuric chloride reacts with the silver of the image, silver chloride and mercurous chloride result:—

$$Ag + HgCl_2 = HgCl + AgCl.$$

As I have not been able to find any record of a specific proof of the truth of this reaction, I treated a quantity of pure precipitated silver by grinding it with mercuric chloride and water, and repeating the grinding at intervals during a few days. The product was washed, and consisted chiefly of a pure white powder, but mixed with a coarse grey powder of probably unacted-on silver. As much of the white product as was deemed advisable was separated by elutriation, dried at steam heat, and found analytically to contain 37·75 per cent. of silver chloride, the amount needed by the above equation being 37·86 per cent. This result was confirmed by other methods, such as the quantity of mercury salt taken up, and the weight of product obtained from a given weight of silver; therefore there is no room for doubt that the commonly accepted reaction is correct so far as the matter of proportion goes. The properties of the product, however, both chemical and physical, point to the conclusion that it is not a *mixture* of the two chlorides, but a definite double chloride. This matter is still under investigation, but acting in the light of evidence already to hand, I will for present purposes regard the substance as a definite compound, writing the equation that represents its production—

$$Ag + HgCl_2 = HgAgCl_2,$$

and postpone any further consideration of the matter.

The action of Sodium Sulphite.—The action of sodium sulphite upon mercurous silver chloride is commonly stated to result in the solution of the silver chloride and the reduction of the mercurous chloride to the metallic state. This I believe to be entirely incorrect, though there appears to be sufficient ground for having provisionally accepted the idea.

* Concluded from page 72.

In the quotation given above from Dr. Eder, one would naturally infer that this was the change, and test books of chemistry very commonly state that sodium sulphite reduces mercurous chloride to the metal. It is also well known that silver chloride is dissolved by sodium sulphite. But the reaction before us is not equal to the result of the action of sodium sulphite upon mercurous chloride and silver chloride separately, the silver is not dissolved, the mercury is not reduced, and the sodium sulphite, apparently, does not play the part of a reducing agent.

Concerning the action of sodium sulphite on silver chloride alone, there is little that calls for remark. The silver chloride is dissolved, and there seems no reason to doubt the commonly accepted statement that a double sulphite is produced (or perhaps more than one).

The action of sodium sulphite upon mercurous chloride has been studied conjointly by Dr. Divers and Mr. Schmidzu (*Journal of the Chemical Society*, xlix., 533). They found that there was at first a transient blackening due to the formation of what they call hypomercurosic sulphite, and formulate thus: $Hg(SO_3)_2Hg_2$. This formula halved and written empirically becomes identical with mercurous sulphite, Hg_2SO_3, and there appears to be no conclusive reason why the production of this compound should not be expressed by the simple equation $2HgCl + Na_2SO_3 = Hg_2SO_3 + 2NaCl$. But excess of sodium sulphite so readily attacks the mercury salt that it cannot be prepared by taking any precautions from mercurous chloride, the final products of the change being mercuric sodium sulphite which dissolves, and a residue of metallic mercury, thus:—

$$Hg_2SO_3 + Na_2SO_3 = Hg + Hg(NaSO_3)_2.$$

For practical purposes, therefore, the action of sodium sulphite upon mercurous chloride may he stated to produce mercuric sodium sulphite and metallic mercury, and the whole change may be expressed thus:—

$$2HgCl + 2Na_2SO_3 = Hg(NaSO_3)_2 + Hg + 2NaCl.$$

It is important to notice that the sodium sulphite does not play the part of a reducing agent at all, for it is not oxidised; and that half the mercury is dissolved, the other half remaining as metal. I have confirmed the truth of this reaction so far as identifying the mercuric sodium sulphite in the solution by the properties it is stated to possess, and I have proved analytically that half the mercury is dissolved and that the other half remains as metal. If, therefore, it were possible to exchange the silver image of a negative for mercury, it would not be possible to increase the amount of metal by the action of mercuric chloride followed by sodium sulphite. The contrary of this has been stated by some writers on photographic subjects.

The action of sodium sulphite upon mercurous silver chloride does not appear to have been investigated. The current and incorrect idea has been referred to above. My investigation of the reaction is not yet so complete that I can give a proved equation to represent it, but it is not likely that further work will discover results of practical interest to the photographer. When sodium sulphite reacts upon mercurous silver chloride, the whole of the chlorine goes into the solution, three-fourths of the mercury and half the silver are also dissolved, and one-fourth of the mercury and half the silver remain in the metallic condition to form the image. The action may be represented thus:—

$$4HgAgCl_2 = \underbrace{3HgCl_2 + 2AgCl}_{\text{Dissolved by the sodium sulphite.}} + Ag_2Hg.$$

The Ag_2Hg remains to form the image, and the mercuric chloride and silver chloride are taken up and doubtless changed by the sodium sulphite in a way that might easily be conjectured; but as I have not yet proved by experiment the compounds that are formed, it is better to leave it an open question for the present. I have also proved that the silver and mercury are actually present in the above proportion in a negative intensified by mercuric chloride followed by sodium sulphite, by an estimation of the metals present in the film. It will be observed that this method of intensification results in an exchange of half the silver of the image for mercury, four atoms of silver (4 Ag) yielding after the action two atoms of silver and one of mercury (Ag_2Hg). This generally results in a slight increase of density, but not always; it appears to depend upon the physical condition of the film and its image whether or not the exchange of half the silver for less than its own weight of mercury (216 : 200) will give increased density; but, personally, I have found that there is an intensification effect in the vast majority of cases.

There are statements concerning this method of intensification that I have not been able to confirm. First, that by repeating the operation any density can be obtained. This is probably the assertion of a mere theoretician who argued from false premises. I have repeated the process six times on a plate, and the density is greatest where it has received only one treatment. It has been pointed out above, that so far as mercury itself is concerned, the action of these reagents does not increase its

quantity. Secondly, that a negative intensified by this process may be reduced by immersion in a solution of sodium hyposulphite. I have never found this to be the case, even by prolonged treatment (one hour), nor can I see any reason to expect reduction under these circumstances.

There is what at first appears to be an anomalous property of the image resulting after the application of this intensifier, namely, that it is invariably darkened to a slight extent by the application of ferrous oxalate to it. As the solution of the chloride of silver in sodium sulphite, as shown in the above equation, is not very stable, it may be that a little silver chloride remains attached to the image, and that this is reduced to the metallic state by the ferrous oxalate, but the fact remains that even by prolonged treatment with fresh sodium sulphite solution I have been unable to eliminate whatever it is that leads to this effect.

It may be worth while recording here, that if mercurous silver chloride and sodium sulphite are allowed to remain in contact for some days, the residue is chiefly silver instead of Ag_2Hg. This fact has probably no photographic significance.

The action of Ferrous Oxalate.—In order to make quite sure of the processes that I am about to recommend, I have proved experimentally that a solution of ferrous oxalate reduces both silver chloride and mercurous chloride to the metallic state; and that ferrous oxalate solution removes all the chlorine from mercurous silver chloride and leaves the whole of both the metals as such.

Practical Methods.—The method of getting control in density that I wish most urgently to recommend to those who aim at getting good negatives with certainty, is to take care that in development the density of deposit never exceeds what is required, and then to work up the negative to the best condition by the action of mercuric chloride followed by ferrous oxalate, repeating this process if necessary; or if the intensification that would be given by these reagents is conjectured to be too great, following, under certain conditions, the mercury solution with sodium sulphite. The important matter is that every effect shall be thorough, that every atom of silver in the negative may be acted upon in the same way and to the same extent.

I first recommended the use of mercuric chloride followed by ferrous oxalate in 1888, in the *Photographic News* (vol. xxxii., p. 18), and in my *Introduction to the Science and Practice of Photography*. During the last two or three years I have had considerable experience in the application of this process, and could have shown many negatives treated by it, but so far as appearance goes it is very doubtful whether any one could distinguish a negative so intensified from one not changed after development. To illustrate the effect, I have treated various parts of a thin landscape negative, which includes sky, sea, distance, middle distance, and foreground, up to four times.

The solutions that it is advisable to use are,—

1. A saturated solution of mercuric chloride, to which has been added two or three cubic centimetres of strong hydrochloric acid to each litre (or half a drachm to each pint). No ammonium chloride or other salt should be added. There is no need to use mercuric bromide, as stated by Burton and Laurie, nor is the subsequent exposure to light specified by these gentlemen at all requisite. The operations may be carried on by daylight or gaslight, and, indeed, I have not found it necessary to pay any attention whatever to the light that falls upon the plate. After the mercuric chloride, the washing must be thorough, generally about an hour or an hour and a half, with constant changes of water.

2. The ferrous oxalate is conveniently prepared by adding one part by volume of a saturated solution of ferrous sulphate to about six parts by volume of a saturated solution of neutral potassium oxalate. The potassium oxalate may be just acidified with oxalic acid, but acid tends to retard the action of the oxalate. The solution may be used weaker than above, but then it acts more slowly. The action of the ferrous oxalate is retarded if all the mercuric chloride is not washed away from the negative, though the addition of mercuric chloride to the ferrous oxalate solution does not appear to have any appreciable effect. If the action of the ferrous oxalate is made unduly slow, the reduced silver and mercury will tend to whiteness, as is also the case in a very slowly developed negative. The slaty colour of the metals produced in extreme cases, especially at the glass side of the film, may lead an inexperienced operator to consider the action of the ferrous oxalate unfinished, although the reduction is complete.

3. The solution of sodium sulphite may vary as to strength within wide limits; a five to ten per cent. solution is convenient. A little acid should be added to it, preferably sulphurous, until the solution ceases to give a red colour to a dilute solution of phenol phthalein. Litmus paper is useless in this case. For ordinary work it is sufficient to take advantage of the fact, that if a good sample of crystallised sodium sulphite is dissolved with one-thousandth of its weight of citric acid, the alkali in it will probably be neutralised. To be on the safe side, five times this amount may be taken, say half a gramme of citric acid to one hundred grammes of sodium sulphite (or two and a half grains of acid to one ounce of sulphite). It is a mistake to say that a negative should be only just rinsed after treatment with mercuric chloride when sodium sulphite is to be used. The washing need not be so thorough as in other cases, but the more complete it is the more rapidly will the sulphite produce its effect.

We have already seen that mercuric chloride, followed by sodium sulphite, will not add to a mercury image, the operation leaving exactly as much mercury as there was originally; and as the effect of mercuric chloride followed by ferrous oxalate is simply to accumulate mercury upon the original silver of the negative, the intensifying action of the sulphite method becomes inappreciable after two or three applications of the oxalate method. This gives an additional uncertainty as to the intensifying effect of mercuric chloride followed by sodium sulphite; but the small amount of added density given by this method is often valuable, and the process has this advantage, that if it does no good it does no harm, for the negative, after a thorough washing, is just as amenable to the mercury and ferrous oxalate as if the sulphite had not been used.

It will be observed that the reducing power (using the expression in a chemical sense) of the image is lessened by the application of mercuric chloride and sodium sulphite, the Ag_2Hg being able to take to itself only three atoms of mercury by one application of mercuric chloride and ferrous oxalate, while the original four atoms of silver could take four atoms of mercury. But the difference in density given by mercury and ferrous oxalate when applied to a negative before and after the use of the sulphite method is not practically appreciable.

I had hoped to have been able to give a more or less exact idea of the densities of negatives as varied by such treatments as have been described, but the visual opacity sometimes proves different from the retardation of printing processes. It appears that this may always be so; but, whether or not, it is wrong in principle to attempt to estimate one effect by the measurement of another when the two are not of necessity proportional. I have found also that the increase of printing density produced by the same operation varies somewhat according to the conditions under which the changes are effected. It may, however, be stated in practical language that one treatment with mercuric chloride and ferrous oxalate generally about doubles the opacity; that after a second treatment the result is about equal to that produced by the application of mercuric chloride followed by ammonia upon the original negative; and that mercuric chloride and sodium sulphite on the original gives a density about half way between the original and that treated once by the oxalate method.

Doubtless, if the manner of controlling density here advocated is adopted some operators will find troubles; and in order, as far as possible, to forewarn those who appear to have a predisposition to fail, I have endeavoured to discover all the drawbacks that beset the operations. If the plate darkens very slowly under the ferrous oxalate, and the oxalate is not unduly dilute or acid, the washing after the mercury salt has been insufficient; but at the same time it may be remarked that ferrous oxalate is much slower in action than ammonia or sodium sulphite. If the finished negative has a black-looking stain upon it, the ferrous oxalate has not been washed away, and a further washing will rectify it. The removal of the excess of mercuric chloride is greatly facilitated if the mercury solution is poured off when the glass side of the film is grey, then a sufficient quantity of the solution is probably in the film to complete the bleaching. It is, however, important to make the bleaching thorough in the end, if a truly proportional effect is sought after.

The minor advantages of the use of the methods recommended might be set out in a formidable list. There is no tendency to frill, even with repeated treatments, the operations are clean, the negative is in no way stained, the shadows are not choked up, and the lights do not lose their gradation; the operations are reliable, and the results are permanent. In order to test this last matter, I heated an amalgam of silver, containing an equal number of atoms of each metal, at the temperature of boiling water for about twelve hours, with occasional weighing, and found that the volatilisation of the mercury gave a loss equal to nearly one part in two hundred per hour—indicating a want of permanence. But a part of a developed plate that had been intensified by the mercuric chloride and ferrous oxalate method until it probably contained more than ten times as much mercury as silver, after heating in a steam oven for six days (forty hours), showed no sign of diminished density either on a varnished or an unvarnished part. The density, indeed, seems rather increased by the treatment, and this may be due to a shrinkage of the film brought about by the prolonged heating. Thus the gelatine confers an extraordinary permanence upon the otherwise slightly volatile mercury. It may be noted as a fact, though hardly an advantage, that

after intensification by the methods advocated, a negative is as amenable to intensification by many and probably by all other processes as it was originally; but the greatest advantage of all is that these processes enable the photographer to work step by step up to the density he desires, with the full conviction that the character of the gradation of the negative is not altered. CHAPMAN JONES, F.I.C., F.C.S.

PRACTICAL INTERPRETATIONS OF THE LAW OF CONJUGATE FOCI.

[A Paper read at the Camera Club and published in its Journal.]

THE law of conjugate foci is one of the few simple laws that occur in the subject of optics. In its application to the use of photographic lenses it is still more simplified in that converging lenses, or lenses forming real images only, come under consideration. Its main application is, with a given lens, to determine distances on either side of its optical centre for positions of object and image, for enlargements and reductions. There is a further application which, I think, has not hitherto been considered to much practical purpose—viz., the application of the law to angular vision.

The first and essential accurate measurement necessary is the absolute focal length of the lens, and when this is known the interpretations of the law are readily understood. In THE BRITISH JOURNAL OF PHOTOGRAPHY for this year I have given one of the simplest methods to determine this, and one that can be carried out in an ordinary room; for this reason I think it will become a popular one.

To describe the law of conjugate foci by reference to Fig. 1, $f^2 = xy$. For all practical purposes this is the only equation involved. The square of the focus for a given lens is a constant, and the distance y beyond the focus for parallel rays on one side, multiplied by the distance beyond the focus for parallel rays on the other side, is also constant. Again, whatever the proportion of the focus y be, x will be that number of times the focus. If we have a 10″ lens, the square of its focus = 100″, if $y = 5$″, x must = 20″. In other words, y being half the focus, x will be twice the focus, or generally if $y = \frac{1}{n}$ the focus, $x = n$ times the focus. Again, the same figures represent the proportions for the sizes of image and object, and as the positions of the conjugate points O and I are always interchangeable, the distances found for the case of reduction are identical

FIG. 1.

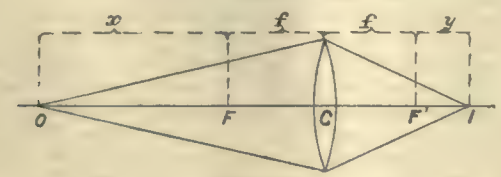
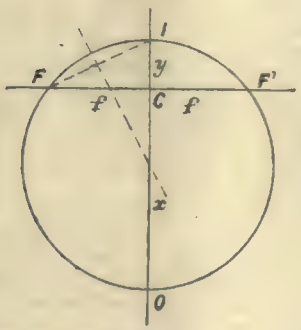


FIG. 2.



with those for a case of enlargement, but reversed as regards their positions from the optical centre of the lens. Putting the law in this simple form, one sees the reason at once for the rule of thumb containing the expression "plus one"—viz., for a given reduction with any lens *the distance of the object from lens* is the number of times *plus one*, multiplied by the focal length of the lens; *and the distance of the screen from lens* is the reciprocal of the number of times *plus one*, multiplied by the focal length of the lens, and *vice versâ* for a given enlargement.

A simple graphic method to illustrate this equation is contained in the property of lines drawn within the circumference of a circle (see Fig. 2). Draw two lines at right angles; on one line measure off the focal length of lens, say 20 inches F C or F′C. On a line at right angles to this measure off the proportion of this (20 inches) you wish to enlarge or reduce, say four times; 20 inches divided by 4 is 5 inches; measure this distance on this other line C I, and complete a circle which shall cut both these points. To do this, join the two points F I, or F′I, bisect the line joining them, and upon this erect another perpendicular. Where this perpendicular cuts the line I O is the centre of the circle sought. Complete the circle. C I is the distance corresponding to y and C O, the distance corresponding to x as in Fig. 1, or here y given = 5 inches, x will be found to be 80 inches; adding the focus to each quantity—distance of object = 100 inches from optical centre of lens, and 25 inches = distance of image from optical centre of lens.

Generally the equivalent focus, or focus for parallel rays, is the mean proportional between the distances made up by the differences of the two conjugate points from the equivalent focus measured on the corresponding sides of the optical centre of the lens.

Graphic methods based on this law are numerous, and the Camera Club has several in its possession; they are certainly pretty, although, the law being so simple, it seems hardly necessary to employ them.

The application that I wish to dwell on chiefly is one whereby in using the camera with the sensitive film, ready to be exposed by the release of the shutter, one is enabled to know, not only what amount of subject will be received on the film itself, but also when the object wished to be focussed for is in the focus. I believe the only satisfactory method hitherto adopted, in which there is a proper field of view, is by employing a pair of cameras with lenses of identical foci, similar to the method of using one side of the stereoscopic camera. This, of course, enables the whole field of view to be visible, and also accurate focussing is a simple matter. It has the objections of being cumbersome and expensive. I am aware that another method of a similar nature has been attempted, in which the finder is a smaller lens, bearing a regular definite ratio in focus to the lens employed to take the picture, and is mounted on the side or top of the main camera, and has a system of multiplying or dividing wheels, so that the movement of the main camera back itself produces a corresponding proportional movement in the finder, and focus is obtained in this way. It is a nice piece of apparatus, but is, of course, a very difficult one to construct, in that an exact convenient proportion as regards the ratio of the smaller lens to the larger one, and a similar proportion in the movement by the wheels, is a difficult matter. Another complicated method, although it is very ingenious, has been described by a gentleman in France, M. Berthon, and those who are interested in this I would refer to his paper on the subject.

I have heard from him that he has elaborated this, but he does not wish me to describe his method fully; but the principle is the same as that he has already described, and consists of two arms of a compass, which are made to open to their full extent when the nearest object ever likely to be taken with the camera is focussed for, and they are quite closed when the lens receives very distant objects, or is in focus for parallel rays. The compass is viewed from the top of the camera, with the eye in a fixed position, the opening and closing of the arms being communicated by movement of the lens; and M. Berthon maintains that very little practice will make this instrument a very valuable aid as a focus finder. The arms of the compass closed then correspond to parallel rays, or the camera back is set for parallel rays, and as any nearer conjugate point is focussed for, these arms, opening more and more, will give an object which was a point at the extreme distance an appreciable angle, becoming larger and larger the nearer such a subject approaches the camera. The application is one of practice; for example, if a man's figure is at the nearest distance that will ever be chosen, and the compass arms are made just to include this figure in the visible angle, the farther a man recedes from the camera the less angle will be included, and as the lens is shortened in focus the arms of the compass will become nearer together, and when they just include the man at any given distance you are aware that the lens is in focus upon the screen. Of course it is a question of practice, various well-known objects being gauged in this way, and, as in most moving life, one or other of these objects, such as a man, a horse, a dog, &c., is pretty well sure to be present for determining the focus required.

If the amount of subject visible in the object focussed for is not large, a method mentioned by Mr. Traill Taylor in THE BRITISH JOURNAL ALMANAC is admirably adapted. It is a difficult matter to construct lenses of different forms of identically the same focus, and the method described by Mr. Traill Taylor is a means of obviating this difficulty, in that by employing two lenses, both of which are rather less than double the focus of the phonographic combination, separated a little distance the one from the other, a position will be found, when these two combined lenses, with this certain separation between them, will give accurately the focus of the optical combination. By applying then an ordinary eyepiece, and fixing the telescope on top of the camera, an object can be picked

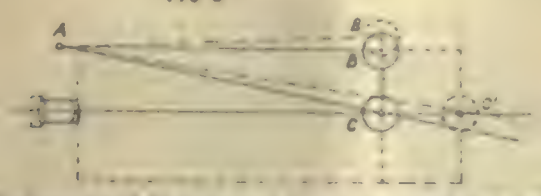
out very accurately, the eye end of the telescope moving with the back of the camera. I have brought one constructed on this principle to show you, the object glass being ordinary spectacle lenses. Of course an instrument of this nature, if made on the principle described by the late Professor Barlow, with a properly achromatised object glass, and instead of another positive object glass a negative achromatic lens, known as the "Barlow lens," in the place of the second spectacle lens, is a very perfect apparatus optically, but, as I have indicated, it has the drawback of a small field.

The last application of the law of conjugate foci that I wish to call your attention to is another and simple form of finding the focus, as well as showing at the same time what is on the screen, and you have before you an instrument to illustrate the invention. This construction is dependent upon the constant angle formed at the edge of a lens receiving parallel rays to its equivalent focus. This is a constant, or no error is measurable, so long as the focus is greater than the aperture, and in all photographic lines this condition is maintained. In Fig. 3, the bar A B is an ordinary rule graduated and pivoted at A, the bar B at right angles to it can be set to the accurate equivalent focus of the lens. The diagonal bar A C is also pivoted at A.

The bar B C is fixed at right angles to the bar A B, then representing the semi-aperture of the supposed lens of the same focus as that explained.

If this is made accurately—the aperture of the lens—the result in focussing will be correct. However, the error in comparison is so slight for an imaginary larger aperture than that of the lens itself in *practical use*, that it is immaterial unless the exaggeration in this respect be very great. The bar A B when set is parallel to the axis of the lens, and the

Fig 3



bar B C of course at right angles to that. In the cross bar A C there is the slot in which a pin fixed to the camera back can slide when the back is moved. For greater accuracy and to maintain parallelism, a bar can be adjusted *parallel to A C when set to the correct ratio of aperture to focus* of the lens employed, or as B C is to A B, and this second bar slotted and carried by the pin at C.

Two small finders are placed at the camera back, the one moving with the back at the top of the pin at C, the other mounted axially on the bar A B at B. For parallel rays the image on the screen is in focus, and in both view meters the same object appears centrally on the plate of both. If it be required to focus some nearer object, by wheeling out the camera back, the pin at C passes along the slot in the cross-bar, and throws the bar A B inwards, pointing towards some nearer object. When an object, then, is in the centre of both view meters, you are assured that the lens itself is in focus on the screen. T. R. Dallmeyer.

[Mr. Dallmeyer informs us that the diagrams by which this paper is illustrated must only be considered as rough and suggestive rather than complete and elaborate. He promises to supply us with more perfect drawings should such be found desirable.—Ed.]

THE NEW ROLLABLE TRANSPARENT FILM.

[A Paper read before the Camera Club, and published in its Journal.

Matthew Arnold said, in his essay, *A Guide to English Literature*, "For myself, I lament nothing more in our actual instruction than its multiformity—a multiformity, too often, of false direction and useless labour. I desire nothing so much for it as greater uniformity, but uniformity in good. Nothing is taught well except what is known familiarly and taught often. The Greeks used to say, 'Give us a fine thing two or three times over;' and they were right."

I trust that you will not gather from my use of Mr. Arnold's concise language that I desire to appear before you in the *rôle* of teacher, or that I have prepared for your edification, as the Greeks said, "a fine thing," for nothing could be further from my intentions. The subject under consideration is one which, in my opinion, has suffered much from multiformity, too often of false direction and useless labour, and I can truly say that I desire nothing so much for it as uniformity.

Another of England's best writers has said, in recognition of the value of little things, "Our mental business is carried on much in the same way as the business of the State—a great deal of hard work is done by agents who are not acknowledged. In a piece of machinery, too, I believe there is also often a small unnoticeable wheel which has a great deal to do with the motion of the large obvious ones."

With the advent of the rollable transparent films we are entering upon a new era in photography, which has been anticipated for many years as the natural sequence of methods lacking more or less well-recognised requirements, for whether it be true or not that no great invention ever comes to us unheralded, certainly no demand of modern times was ever more imperative and persistent than that there should be some transparent substitute for glass for the photographic negative. We may assume that it is quite unnecessary to enumerate the various methods which have been proposed, or which have assumed a more or less tangible form; but probably no one will affirm that any of these films ever assumed any commercial importance until the Eastman Company issued simultaneously a film and a practical means of exposing the same. In fact, so closely allied is a film with its method of exposure, that really the two things should not be considered apart, for it is self-evident that the moment the support of a sensitive surface becomes flexible, mechanical difficulties occur which must be met, and that effectually, or, no matter how perfect the flexible film might be intrinsically for picture making, it certainly could never be considered a suitable negative material.

To the student who patiently searches the records of the past for some evidence that the early workers in photography were really imbued with a desire to solve this problem of a flexible film, the result is most disappointing, and yet full of deep interest. Nor can we doubt that the subject would have received more special attention had it not been that the entire art was young, and the enormous advances made within a few years of Daguerre's discovery, with the magnificent vista of possibilities which each succeeding change revealed, distracted the attention of experimenters from what has since been thought by some to be the philosopher's stone of photography.

Not that the idea of a flexible film, or even a means of exposing the same, is not evident in many old records, still more the idea of a roller slide, the obvious and only means of correctly exposing films, was more or less plainly fixed in the minds of many thoughtful men.

Some of these ideas took tangible shape, and much good work was done with very indifferent materials and appliances. Still, no real solution of the problem as a whole can be claimed by any one, unless the New Rollable Transparent Film of the Eastman Company, in connexion with their apparatus for exposing the same, can be said to completely solve all the difficulties.

It is therefore with no small measure of personal diffidence that I approach a subject full of the utmost importance and significance for the future of photography, by the statement that, in the advent of the rollable transparent film, we are entering upon a new era, the end of which no man can foretell, but which has all the features of great power and potency for the extension of photographic and many allied methods.

I say diffidence, for my association with this special department of the art has brought me into intimate contact with so many photographers from all parts of the world, that I am compelled to admit that a very large number of those elements necessary for the success of any human scheme seem to lie quite outside of the influence which should attach to anything said or anything done by those whose exceptional and varied experience at least qualify their statements and acts for a respectful hearing.

The position of the Eastman Company, as vendors of films and film apparatus in all parts of the world, has made them the recipients of a mass of information and data relating to this subject utterly unknown to any one but themselves, the results of which might, however, be of the greatest possible value to photographers if they would but accept them in the same spirit with which they are offered. May we, therefore, before we take leave of a period which will soon be considered historical, at least glean some seed-wheat from a past which I am only too ready to admit contains much chaff.

It is said that history repeats itself, and in the saying no sadder commentary could be made on the wilfulness of mankind, for if we be intelligent factors of a civilised and progressive community we should, so to speak, fortify ourselves by retrospective vision. It is, therefore, in this connexion that I venture again to mention that *bête noir* of photography—the stripping film. This film, the construction of which was along the lines of requirements suggested by a knowledge of what was necessary, modified by what was then possible, had in its own intrinsic merits all the possibilities of a great future. It was coated upon the purest of paper, made especially for the purpose. The film was isolated from the paper during its wet and absorbent condition by a substratum of soluble gelatine, selected with the greatest care to ensure absolute inertness. When

dry it was exposed, and afterwards developed, fixed, and washed, whereupon the temporary paper backing was removed and a clean substantial backing of gelatine substituted, which became a permanent part of the negative.

The instructions accompanying each packet of these films were clear and explicit; they were from time to time varied and enlarged upon as experience accumulated, in order to make the public perfectly familiar with the few salient features necessary to success. Both in America and in England public and private demonstrations were given free of cost to any one who evinced any desire to know anything of the process, whether he was a user of the film or even avowedly did not intend to be. The value of the roller slide as a necessary adjunct to the process was enlarged upon, and the functions of its several parts described in detail, and yet what has been the result of this enormous expenditure of time, money, and energy?

First.—We find a predisposition to use developers that contained in themselves all the elements necessary to cause the soluble substratum to loosen its hold upon the insoluble film.

Second.—A persistent use of developers which had exactly the opposite effect, *i.e.*, to tan or render the substratum in part or wholly insoluble, and thus prevent the subsequent removal of the image-bearing film.

Third.—We find the films left in water overnight during summer temperatures, which caused the substratum to decompose and to give up its otherwise willing prisoner.

Fourth.—Others who used developers more in accordance with the clearly explained requirements, but who insisted on drying their films before stripping, whereupon any otherwise innocent tendency of the substratum to become insoluble was aggravated into a serious danger.

Fifth.—Those who from motives of economy or otherwise persisted in purchasing their indiarubber substratum from people who had no personal interest in the success of the process, but on the contrary were most earnest in condemning it.

Sixth.—Those who regaled themselves by lighting their pipes during the process of soaking the stripping skin and then complained that the wet gelatine became an unmanageable mass.

Seventh.—Those whose natural impatience impelled them to remove the negative from its temporary glass support, "just to *see* if it was dry," instead of adopting the more rational course of ascertaining by their sense of feeling the condition (which, assuming all the other processes to be perfectly performed, was of the most vital and final importance).

I do not hesitate to say that there were some serious elements of failure in the stripping film, which under adverse conditions were exaggerated, and which were greatly to be deplored, but I can truly say that these conditions seldom occurred excepting in violation of often and repeated warnings. So sure was the Eastman Company of the intrinsic value of this process, that they put themselves, both in England and America, at the disposition of the public as developers of pictures from these film negatives which the public themselves practically said they could not work, and what a revelation was then made of the true condition of affairs! For, tried by the test of average, the only just and equitable law, this same process that was despised and condemned now became in their hands a most marked and decided success. For whatever defect this film has been charged with, certainly the process of stripping itself was the one special feature of which photographers made the most mess and with which they found the most fault. W. H. Walker.

(To be continued.)

THE ROYTON EXHIBITION.

Our correspondent informs us that this Exhibition was a great success, there being over 500 exhibits, many of them showing first-class work. Much praise is due to the organizer, the Rev. J. George Gibson, and his assistants, for the manner in which all arrangements were carried out, for although the rooms are large, the arrangement of the great number of exhibits must have required considerable patience and skill. The attendance on the lantern evenings was also very good.

Judges:—Messrs. Paul Lange, Watmough Webster, and Walter D. Welford.

The following is the list of awards:—

Class 1 (Amateur Landscape or Seascape).—Silver medal, J. G. Austin; bronze medal, C. Court Cole.

Class 2 (Professional Landscape or Seascape).—Silver medal, J. Pike; bronze medal, J. P. Gibson; highly commended, Frank M. Sutcliffe.

Class 3 (Amateur Portraiture).—Silver medal, S. Butler; bronze medal, Alfred Stieglitz; highly commended, J. G. Austin.

Class 4 (Professional Portraiture).—Silver medal, W. J. Byrne; bronze medal, H. S. Mendelssohn.

Class 5 (Architecture, Amateur).—Silver medal, C. Court Cole; bronze medal, Ernest Beck.

Class 6 (Architecture, Professional).—Silver medal, J. P. Gibson bronze medal, W. H. Reeves.

Class 7 (Enlargements, Amateur).—Silver medal, W. H. Kitchin; bronze medal, J. H. Falks; highly commended, T. J. Bright; very highly commended, Rev. J. George Gibson.

Class 8 (Enlargements, Professional).—Silver medal, M. Anty; bronze medal, F. Whaley.

Class 9 (Instantaneous, Amateur).—Silver medal, E. Beck; silver medal, Rev. J. George Gibson.

Class 10 (Instantaneous, Professional).—Silver medal, Lyd. Sawyer; bronze medal, J. E. Goold.

Class 11 (Best Photograph, Beginners).—Bronze medal, R. B. Lodge.

Class 12 (Lantern Transparencies, Amateur).—Silver medal, W. H. Richin; bronze medal, Edgar G. Lee.

Class 13 (Lantern Transparencies, Professional).—Silver medal, G. W. Wilson; bronze medal, G. E. Thompson.

Class 14 (Best picture on Fry's Plates).—First prize, F. Whaley; bronze medal, Walter D. Welford.

Class 15 (Mechanical).—Silver medal, T. Scotton; bronze, W. Parry.

Class 16 (Scientific).—A. A. Carnell, S. F. Clarke.

Class 17 (Landscapes with Figures).—J. E. Austin, T. I. Bright, C. J. Roe.

Class 18 (Genre Studies).—J. Hubert.

Class 19 (Best and Second-best Pictures in the Exhibition).—H. P. Robinson, F. M. Sutcliffe.

Class 20 (Champion, Amateur).—A. G. Tagliaferro, J. W. Kenworthy. Bronze (extra), C. S. Roe; very highly commended, J. Dumont.

Class 21 (Champion, Professional).—H. P. Robinson, F. M. Sutcliffe; bronze (extra), W. W. Winter.

Foreign Notes and News.

The last number of the *Photographische Nachrichten* draws attention to the remarks in The British Journal of Photography concerning the acid fixing bath, and especially to the practice recommended by some of adding sulphurous acid to the soda fixing solution. This habit, says Dr. Stolze, that seems to be prevalent in England explains a good many of the unfavourable opinions which have been expressed about the acid bath. It is an altogether mistaken practice to add sulphurous acid to the bath instead of acidulated sulphite of soda solution. It is quite true that sulphurous acid is in all cases the active body, but not by itself; for it is very quickly oxidised by contact with the air to sulphuric acid, and this decomposes the fixing soda into sulphurous acid and sulphur. To add free sulphurous, therefore, comes to the same thing as adding sulphuric acid, and this necessarily makes the bath turbid, which is just what one wants to avoid. Lainer's method especially requires an excess of undecomposed sulphite of soda. As long as this is present the sulphuric acid originating in the oxidation of sulphurous combines with the sodium sulphite liberating sulphurous acid, and thus does not cause any milky precipitate. If this take place it is a sign that the sulphite of soda is used up; by adding some of it and filtering, the cause of trouble may be removed.

A. Lainer gives the following method of reducing negatives, in the *Photographische Correspondenz*, when employing the acid fixing bath:—A bath containing a considerable amount of sulphurous acid is first prepared and poured into a vessel in which it can be preserved from contact with the air. In this the negative is immersed till the desired effect is obtained, which takes place in about twelve hours, by which time the darks have become quite transparent. The gradual nature of the action renders failure almost impossible. The bath in question consists of fixing soda, and an acid bath of 250 parts of sodium sulphite, 1000 of water, and 70 of hydrochloric acid. The addition of a little ferrocyanide of potash acts as a hastener, but has often to be repeated. This bath is also well suited for the treatment of positives, and it removes the brown spots which are frequently produced by mercury intensification on badly washed negatives.

The following receipt for a hydroquinone intensifier is given by Baron Hübl in the *Photographische Correspondenz*. Prepare the following solutions:—

A.

Hydroquinone	10 parts.
Water	1000 „
Citric acid	6 „

B.

Silver nitrate	1 part.
Water	30 parts.

Mix three of A and one of B, and pour it over the negative, which should have been developed with oxalate and well washed. It is not only the lights which are intensified, but any undeveloped details are also brought out. This method is said to be excellent for half-tones, and much superior to Casselbaum's receipt.

An interesting addition to the camera (the object is to obtain automatically a regular distribution of light in landscapes) has been invented by Ritter von Standenheim, to which he has given the name of "Photonome." It would appear to be of use in cases where there is a difficulty in bringing out the distance and the foreground with sufficient equality of definition. Herr von Standenheim arranges a ring in front on the objective, which carries a clockwork mechanism communicating motion to a plate which moves slowly in a slot from top to bottom over the face of the object glass. A revolving fan serves to regulate the speed. By this means a longer exposure is given for those parts of the landscape which are least brilliantly illuminated, and an equality of result is obtained.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1,366.—"An Instrument for Calculating Photographic Exposures." A. Watkins.—*Dated January 27, 1890.*

No. 1,482.—"Improvements connected with Colouring Photographic Impressions, and in the Mixing and Preparing the Colours, and as a Varnish or Enamel for same." J. J. E. Mayall.—*Dated January 28, 1890.*

No. 1,515.—"Improvements in Shutters for Photographic Apparatus." H. J. Bidbeck.—*Dated January 28, 1890.*

No. 1,620.—"Improvements in Magic Lanterns." E. T. Perken, F. L. Perken, and A. Bachert.—*Dated January 29, 1890.*

No. 1,655.—"Improvements in or appertaining to Apparatus applicable for Developing Artistic and other Effects on Screens for Photographic Purposes or the like." J. J. Atkinson and R. W. Barnes.—*Dated January 30, 1890.*

No. 1,715.—"New or Improved Means of Exposing a Succession of Photographic Films." M. A. Weir.—*Dated February 1, 1890.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 10	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
" 11	Quekett	20, Hanover-square.
" 11	Newcastle-on-Tyne & S. Counties	25, Pall Mall East.
" 11	Derby	Mechanics' Club, Newcastle-on-Tyne.
" 11	Sheffield	Secretary's Rooms, Derwent-buildings.
" 11	Manchester Amateur	24, Cross-street.
" 11	Bolton Club	Manchester Athenæum.
" 12	Photographic Club	The Studio, Chorley Lane, Bolton.
" 13	Birmingham	Anderton's Hotel, Fleet-street, E.C.
" 13	Cheltenham	Hamilton Rooms, Birkenhead.
" 13	Manchester Photographic Society	24, George-street.
" 13	London and Provincial	Masonic Hall Tavern, Basinghall-st.
" 14	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JANUARY 21.—Mr. T. E. Freshwater in the chair.

Mr. F. A. Bridge produced a bottle of developer which Mr. Cowan had brought to a previous meeting after developing some pictures with it. Mr. Bridge had tried it that day, and found that the developing power was not exhausted, although a long time—eight an hour—was required to complete the development. The mixture was that containing Rochelle salt and carbonate of potassium.

Mr. A. Cowan had continued his experiments with developers made up as variations on the American formula suggested to by Mr. Bridge, and brought up a large number of results. Among other experiments were some with sulphite and pyro only, and he found that in this case there was less and less density as the sulphite was reduced in quantity. There was also a considerable difference in the effect of different samples of sulphite. That the tartrate had a considerable effect was shown by a pair of plates, with one of which it had been omitted, and the image was less by one-half than in the one in which it had been included. Lithium carbonate and pyro, two grains of each to the ounce, without other additions, gave a very dense image, with a slight colouration in the shadows, however. Acetate instead of tartrate gave a somewhat less dense image. Sensitometer tests showed a gain of about two numbers higher with the American formula than with the ordinary pyro, bromide, and ammonia. Such development brought out the same numbers as the American formula, but with a little fog on, so much pushing as was necessary. He certainly thought that a good claim had been established for using tartrates and carbonate of lithium.

Mr. A. Haddon said that when, at a previous meeting, Mr. Cowan brought forward a set of experiments he thought that the developing power was due to the alkalinity of the sulphite, especially as more samples were so much more active than others. He (Mr. Haddon) had promised to make some experiments in order to determine when sulphite was in a neutral condition. He had done this, but the results were contradictory. The substances that he had tried as tests were phenol phthalein, rosolic acid, methyl orange, and litmus. A certain quantity of sulphite required the addition of three drops of sulphurous acid to bring about that change of colour supposed to indicate neutrality when either phenol phthalein or rosolic acid was used as a test, whilst one hundred and thirty drops were required with methyl orange and with litmus before the change of colour took place. Which set of experiments indicated the truth he could not say.

Mr. J. B. B. Wellington showed a 15 × 12 transparency on collodio-bromide. Towards the corners there were a number of reddish spots, apparently of reduced silver. He only found these spots to occur with large plates; smaller plates coated with the same emulsion were free from them.

Mr. W. E. Debenham inquired whether the large plates had been used before, and, learning that they had been, suggested cleaning one with strong nitric acid and observing whether spots still appeared on it.

A question from the box was read:—"In this day's *Standard* a letter appears in which it is stated that the late Professor Joule, best known for his investigation of the mechanical equivalent of heat, has enriched photography by several important inventions. Will any member describe these inventions?"

As there was no reply, it was arranged that the Secretary should communicate with the writer of the letter, and ask, in the name of the Association, to be favoured with the description asked for.

The Chairman called attention to a practice still prevailing in certain places of storing oxygen and hydrogen gases in bottles of the same colour, a practice strongly condemned by the meeting; and it was thought that the best thing to do was systematically to refuse to have anything to do with these gases unless they were stored in bottles of recognised distinctive colours.

CAMERA CLUB.

ON January 30 Mr. T. R. Dallmeyer read a paper entitled *Practical Interpretations of the Law of Conjugate Foci* [see page 90.] Mr. Lyonel Clark occupied the chair.

The Secretary handed round a matt-surface silver print sent by Mr. Quick, in which the note-paper on which his letter was written had been sensitised and printed upon with happy results.

Mr. Dallmeyer showed a graphic method of illustrating the equation representing the law of conjugate foci by the properties of lines drawn within the circumference of a circle. He also showed applications of the law of conjugate foci whereby the proportions of a view meter were served, and also to give indications of the right lens to be used for being in focus. Those included one by M. Berthon, one mentioned by Mr. J. Traill Taylor, and one described and illustrated by an actual example by Mr. Dallmeyer himself.

Some remarks were made by Messrs. Willis, Elder, Wilson Noble, and the Chairman.

The subject on Thursday, February 13, is *Landscape*, when a paper will be read by Mr. Graham Balfour.

HOLBORN CAMERA CLUB.

JANUARY 31.—Mrs. Dear was unanimously voted to the chair, which she filled with becoming grace.

Mr. Chang and Mr. Cobb submitted proofs of the flash-light pictures taken on the occasion of the recent visit of the Club to the rooms of the Holborn Cycling Club, which were much admired.

Mr. T. O. Dear submitted to the notice of the members an album of views taken by a friend in New Mexico. A large party of the members contemplate going there at once, as there seems to be some sunshine in the neighbourhood.

During the evening a magnificent enlargement arrived from Messrs. Fry & Co., from a negative of the Club headquarters, taken by Mr. Brooks.

The members will welcome visitors on Friday, February 7, when the subject will be *Instruction in Photography*, including *How to Select a Camera and Lens and Use Them to the Best Advantage*.

BATH PHOTOGRAPHIC SOCIETY.

JANUARY 29.—Meeting at 10, Quiet-street.—Mr. W. Pumphrey in the chair.

Messrs. H. J. Lewis, H. G. F. Wells, D. Twain, and J. S. Gibbs were elected members, and Ernest Pitman and J. Day auditors.

A circular letter was read from Dr. Emerson offering a copy of his work, *East Anglian Life*, to the Society. This generous proposal was, on the motion of Mr. George F. Powell, accepted with the best thanks of the Society.

Messrs. Dugdale and Davis then gave a dissolving view lantern entertainment. The slides represented places visited at the summer outings. These were made from wet collodion by Mr. Dugdale, who also showed a series of slides he had coloured. The oxy-ethe light was used and manipulated by Mr. Davies in a satisfactory manner.

The Chairman thanked these gentlemen for their efforts, and hoped a competition of members' slides would take place before the summer excursions again started.

Mr. Dutton showed prints on celluloid (silver bromide process), also, as a comparison, others on opal and cardboard. He remarked that the percentage of failures with celluloid was at present high.

Annual meeting, February 26.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

JANUARY 30.—A letter was read from Mr. A. W. Beer (ex-President), regretting his inability to attend owing to illness. In his absence, Mr. B. J. Sayce occupied the chair at the commencement of the proceedings, and, after a vote of thanks to the retiring officers and Council for their services during the past year had been unanimously passed, Mr. Sayce introduced Mr. Paul Lange (President-elect), who thereupon took the chair.

The following gentlemen were elected members of the Association—viz., Messrs. J. W. Warburton, M.D., John Price, M.I.C.E., Rev. G. F. Wills, Messrs. H. Cope West, R. S. Gladstone, B. Cookson, and J. Watkins.

Mr. Lange spoke at some considerable length as to the benefits derived from Conventions generally, more particularly when attention was drawn to something really practical. He advocated that a better feeling should be cultivated with kindred societies, and drew attention to the Chester Conference, to be held shortly, of which Mr. F. Evans was the able Secretary. Mr. Lange had

not had time at his disposal to prepare anything in the form of a "speech," and called attention to the general plan of operations which it was proposed to carry out during the session, and hoped the members would not be reticent about photographic troubles and failures (especially the younger members) which they might experience from time to time. He was sure there were many experienced members who would be most happy to give the necessary information.

A short discussion on the subject of *The Best Lenses for Detective Work* then followed, in which Messrs. Sayce, Wilkinson, Earp, Lange, Kirby, Williams, Tomkinson, and Swinden took part. It was pretty generally allowed that an ordinary French lens working at *f*-11 with a rapid shutter gave good results, especially so when working with a lens covering the next larger-sized plate than the one used, *i.e.*, a 5×4 lens for quarter-plate prints, &c.

Arrangements had been made for Mr. Beer's paper, entitled *Bits on the Borders and Rambles on the Marches*, but, as this could not be given, owing to Mr. Beer's illness, Mr. W. J. Archer exhibited a selection of Woodbury lantern slides and a series of views of the Paris Exhibition, including a few panoramic slides, which gave great satisfaction.

The exhibits consisted of snap shots by Mr. H. Wilkinson on glass and film, new lantern-slide carrier by Mr. W. I. Chadwick (Manchester), and Mawson & Swan's transparency and photograph frame.

The following announcements were made—viz., Photographic exhibition by the Worcestershire Camera Club, to be held in the Museum and Art Gallery, Kidderminster, from March 1 to 15; Photographic exhibition by the Crystal Palace Company from March 11 to 29; and that the Belfast Camera Club (Y. M. C. A.) would hold their first annual exhibition at an early date.

DERBY PHOTOGRAPHIC SOCIETY.

A GRAND *conversazione* in connexion with the above Society was given at the St. James's Hall, Derby, on the 29th ultimo, and proved, in every respect, a very successful and enjoyable affair. The hall itself presented a very attractive appearance, the foreground of the orchestra being ornamented with choice flowers and plants, whilst the walls—or, rather, screens in front of them—were adorned with specimens of the latest developments of the photographic art, including some very beautiful platinotypes, the product of members of the Society. A small but interesting section of these were for competition, which was entered into with much spirit, principally by the younger members of the organization.

The first certificate was obtained by Mr. T. A. Scotton, jun., whose representation of *A Country Lane* (King's Heath) was a charming production in platinotype, the trees, atmosphere, and distance being particularly good. The second certificate was awarded to Mr. C. Bourdin for *A View of Derby, off Exeter Bridge*, an excellent platinotype, in which the water of the River Derwent was admirably portrayed. The third certificate was won by Mr. C. J. Chadwick (the Hon. Secretary) with a beautiful little silver print of *King's Mills*. In the same competition Messrs. J. A. Cope, Fred C. Bemrose, and A. B. Hamilton also took an honourable part. The other photographic exhibits (not for competition) were contributed by Messrs. W. W. Winter, Richard Keene, Thomas Scotton, A. B. Hamilton, William Hart, Frank Cooper, F. E. Bemrose, C. J. Chadwick, &c.

A varied assortment of photographic apparatus, dry plates, chemicals, &c., was exhibited by Mr. R. Keene, of Irongate; whilst Mr. Alfred Smith, of Victoria-street, displayed a tasteful assemblage of artists' and photographic stores.

In response to the invitation of the President and the Committee, a large and influential company of ladies and gentlemen from the town and neighbourhood assembled to do honour to the occasion.

After the preliminary receptions had been gone through, Mr. HERBERT STRUTT, J.P. (presiding), said they would see that the first item on the programme was an address from himself. About ten years ago the "dry plates" of commerce came into the market, and were at once eagerly seized by outdoor photographers, and this created a wonderful demand for apparatus, the price of which was correspondingly reduced. The process, too, had been so simplified—and last, but not least, it had been rendered so clean—that, as the result of all these facilities, there were about five hundred per cent. more outdoor photographers than there were ten years ago. Any one, moreover, who had adopted the art of photography was not likely to let it drop, as he himself could testify after about four years' experience. Not only did it lead them to the most beautiful parts of the country in the finest weather, but there were the mysteries of the "dark room," the pleasures of mounting, and photographs to admire for the remainder of their natural lives. The number of outdoor photographers, as he had previously remarked, had largely increased, and so had this Society, which, founded in 1884, now numbered about sixty-five members. They believed, however, that there were some, possibly in that room, and certainly many outside it, who took an interest in photography but did not belong to the Society. It might be asked what the advantages of joining a Society like this were. He had said that he himself could not attend the monthly meetings, but he received circulars respecting them, and he often wished he could come. For the small cost of 10*s.* annually they obtained monthly meetings (throughout the winter months, at all events), with lectures on the lantern, the use of a dark room, and also professional advice, for the Society had a question box, and if they put a query in it they could generally obtain a professional answer. In addition to this, there were the summer excursions, which were usually in charge of a professional, when they could visit the most beautiful and interesting parts of the country at a greatly reduced charge.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 6.—The first popular lecture this season under the auspices of the above Association was given to a crowded audience in the Kinnaird Hall on Wednesday by Mr. J. W. McCall. The scenery illustrated was that of Orkney, Shetland, and Greenland, the pictures having been prepared by Messrs. Valentine & Sons. A large screen was used, some thirty feet square, and special lantern arrangements had to be made.

Starting from Kirkwall, with its celebrated Cathedral, the various islands were visited in turn, and the Orkney group was next shown, the audience getting a capital idea of the bold headlands and magnificent rock scenery, besides views of Lerwick, Stromness, and Scalloway, the old castles and ruins found on the various islands, and scenes illustrative of the habits and customs of the natives. The series closed with views of the Tay and Forth Bridges, several other large structures being shown by way of contrast.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

JANUARY 1,—The President (Mr. Frederic Graff) in the chair.

The annual report of the Treasurer was presented, showing a cash balance on hand of eight hundred and twenty dollars, sixty-eight cents.

The annual report of the Executive Committee was read, giving a *resumé* of the work of the Society for the past year. A number of valuable additions to the library had been made, and a considerable sum expended for binding of journals, &c. Principally through the efforts of Dr. Ellerslie Wallace, a complete catalogue of the library had been prepared, and was now ready for the printer.

Your Committee beg leave to suggest to the Society the propriety of having a public exhibition of lantern slides either during the coming month or in March. The Society's public lantern exhibition in 1889 was given during the joint exhibition in April, so that your Committee has nothing to report in that respect.

The suggestion in the report to hold an exhibition of lantern slides was brought up by Mr. BROWNE, who moved that the Committee be requested to arrange an exhibition of lantern slides at their early convenience.

The election for officers and Committee for 1890 resulted as follows:—*President:* Mr. Frederic Graff.—*Vice-Presidents:* Messrs. John G. Bullock and Joseph H. Burroughs.—*Executive Committee:* Messrs. Ellerslie Wallace, M.D., Charles L. Mitchell, M.D., and Edmund Stirling.—*Treasurer:* Mr. Samuel M. Fox.—*Secretary:* Mr. Robert S. Redfield.

A paper prepared by Dr. Charles L. Mitchell and Mr. John G. Bullock, on *The Dangers of Flash-light Compounds*, was read by Mr. Bullock [this will appear subsequently].

Correspondence.

"ONE-HUNDREDTH OF AN INCH."

To the EDITOR.

SIR,—It is a scholar's duty to interpret what he sees simply, without the spectacles of prepossession. Anonymous attacks may not be invariably due to prepossession, but they are very suggestive of it. Your correspondent, "Free Lance"—the adjective in his *nom de plume* being very indicative of his *translation* of current events—supports *in toto* Mr. Debenham in regard to his remarks made at the meeting of the Photographic Society of Great Britain, when the subject of certain tables of Sir David Salomons came under notice and discussion. He says:—

"In the discussion on the paper by Sir D. Salomons, there was much talk very wide of the mark. Mr. Debenham was perfectly right in his remarks upon the relative deviations permissible according to the focus of the lens, the point at issue being really a function of the focus and angular aperture."

Mr. Debenham himself has also read a paper before the London and Provincial Association, in which some of his remarks are of value, but had his premises been entirely sound I imagine that he could not have fallen into the error contained in the following statement of his, published in your columns of the same issue:—

"Another absurdity is that of setting up some standard of a permissible amount of confusion, such as that of one-hundredth of an inch, and then proceeding on the assumption that all parts of the picture in which that amount of confusion is not exceeded are in focus."

"Free Lance" poses as Mr. Debenham's looking-glass, and not only in common justice to myself do I wish to make a fuller explanation, but also for the benefit of Mr. Debenham's hearers, in whose opinion he would establish himself as the exponent of what he terms *fallacies and absurdities!* On the occasion referred to by "Free Lance" (and *if* "Free Lance" was present he will remember) I was the only one who entered into the discussion following Sir David Salomons' paper, except Mr. Debenham himself. I explained the grounds on which the original tables published by my late father were compiled, and although the report (for the *Journal of the Photographic Society*) of my statements was sent me for correction by the printers, I corrected them as they stood, without adding to them. Had I been fully reported it would have appeared that I explained the basis of the foundation of the tables in a manner that neither Mr. Debenham nor "Free Lance" could dispute nor refute in their value. In order not to be misunderstood, it appears it would have been better to have adopted the style of "Sandford and Merton in one syllable," as it is evident that if a statement cannot be apprehended by the interpreting person it would very likely appear to *him* as an absurdity. In the original tables the allowable out-of-focus circle of one-hundredth of an inch was laid down as a not too extravagant limit for the size

assumed by theoretical mathematical points or lines to convey the idea of topographical sharpness in photographs, *when viewed at the ordinary distance of vision*, namely, at about fifteen inches. To an intelligent mind a separation of two imaginary mathematical lines one-hundredth of an inch apart at the distance of normal vision would subtend an angle of about two minutes of a degree. If the angle subtended at this distance was greater than two minutes of a degree, a line filling up the space *might with good sight be considered too coarse*; hence the limit assigned to topographical reproduction when viewed at this distance. If the same separation of one-hundredth of an inch were viewed nearer than the normal distance of vision, the angle included would necessarily be larger than two minutes of a degree, and I distinctly stated in my remarks at the "Parent Society" that were a negative taken in which subsequent enlargement would be necessary, the one-hundredth of an inch circle of confusion given between the limits of the plane of camera back for parallel rays and an object so distant that it produced such a circle of confusion would undoubtedly not be sufficiently small. But I maintain that if the angle included be about two minutes of a degree, at whatever the distance of vision be chosen as the point of sight, that the definition for ordinary eyesight will be sufficiently sharp in a topographical sense for ordinary distinctness of vision! For example, the leading articles of the *Times* are written in print the lines of which are as nearly as possible one-hundredth of an inch in thickness, and the dots of the letter i measuring one one-hundredth of an inch; the word "responsibilities" is eight-tenths of an inch in length, and is allowed one-half a tenth for each letter, the separation then of straight lines being half a tenth. It is also remarkable that if a passage is come across where the separation of the words to suit the width of column happens to be greater, reading by this extra separation becomes easier, whereas if a column is crammed the reading becomes more difficult. All this points to the fact that the angular separation of the letters for ordinary vision and distinctness and thickness of outline is the well-chosen average of experience.

To revert to "Sandford and Merton," it would be well to ask Mr. Debenham if, because he can see the sun at an easily measurable angle at the distance it is from our planet, whether he imagines it would subtend the same angle at the distance of, say, one of the nearest fixed stars. I think if he and "Free Lance" consider the question from this point they may be persuaded that the subject is not one of *absolute dimensions*, but one involving *angular measurement*. To state the case clearly and fairly: If a lens be employed under conditions in which the cone of rays for a given aperture and with a given focus cross, and a circle of confusion as a limit be chosen of such a diameter that it does not exceed, when viewed at the distance of the focus of the lens itself, a visual angle of more than two minutes of a degree, that it may be considered topographically sharp as regards its comparison with the finest definition possible with that instrument, it is evident that if the circle of confusion of one-hundredth of an inch at normal vision included two minutes of a degree, that the nearer this approaches to the eye the larger and larger will the angle become.

The microscope is an instrument which enables one virtually to see objects at a much larger angle than the eye itself could view them, and similarly the telescope is an instrument which enables one to separate objects very much more than the eye can do of itself, unaided, by virtually coming also so many times nearer to the object, according to its so-called magnifying power.

In conclusion, two minutes of a degree subtend:—

1/100	of an inch at a distance of		17	inches.
1/150	"	"	"	11·4 "
1/200	"	"	"	8·5 "
1/250	"	"	"	6·8 "
1/500	"	"	"	3·4 "
1/1000	"	"	"	1·7 "

The practical interpretation of the above is that to reduce the limit of one-hundredth of an inch to a *smaller* absolute amount for given purposes, such as the production of a negative for enlargement, the original tables calculated for *normal distance of vision* will require the lenses to be stopped down in the exact proportion *the focus bears to the distance of normal vision*.

For example, the original tables may be taken as exact for a lens of seventeen inches focus, but if a short-focus lens (say three and a half inches) be employed with the purpose of subsequent enlargement, the stop used should be one-fifth of the diameter given in the original tables.—I am, yours, &c.,

THOS. R. DALLMEYER.

25, Newman-street, W.

THE EFFECT OF LEATHER, ETC., ON SENSITIVE PLATES.

To the EDITOR.

SIR,—The following note may be of interest as connected with a subject discussed at a recent photographic meeting of the manner in which the sensitiveness of gelatino-bromide plates is affected by emanations from the fittings of the dark slides, the vapour of turpentine being instanced specially as producing bad effects. In the wet plate days, if the nitrate bath was placed in a situation to absorb the emanations from fresh paint or turpentine, it was supposed to be injured by it; and I quite believe it did, but not as affecting its *sensitiveness*, but producing a sort of scummy markings on the film, which were of course superficial but injurious, all the same. The old plan of placing a bucket of water in a recently painted room to remove the smell will prove that water, at any rate, will absorb such vapours, for after a few hours such water will taste quite strongly of paint, indicating that a pure fluid has by this simple means been rendered impure.

Now, with respect to dry plates. I painted over the backs of two plates of different makers with Bates's black thinned with turps, and whilst still tacky enclosed them in a dark slide and left them for a week, at the end of which time the black varnish was still tacky and smelt strongly of terpentine, proving the fact that these plates had been literally in a bath of turpentine vapour for a week, and yet on development there was no perceptible difference in sensitiveness or anything else, and not the slightest markings to indicate any change whatever had taken place, both plates giving good negatives. I therefore concluded that insensitiveness or markings found on plates kept long in dark slides must be searched for in other directions, especially the protection of some parts more than others from the action of air. Anyway, an investigation of the subject would be well worth the time expended on it.—I am, yours, &c.,

E. DUNMORE.

EMANATIONS FROM DARK SLIDES.

To the EDITOR.

SIR,—Referring to your article on *Emanations from Dark Slides*, I am, from very long experience, convinced that the material used for the hinges is alone to blame. I wrote you in September, 1884, that with Swan's and Edwards's plates, in *hot* weather it acted as a retarder, the space corresponding with the hinges being more or less *transparent*, according to the temperature; while with Wratten's and Fry's plates the reverse was the case, and the band was intensified, the rest of the plate being correctly exposed. Mr. Pringle alluded to my letter in page 74 of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1885; Mr. England wrote to the same effect. Mr. Hare then adopted a material which not only cured the fault, but is much more durable. My object in writing then was to find why leather cloth should act in *directly opposite* ways on different brands of plates. I cannot too strongly advise photographers to discard the leather-cloth hinge. They may in *cool* weather work for years without any fault, which makes it more difficult to blame the camera when it does arise. The material used by Mr. Hare answers admirably.—I am, yours, &c.,

D. W. HILL.

Silvermere, Woodberry Down, N., February 1, 1890.

MOUNTANTS.

To the EDITOR.

SIR,—If this should meet the eye of Captain Abney, would he be so good as to inform me where the mounting solutions may be obtained of which he speaks in his *Instructions*, p. 320, eighth edition? He says, "One great advantage of the solutions is that they do not cockle the mount, however thin it may be. Prints may be mounted on foolscap paper with the greatest ease, and they will be as flat as if mounted on the thickest cardboard." I wish that were my experience. Directly I apply the mountant (and I have tried several) the print curls itself round like a caterpillar, and as I have unfortunately but two hands, it is with the greatest difficulty that I hold it open while placing it upon the mount, which is of the same fairly thick paper on which I am now writing. Then I rub it with my clenched fist over blotting paper, and, finally, with a paper knife, as he directs, after which I put it in the napkin press and screw it down to sticking point. In the morning I take it out to look at it, and in two minutes it is bent round like a bow. Can he, or any one else, help me?—I am, yours, &c.,

G. H. P. BURNE.

[The directions given are to swell eighty grains of gelatine or fine shreds of glue in the least possible quantity of water, and then boil with two ounces of alcohol, keeping them agitated with a stirring rod all the time. When cool, the solution becomes gelatinous. It can be used for mounting by letting it stand in a pot of warm water. Those who desire to try this must prepare it for themselves, as we cannot learn of its being procurable from any dealers.—ED.]

ARMSTRONG'S ILLUMINATING CHAMBER.

To the EDITOR.

SIR,—I make it a rule never to reply to anonymous correspondents. In your issue of 31st ultimo there appears a letter signed "An Old Hand." It is quite evident the writer has not seen my invention which I hav

patented. I decline to educate "An Old Hand" through the medium of the public press, and should he desire to know how my invention accomplishes what he considers an impossibility, he has two courses open to himself. The first is to write to me in an open, straightforward way; or, failing this, to invest in one of my patent chambers, when he will see it does all I have stated and a great deal more.—I am, yours, &c.,

8, Garrioch-gardens, Kelvinside, Glasgow. T. N. ARMSTRONG.

"AMATEURISM."

To the EDITOR.

SIR,—I should not have troubled you again, but I would not like Mr. Hubert to remain under the impression that I withdrew from any position I took up in my first letter with regard to the generally under-educated condition of photographic professionals in the matter of the theory and chemistry of photography. Since writing, several instances have been brought to my notice which only strengthen me in the belief that the estimate of ten per cent. of theoretical competents is quite within the mark; in fact, Mr. Hubert himself in his former letter appeared not unwilling to concede as much.

In conclusion, I very much regret that from the nature of my letter (though it dealt, I firmly believe, with *facts*) I could not, in justice to others, put my name and address. Mr. Hubert may know, perhaps, some day that I, at least, am endeavouring in my district to remedy the defects I have mentioned to the best of my power.—I am, yours, &c.,

A PHOTOGRAPHIC CHEMIST.

Exchange Column.

Wanted, studio table, or chair with backs, or other accessories, in exchange for first-class silver English lever watch.—Address, W. WALKER, 156, Noel-street, Nottingham.

A No. 3 cabinet lens, takes up to whole-plate; wanted, a portable whole-plate camera with three or four double backs.—Address, F. MOLTENO, Photographer, Studio, 120, Rushey Green, Catford, S.E.

Will exchange one of Watson's 5×4 Premier cameras, with three double backs, in first-rate condition, for a good quarter-plate camera, one preferred with roller slide.—Address, FRED CATTLEY, Bloomfield House, Catford, S.E.

Wanted, six or seven-inch condensers. Will give in exchange telescope (day and night), by Davis; whole-plate single lens, wide-angle; and mitre cutting machine, takes three-inch moulding.—Address, A. L. KNIGHTEN, Photographer, Oakham.

About ten years of the *Photographic News*, up to last December; also a 12×10 Hunter & Sands' patent shutter. Will exchange for photographic accessories or a battery that will light a twenty-candle incandescent lamp.—Address, H. W. BEVAN, 2, Pier-terrace, Lowestoft.

Conductor's copy of *Israel in Egypt*, first edition; *Deborah* and *Dettingen Te Deum*, in one vol.; *Kent's Anthems*, two vols., first edition; one vol. of *Dr. Nares' Anthems*. Will exchange the above for good whole-plate camera with three double backs.—Address, J. H. MILLER, Ward-street, Blackley, Manchester.

Answers to Correspondents.

LABOR.—We never heard of any such "handbook." The daily or weekly press supply the desired information.

W. W. C.—Hyposulphite of soda is in every way better than cyanide of potassium for fixing gelatine negatives. The latter salt is very unsuitable for the purpose.

G. & H. B.—No *new* cameras and lenses are allowed to be introduced into the United States free of duty, but if they have been used or are to be used as "tools of trade" no charge is made.

P. A. J.—Judging by the example sent we should say the ink was too thick. Try thinning it somewhat with a little turpentine. The formula you have prepared the transfer paper by is a very good one.

A. BERRY.—The cause of the stained iridescent marks round the edges of the negatives is that the plates are old. As you purchased them abroad it is possible the dealer had them in stock for a long time.

W. X. L.—To photograph a group of a thousand persons by flash light a *very powerful battery* of lamps will be required; but we cannot state the number, as such a group is very far beyond our flash-light experiences.

CURIOUS.—You had better obtain Frescenia's works, *Qualitative Analysis* and *Quantitative Analysis*; these will give you the desired information. Our space in this column is too limited to reply in such terms as would be of any service.

C. C. BONNER.—We should imagine you would have no difficulty in photographing the cat by the flash light. You had better, however, make sure of the negative at the first shot, as it is doubtful if puss will readily accord a second sitting.

P. J.—Write to the Westminster Fire Office; they have a modified tariff for photographic risks. Other offices, we are told, are also modifying their rates to photographers. It might be well to get quotations from different offices and compare them.

G. H. A.—The spot on the negative may doubtless be removed by skilfully scraping it out with a penknife. As it is but small and prints white why not touch it out in the finished pictures? Some little skill is necessary in taking a spot out of a negative by scraping.

BURNISH asks: "Could you kindly inform me how burnished prints are spotted? I have spotted the prints before burnishing, but the spotting comes off in the burnishing. I have tried spotting after burnishing, but the spotting shows very badly, and I have great difficulty in getting the colour to adhere to the surface."—Spot the prints with water-colour mixed with albumen; then rub them over with a dilute solution of Castile soap in alcohol.

HERTS.—The frost pictures enclosed are very good. The misty distance of which you complain really enhances the pictures, as it conveys the idea of a winter atmosphere. Any method of "curing" this would quite destroy the pictorial character of the work.

D. UNCAN.—The substances named by you are trade preparations, and we do not know their composition. For the first-named, gelatine will probably answer; and for the latter, copal varnish. This may possibly require some dilution, which may be done with turpentine.

T. CHICK.—The spots appear to be due to something in the manipulation, but what it is, is impossible for us to say unless we saw it carried out. The formula for the fixing bath is all right. It is quite possible that a slight sulphuretting action may be set up in the small blisters which afterwards develop into spots.

OPERATOR.—Your difficulty arises from the toning bath being too strong. Pictures toned in a "minute or two" cannot be expected to turn out satisfactory, as the toning is only superficial. Instead of making the bath one grain of gold to the ounce of solution, make it one grain of gold to eight or ten ounces, and allow a longer time for its action on the prints.

DRY PLATE.—One of the best methods of recovering the silver from waste emulsions is to precipitate the bromide with sulphuric acid. Melt the emulsion and pour it into a large earthenware vessel; then add common sulphuric acid in the proportion of three or four ounces to each pint of emulsion. Stir well and allow to rest. By the following day the bromide will have settled down as a compact mass. It can then be collected and washed, and then sent to the refiner.

CARBON.—We should not advise the carbon film to be varnished in any way. See that the film is perfectly dry, then back it with a plate of glass the same size, and bind the edges securely together with strips of paper, which might afterwards be varnished. See leaderette in present issue. Bichloride of platinum may be obtained of Messrs. Hopkin & Williams, or of any operative chemist. The strength of the solution is unimportant—say, one or two grains to the ounce of water.

CHEMIST writes: "Could you please tell me through the JOURNAL where (and the price) I can obtain a good and cheap book on 'Photographic Chemistry' for a beginner? I want to know all the names of the chemicals used in photography, their colour, whether solid, fluid, or powder, and whether poison—if so, the best antidote; also a test for determining the chemical if the label should be rubbed off the bottle. I have the *Elementary Treatise* by Arnold Spiller, but that don't give what is required."—Hardwich's *Photographic Chemistry* or Meldola's works are the best, but neither of them give all the information that our correspondent desires. He appears to require a work of a more elementary character than any published, combined with one of the most advanced kind, including chemical analysis.

G. W. READ says: "I want to photograph some machines at night by magnesium wire with a whole-plate combination lens; they vary from ten to twenty feet in height, are stationary, and cannot be moved. 1. How much magnesium wire shall I require for a sixty times Ilford whole plate with *f*-16 combination? Will it be double the quantity for the next size less stop? 2. Is it best to light behind the camera, or half the quantity each side about four feet away? 3. Will it take half the quantity for half-plate?"—1. The exposure required can only be correctly arrived at by exposing an experimental plate. If the stops are arranged according to the Society standard, the exposure is double for each succeeding smaller one. 2. All will depend upon the subject. If only one strand of wire be used, it will be well to keep it moving during the combustion, so that the shadows are not too hard. 3. Practically the same amount of magnesium will be required for a half as for a whole-plate if similar stops be used.

TUFNELL writes: "I have over fifty reams of albumenised paper that is so acid that it makes the sensitising bath nearly useless after floating about fifty sheets, and as a very old reader of your JOURNAL I should be extremely glad if you would tell me if there are any means of keeping the sensitising bath more neutral, or any means of fuming the paper before sensitising. Would a little ammonia put into the silver bath help in any way, or would the ammonia precipitate the silver and thus spoil the whole thing? I should esteem it a great favour, indeed, if you can help me by a hint in this trouble."—It is a very unusual thing for albumenised paper to be in such an acid condition as mentioned by our correspondent. It would, we imagine, be of little use to fume the paper before sensitising. The addition of ammonia to the silver bath would precipitate oxide of silver, supposing the bath to be neutral when made. The best plan will be to neutralise the bath each time after using by the addition of a small quantity of carbonate of soda, just sufficient to produce a permanent opalescence. If this be done overnight, the excess of carbonate of silver will subside by the morning; or it may be filtered out and the solution used at once.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, February 12, *Artificial Light for Portraiture*. February 19, *Lantern Illuminants*.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—The annual meeting will be held on Tuesday next, February 11, at eight p.m., at the Gallery, 5A, Pall Mall East.

MR. J. DESIRÉ ENGLAND has sent us a packet of his new celluloid films. So far as we have tried them, they have in every case yielded negatives free from defects and possessing excellent characteristics.

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THE EXPLOSION OF AN OXYGEN CYLINDER.

From the correspondence in our pages this week, and from a report from the engineer of the establishment at Polmadie, where the lamentable accident occurred, we are now able to speak with some degree of knowledge of the circumstances under which the oxygen cylinder exploded.

So far as the facts have been ascertained they may be summed up as follows:—First of all, there were present in the cylinder both hydrogen and oxygen, and the foreman, Mr. Bow, who lost his life, was himself responsible for mixing them. He had evidently, says Mr. Henry Brice, engineer and manager, filled hydrogen into new cylinders, which, instead of painting red, he marked simply with an "H," and he must have done this in a hurried moment, with the intention of painting them later on, for in not painting them he failed in his duty. This cylinder was, with others containing hydrogen, brought to be emptied into a gas holder, and thinking, no doubt, it was empty, he afterwards had it filled with oxygen, whereas some hydrogen must still have been left. The changing of the contents of a cylinder was a breach of the regulations. After being filled, guaged for pressure, and tested for tightness of the valve, it was carried out, and, at the moment of touching the ground, it exploded. The cylinder itself was said to have been tested on the 2nd July, 1889, to 240 atmospheres, or 3600 lbs. to the inch—twice the working pressure.

Assuming these to be the facts, we have next to inquire as to the means by which the gases exploded. In course of an article in our issue of May 31, 1889, we spoke of the great heat that arises when air is compressed. The heat engendered during the compression of oxygen in its cylinder is said to be very great. It probably is the case, as stated, that when hydrogen is present with oxygen a given degree of compression generates a greater degree of heat than is the case when either of them separately are subjected to diminution of bulk. Of this we have no personal knowledge derived from experiment, for we may confess to having no desire to try any experiment so nearly associated with danger. We can very easily understand how that the heat generated by the act of compression of the mixed gases might be such as to slowly heat to dull redness any metallic chip, splinter, or dust in the interior of the cylinder, and how, when such a thermic stage was reached, an explosion would be the inevitable consequence. We need scarcely assure users of the gas that total cooling of the cylinders and their contents takes place very soon after they are removed from the charging room, and hence that no danger to them from such a cause can ensue.

We are glad to direct attention to the decision of the oxygen companies mentioned in the letter of Mr. Hester, of Brin's Oxygen Company, which is to the effect that cylinders for oxygen are to be fitted with a screw of a totally different character from those for hydrogen. This will quite eliminate any possible danger from the mixing of the gases.

PICTORIAL *VERSUS* MICROSCOPIC DEFINITION IN LARGE DIRECT PORTRAITS.

Last week, it will be remembered, we referred to the fact that many amateur photographers are devoting attention to large direct portraiture. The examples we have seen, however, partake more of the character of figure studies than of portraits of individuals. As we mentioned, the pictures possessed the quality that may be classed as pictorial sharpness, in contradistinction to what is known as crisp definition.

Since our remarks appeared we have received a protest from a well-known professional photographer against what he terms the proposed introduction of "Mrs. Cameron effects" in portraiture. He says it has always been the aim of photographers to obtain the sharpest picture possible, and to this end they have gone to great expense to procure the best lenses for the purpose; and adds, "Will this degradation of photography tend to its elevation in the eyes of the public?" Furthermore, he directs attention to the fact that we have several times expressed the opinion that there is a quality in direct pictures which is not seen in enlargements, and asks if this is not due to their greater sharpness? We may at once say that we have frequently advocated the production of large direct portraits, but—and this is a very important qualification—only when the camera is placed at such a distance from the sitter as it would occupy when taking an ordinary *carte* or cabinet picture. Also, that the portraits should be restricted to their quarter or half-length only; and that life-size heads should be eschewed altogether.

Upon making inquiries amongst professional photographers who have the necessary appliances for taking large portraits—by large we refer to twenty or twenty-four-inch pictures—we learn that when the head approaches to anything like life-size, however good the picture may be, it seldom meets with much approbation from the sitter. And what is of more importance, from a business point of view, duplicates are rarely ordered, except on a very limited scale. One artist who produces these pictures remarked, somewhat confidentially, that large direct portraits are all very well for specimens, and for the exhibitions, but not for business. They are troublesome to take, cost a lot for retouching, and rarely please the customer so well as an enlargement from a smaller negative. As a rule, so we are

informed, very large direct portraits are not a great commercial success.

That large portraits taken in the usual manner are less satisfactory from an artistic point of view than are enlargements from small negatives produced under ordinary conditions, is by no means surprising when we consider the circumstances prevailing in each case. Referring to the catalogue of one of our leading opticians now before us, we find that a twenty-two-inch focus lens is catalogued to take a portrait on a twenty-inch plate, while an eight-inch one is quoted for a cabinet portrait—and this is what is generally used for the purpose. The reputation of the house whose list we are referring to is a sufficient guarantee that the larger lens will actually cover the size plate stated. But let us look at the conditions when the two lenses are used to produce the pictures they are mentioned to take. In the catalogue before us only the back foci of the lenses are given, but for our present purpose we shall assume that the difference between this and equivalent focus is proportionately the same with each, hence we shall take the back focus as being approximate.

If an eight-inch focus lens be required to take a cabinet picture, a proportionately longer one must be necessary to take a twenty-inch one, all things being equal. A simple calculation will show that to take the pictures under identical conditions, the one obtained with the twenty-two-inch lens must not exceed fifteen inches. And to take a twenty-inch picture, the focus of the lens should be considerably over thirty inches—assuming that large lenses could be made as perfect as small ones, which is not the case. To work the large lens up to its catalogued size would be equivalent to taking a seven and half inch picture with the cabinet one, though it would actually do this work better than would the large one—of the full size mentioned.

In taking, say, a head and bust on a twenty-inch plate, with a twenty-two-inch focus lens, the camera must be placed very close to the sitter, therefore the perspective will necessarily be very much strained, which always produces an unsatisfactory result. It must not be forgotten that in the foregoing remarks, for the reason we have stated, we have been dealing with the back focus of the lenses; the equivalent, or real focus would in each case be a little longer, but this will not materially affect the principle involved. When a short-focus lens is used to take a large picture, a small stop must be employed to get the different planes in fairly good focus, hence a wiry sharpness in places results. This brings us to another question.

Do the public really desire this exceeding sharpness in large portraits? Photographers have certainly educated them to it by their small work; and when a large portrait is shown with excessive definition in some parts and indistinctness in others, a complaint may be met with that the picture is not in good focus. But supposing no portion was excessively sharp, then no part would, by comparison, appear conspicuously wanting in that quality. This is the class of picture that several well-known amateurs are now essaying, and some excellent results they have produced. But we must confess that many have been considerably marred by their being taken too close to the model, and also by too much diffusion of the definition. Although in large direct portraiture—heads in particular—we are no advocates for microscopic definition, still there is a limit to the lack of sharpness allowable.

To those portraitists who are now taking direct pictures with large combinations, we would suggest their making a trial with the front lens alone, and that stopped down only just sufficient to give fair pictorial definition over the size plate employed. This method of working need not entail a much longer exposure than is necessary when using the instrument in its entirety, with the small diaphragms necessary to secure sharpness all over the plate. As the lens used in this way would have to be placed somewhere about double the distance from the subject that it would under ordinary conditions, far better perspective, and, consequently, a much more pleasing result, would accrue.

It may require a little courage on the part of a professional to produce pictures which are even a little unsharp, and which may, in a photographic sense, be considered imperfect; but it is quite possible that the public for whom they work would really appreciate them. Anyhow, it might be worth the trial by those who are taking large portraits, and do not, at present, find them a commercial success.

At the present time, a considerable portion of the large portraits are printed on rough paper. Now, with this it is quite impossible to render anything like the excessive sharpness obtained with a good combination lens worked with a small aperture. Hence, where is the advantage of microscopic definition? Furthermore, when pictures with only pictorial definition are taken, they are less costly to produce, as the retouching will be reduced to a minimum. Elaborate retouching of large portraits—which is not necessary with diffused definition—must be skilfully done, otherwise the picture may be utterly ruined.

DAMP: ITS EFFECTS AND THEIR PREVENTION.

The present winter has proved so far, perhaps, one of the dampest seasons on record for many years past, for beyond a few days of very severe frost in the early part, we have been favoured with little else but fog, mist, and rain. Of all professions that of photography is the one most likely to suffer from a continuance of this state of affairs, and the trouble has become infinitely greater since gelatine plates and platinotype printing have been so universally adopted.

In days gone by the chief difficulties experienced in continued damp weather arose in connexion with the storage of negatives and of albumenised paper; in some few cases the trouble, perhaps, extended to the apparatus, for from the construction of photographic studios they are not at all times the best places in which to store fine cabinet work and expensive furniture and accessories. Damage to the studio and buildings themselves can scarcely be considered as peculiar to photography, but rather as general at the time of year, though it must be acknowledged, for the reason mentioned above—the nature of their construction—that photographic studios are calculated to intensify rather than moderate the evil.

The storage of varnished collodion negatives in a dry atmosphere presents no special difficulties, nor, indeed, can any trouble be said to attend gelatine films under similar circumstances; but when damp supervenes, the necessity at once arises for the exercise of the most stringent precautions. The danger with collodion negatives arose, as all old workers are aware, from the uneven expansion of the collodion film and varnish respectively, which resulted in a peculiar cracking or splitting of the film in vermicular lines. The damage was not irremediable if discovered and combated in time, but it can be well imagined that when the evil attacked a large stock of, perhaps, some thousands of negatives, the labour and care entailed in arresting its progress.

and making good the damage already done must of necessity have been considerable.

Gelatine negatives under the action of damp behaved differently. If varnished, the gelatine itself is tough enough as well as elastic enough to resist any danger of cracking; but its very elasticity and expansibility, combined with its well-known affinity for water, combine to produce cracks of another kind, confined, however, in this case to the layer of varnish. The peculiar crystalline markings produced by damp upon varnished gelatine negatives were at one time supposed to arise from a sort of efflorescence of some substance, probably hypo, which had not been properly washed out of the film, and more than one eager supporter of this theory succeeded in detecting that substance by the somewhat rough test of applying the tongue to the film. Mr. Warnerke was, however, the first to afford a clue to the true explanation, namely, that the varnish not being waterproof, the damp penetrated to the gelatine film, causing it to swell, thus splitting or rending asunder in all directions the inelastic layer of varnish, and so causing the markings in question. That this is actually the true cause is easily demonstrated by placing a drop of water on a varnished film and leaving it for a few hours.

Here, again, remedial measures are possible, and the cure is more perfect than in the case of gelatine, but still the waste of time and labour suggest preventive rather than curative treatment. For this purpose, as minimising or altogether doing away with the danger, no simpler plan exists than the use of collodion in addition to or as a substitute for ordinary varnish. If a preliminary coating of collodion of the proper kind be applied to the gelatine film before varnishing, a more waterproof protection is afforded and the risk of damage is very much lessened; while, if the varnish be altogether dispensed with, the source of danger disappears entirely, and the negative is almost equally well protected from mechanical damage.

The exercise of proper care in hardening the film with alum before drying the negative is also a judicious and necessary practice, since by reducing not only the tendency to absorption, but also the amount of expansion, it renders the trouble less likely to occur.

Many photographers, especially amateurs, habitually store their negatives without varnishing of any kind. Such will in damp weather experience an entirely different sort of difficulty. In the first place the film will swell slightly, becoming soft and tacky, in which condition it is not only peculiarly liable to injury by scratching, but also to adhere to anything with which it may come in contact. Thus if stored, as is a prevalent practice, in boxes with paper between, the negatives will in time become cemented to the dividing papers, and needless labour is entailed in separating them, if even this can be done without permanent damage. In the printing frame, too, such softened films are inevitably stained by contact with the silvered paper, and if not permanently damaged or utterly ruined, necessitate the expenditure of avoidable labour.

In very bad cases we have known unvarnished gelatine negatives to be utterly spoilt by fungoid growth and general decomposition caused by damp, while it is needless to say that imperfectly washed films are doomed to a still shorter life if moisture be present.

As in the case of varnished negatives, the sensitiveness to moisture of the gelatine surface may be lessened by thorough hardening, but the only practical system to adopt is that of complete prevention, or, at any rate, the nearest approach to the perfect elimination of damp that can be attained. This holds good, of course, in every department equally, but there are different ways of carrying it out in practice.

For instance, in the studio nothing more is required than gentle warmth and thorough ventilation. Without the latter it is hopeless to attempt to secure a dry atmosphere, as stagnation is the most powerful ally of damp in its fell work; but if a genial temperature be maintained, and a constant change of atmosphere kept up by means of a suitable system of ventilation, the most heavily moisture-laden atmosphere will scarcely possess any power for harm, at least on such articles as are constantly exposed in the studio.

The system of heating is purely a matter of taste or convenience, coal, coke, gas, oil, or hot water being equally available, though, undoubtedly, the last, when properly installed, is the most perfect in principle as well as convenient in use. Next to hot-water pipes we should place a radiating stove consuming gas, coal, or coke. Gas will be the cleanest, while coal or coke on the "slow combustion" principle will prove most economical. For small studios, where circumstances prevent the use of any of the above, a paraffin-oil stove, if properly constructed and suited in size to the area to be heated, will answer all purposes.

One thing, however, is of the utmost importance, at least in very cold damp weather of long continuation, and that is, that the heat must be kept up constantly day and night. If this be not attended to, moisture will be condensed upon everything during the cold hours of the night to be simply reconverted into vapour when the heat is reapplied, and so the latter rather adds to the dampness of the atmosphere than the reverse.

The same principles should be observed in the negative room, namely, warmth and thorough circulation; but some little attention should be paid to the method of storing the plates. As already mentioned, a prevailing fashion is to store the negatives in boxes with paper between; but though this has the one advantage of economising space, it is objectionable on almost every other ground, at least for professional purposes. Grooved boxes are a slight, but not a very conspicuous, improvement, since they prevent the free circulation of the atmosphere, which is so important.

Where space and circumstances permit, the negatives should be stored in open racks of solid construction to carry the weight of glass, and fitted with grooves not too closely placed. Under the conditions we have laid down, namely, genial and equable temperature, and perfect, or at least constant circulation, it is difficult to conceive that any injury can accrue to the negatives, though possibly some little difficulty may arise, or has been imagined by some, from dust.

This brings us to another recommendation, namely, that each negative be enclosed in an envelope of, preferably, waterproof paper, which will secure for it at least a tolerable protection from that evil. If the negatives and envelopes be thoroughly dried before packing, it will require gross carelessness in their subsequent care to produce any injury; but the envelope provides an additional safeguard against accident, inasmuch as, should any condensation of moisture occur from failure of the heating or ventilating system, it will take place on the envelope instead of the negative film. We have seen one of the largest stocks of negatives in the kingdom stored in this manner, and we are informed that injury from damp or any other cause connected with storage is a thing unknown.

For the amateur any such elaborate system is, of course, an impossibility, yet it is of as much importance to him to protect his negatives from injury as to the professional. For amateur

purposes, perhaps the best plan is to store the negatives in packets, the objections to that system being less on a small scale than when large numbers are involved. Let the negatives be packed in half dozens with paper, or, better still, tinfoil, between each pair of films, placed face to face. Before packing, let the negatives be thoroughly dried, together with the paper or tinfoil, and warmed; while still warm, place them together and enclose each half dozen in tinfoil, carefully folded so as to exclude all damp. The separate packets can then be stored in the ordinary millboard boxes in which the plates are sent out without the slightest fear of damp getting at them. By reducing the number of plates in a packet the trouble of finding the negatives is reduced, and fewer films are exposed to the atmosphere when the packet is opened.

For the storage and use of platinotype or albumenised paper, sensitised or unsensitised, different arrangements are necessary. The first must, of course, be kept in the calcium tubes provided for the purpose. For ready-sensitised silver paper or untoned prints, a plain tin tube with well-fitting lid will suffice, especially if wrapped before insertion in the tube in a sheet of old silvered paper kept for that purpose. The unsensitised albumenised paper is better kept flat, and, besides, necessitates greater dryness on account of its hygroscopic character and the solubility of its surface. For this a drawer or box should be provided large enough to more than take the full sheet, and fitted with a false bottom and inner lid, the former perforated with holes round the edges. If the space beneath the false bottom be packed with chloride of calcium, or, better still, unslaked lime, it is converted into a calcium chamber, and the double lid will enable the paper to be kept "bone dry" for any period. Paper so stored should, however, be exposed to the atmosphere for an hour or two before sensitising.

It is important that all the operations connected with placing in the printing frames, or removing therefrom, paper, whether platino or silver, be carried out in a perfectly dry room, otherwise the damp absorbed will exert an injurious action during the time occupied in printing.

Though the fixed alkalies are for various developers obtaining continuously increasing popularity, we do not doubt that a poll would show an immense majority in favour of the old ammonia and pyro solution. One of the most telling objections against the use of ammonia is the uncertainty as to the strength of any particular sample at the moment of using; and that the objection is well founded cannot be denied. Very few retail dealers take the opportunity of testing for themselves the strength of the solution as received from the wholesale dealer, and when it is considered how many opportunities are afforded for loss of strength, surprise would not be felt at the existence of still greater variations.

There is, first, the competition in price, which would tend to the manufacturer sending out the strong solution a little below the strength of saturation. Next, the dealer has to keep it in store and decant it into smaller receptacles. Then we have the retailer, who, from a bottle, perhaps a quart in size, delivers various quantities from an ounce to a pound, the bottle standing meanwhile for an indefinite period, according to the demand, possibly now and then having its stopper shot out in hot weather, unobserved till the vapour compels notice. From this condition to that of storing on the dark room shelves is but a step. And according to the time it is so stored to the size of the bottle containing it, and to the frequency with which it is used from, depends the ultimate strength of the "ammonia" used in the developer.

Care taken at all these stages will assist in preserving the strength of the solution; but the often recommended plan of diluting it to half strength has everything in its favour, and should be adopted by all workers. Unfortunately, "ammonia" is too much looked upon as a definite liquid, not one in a thousand of those using it making the slightest attempt to ascertain the strength of the solution he happens to have purchased. As some guide to those who, in a truly scientific spirit, would desire to know more definitely what their solution of ammonia does contain, we print below the most recently determined table, showing the actual strengths of solutions of ammonia according to their specific gravities. It is by Herren G. Lunge and T. Wiernik, and made with extreme care, and, as will be noted, varies in the lower gravities to some notable extent from the data hitherto published:—

Specific Gravity at 15° C.	Percentage of Ammonia Gas.
0·990	2·31
0·980	4·80
0·970	7·31
0·960	9·91
0·950	12·74
0·940	15·63
0·930	18·64
0·920	21·75
0·910	24·99
0·900	28·33
0·890	31·75
0·880	35·60

The use of ballooning for the military, and of course its cognate photographic use, has been hitherto supposed to depend upon the employment of hydrogen gas in one way or another, and that hot air was useless in tropical climates; but these ideas will now have to be abandoned, for Mr. Percival Spencer has ascended by means of a hot-air balloon in Central India, and has safely descended in a parachute. The balloon was his patent asbestos construction, and heated by burning methylated spirit inside.

A new use is given for collodion by Mr. H. N. Warren in the *Chemical News* last week, and as it has a decided photographic bearing, we reproduce it for the benefit of those of our readers who still practise the wet collodion process. Every one who is at all familiar with its details knows to his cost what "pinholes" mean, and many are conversant with Mr. Henderson's panacea, the addition of nitrate of baryta to the bath. There is not much doubt that the *rationale* of this addition is the rendering insoluble the sulphuric acid in the bath introduced by the collodion, and the difficulty, subsiding precipitate, produced by the addition is another link of proof. The waiting for the subsidence of this precipitate is a loss of time, and it is very probable that Mr. Warren's method of hastening the falling of sulphate of baryta precipitate will be here available. It consists simply in adding a few drops of collodion to the liquid, holding the sulphate in suspension; he states that it will mix intimately with the fine precipitate and allow of immediate filtration. Ordinarily, as we need scarcely remark, the precipitate would, from its great fineness, pass readily through the filter paper.

In the *Journal of the American Chemical Society*, Mr. E. Walker, Ph.D., gives a method of preparing alcohol of a purity so great that nitrate of silver may be dissolved in the spirit and yet the liquid remain colourless, however long it is kept. It consists in adding a little permanganate of potash, allowing to stand a few hours, adding a little chalk or whiting, and then distilling, rejecting the first portions that come over. Incidentally, he mentions a point that should not be lost sight of by those who use spirit for photographic purposes; even for varnish making it should be vetoed, as no foreign substance should be allowed to be put in contact with a delicate production like a photographic image. He writes, "I find most alcohol of 93 per cent., when kept in tin cans, slowly reacts on the tin, giving after a while a cloud of $Sn O_2$, which is too fine to filter out, and renders purification by distillation necessary. Now, *à priori*, there are perhaps no reasons

for suggesting that tin oxide should be injurious to the image: but it is far better away, and the hint should be taken not to store methylated spirit for varnish or other purposes in tin reservoirs, as is, we believe, most frequently done. Stone jars or glass carboys will be decidedly preferable. That the warning is not groundless may be seen by any one who has a store of methylated spirit in a tin vessel. It is most frequently noticed to have a slightly milky aspect, due, in all probability, to tin oxide."

LIGHT AND EXPOSURE TABLES.

The sudden improvement in the photographic quality of the light at this time of the year has never, we think, struck us so forcibly as at the commencement of the present week, when on one or two of the bright mornings we then had, the light was scarcely less active than it would be under similar conditions in May or June. In rapid camera exposures the improvement, as compared with a similarly bright day about a month back, was sufficiently noticeable, but it was chiefly remarkable in connexion with printing. With the same negative and paper (silver), which early in January would not give a print in three days, half an hour's exposure to February sunshine was found to have produced too great a depth of colour. It is only what might be naturally expected, that chloride of silver should show more plainly than bromide the increasing activity of the light.

But the difference noted leads us to examine with some curiosity the published tables of comparative exposures requisite at different times of the year. Few photographers, whether amateur or professional, have passed many winter experiences without noticing the sudden improvement in the light at this period that we allude to, an improvement that varies in degree with the sensitive material acted upon. For negative work it was proportionately far greater in collodion days than it is at present, and in printing processes generally it is still greater. Yet on turning to one of the tables referred to, we find the difference between January and February placed as 7 : 4, those being the proportionate times of exposure alleged to be necessary in the respective months. But to what material do the figures refer? If camera exposures in February are shorter by one-half than in January, then printing exposures will be probably twenty times reduced; or if the figures be arrived at from experiments with chloride of silver, the comparative difference in the case of bromide will be practically *nil*, which we know not to be the fact.

Then again, in the same table we find February and October classed together under the same column as being equal in the matter of light, but we venture to think that most photographers will agree with us in classing the brightening illumination of the rising months of the year far higher than that of the waning autumn months. Similarly, the light of a June evening at eight p.m. is classed as twenty per cent. worse than that of an October afternoon at four p.m. which we think will be unanimously regarded as absurd. We have produced many and have seen many more pictures so produced, even in the old collodion days, under the summer conditions, but should deem it a well-nigh hopeless task to attempt, with all the advantages of gelatine, in the closing light of an autumn day. Whether the published tables possess any really practical value is a moot question, but that any one table, however accurately prepared, can be reliable for all purposes is absolutely impossible.

THE NEW BENZOLINE LIMELIGHT.

VII.—Minor Applications.

The application of benzoline and similar fluids to the enrichment of coal gas, air, and oxygen, gives a wide field for experiment, even when confined to limelight purposes. Benzoline in the warm bath saturator, through which oxygen is passed, is capable of producing a most powerful limelight without the aid of coal gas or ether, and if used to enrich coal gas in the same saturator, trebles or quadruples the lighting powers of the gas—one foot of enriched gas being equal to about four of ordinary coal gas.

If we pass *air* through the warm saturator, an excellent quality of combustible gas is produced, which burns similarly to coal gas. This enriched air, when applied to the limelight, gives a very fair light, though, as might be expected, it is inferior to ordinary coal gas. It is possible to get a three hundred candle limelight in this way; and as enriched air is *non-explosive*, and quite incapable of producing "pops," it is evident that the most timid or absent-minded operator can employ it without uneasiness. The process is to use two gas bags—one containing oxygen, the other being filled with air from a bellows; the air is passed through the warm saturator, and being thus converted practically into coal gas, is used precisely in the same manner. Dissolving is of course easy, and the light steady, quiet, and passably brilliant.

When coal gas can be obtained, it is of course better to fill the gas bag with it instead of air, as it gives a much better light and is just as safe. To give an idea of the capabilities of the different processes, it may be said that with a large-bore nipple, a certain fixed pressure of oxygen, and with the warm bath saturator—

Enriched air gives about	.....	300 candles.
Plain coal gas "	.....	400 "
Enriched coal gas "	.....	520 "
Enriched oxygen "	.....	600 "

I do not think that enriched air will be much used, because it requires *two* bags and gives only three hundred candles light; while enriched oxygen gives six hundred candles, or more, and needs but *one* bag or cylinder. Enriched oxygen under certain conditions will give loud "pops," while enriched air cannot pop. Recently one of my customers, using a warm bath saturator, was arranging the apparatus for a lantern exhibition. Being in a hurry, he forgot to light the night-light, and used the saturator *cold*; the result, on turning off the gas, was a pop which startled him, though it did no damage. When the audience assembled, he took care to have the saturator *warm* by using the night-light, and did not have any more cracks.

Several persons have written to me giving particulars of using benzoline in cold ether saturators; their experiences were about the same. They had a fairly good light, with plenty of roaring and hissing at the jet; after a while the light deteriorated, and the winding up was an explosion, if an unstuffed saturator was being used, which did considerable damage; or, if a stuffed vessel was employed, they had a pop, rendered much louder than necessary by having a *long* pipe between saturator and jet.

Oxygen which has traversed a cold benzoline saturator leaves it in a highly explosive condition: it is exceedingly apt to pop, and is practically unworkable on this account, besides its noisy attributes.

Oxygen which has passed a heated saturator is almost non-explosive; it will not "pass back" even if burnt as coal gas in a blow-through jet, with its large hydrogen aperture, and it works silently. If *sufficient heat* is used, enriched oxygen is as safe as coal gas, and cannot pop. I wish to make it distinctly understood that I consider *unstuffed* vessels used cold with benzoline as dangerous, because they are liable to explode. The benzoline limelight is coming fast into general use, and an accident now would be disastrous to its reputation. My vessels, being stuffed, cannot under any circumstances burst so long as the wool remains in them. Flame can be passed through, and any number of pops can be produced, if required, by using them cold: but I have never been able to rend asunder stuffed vessels, even when made of tin so thin that it could be easily cut with a pair of scissors.

Unstuffed vessels, if used warm, are even more dangerous, for there is in addition to the chance of bursting the additional fear of sending benzoline steam into the oxygen gas bag.

Heat applied to a vessel containing loose liquid must cause it to *boil*, the steam must go somewhere, and if the jet taps are turned off, it will go into the gas bag, and if a pop should occur the bag might be exploded.

Heat applied to a stuffed vessel saturated with benzoline does NOT cause it to boil; there is no steam to go anywhere, and if the jet taps are turned off, not a particle of benzoline will find its way into the gas bag. This is a most important point, for it ensures *safety*.

By way of a crucial test I have filled a stuffed vessel with inflammable fluid whose boiling point was about 100° Fahr., and, after draining, immersed it in hot water at 150° Fahr., and there was no steam: when a yard of rubber pipe was placed on one nozzle of the vessel and the other nozzle was closed, there was no issuing

vapour at the end—certainly not enough to be lit with a match. If a a heat of 150° Fahr. is safe, it is clear that 80° or 90°, the temperature used in the air bath, cannot be attended with the slightest risk.

It might be supposed that the pops would burn the wool stuffing. I have hitherto not found any signs of scorching when pulling experimental vessels to pieces; but it is desirable if a pop should occur to turn off the tap of the oxygen gas bag quickly, in order to preserve the wool packing. As a matter of fact, no pop has yet occurred to my knowledge with the warm bath saturator when used hot with light benzoline. ALBERT W. SCOTT.

EXTEMPORISED FLASH LAMPS.

MAGNESIUM flash lamps are now legion, and in the variety of their forms exhibit a really surprising range. Yet some of the best results in that class of work that have come under our notice have been produced with the simplest and crudest of appliances. For instance, we were present one evening during the recent festive season at a gathering at the house of an amateur photographer, and several of the company were more or less connected with, or interested in, the science. In the course of the evening it was suggested that a group in fancy costume should be "flashed" as a memento of the occasion, but our host did not happen to have a lamp, though he was by no means unpractised in artificial-light portraiture. Being one of that class who believe rather in common sense than elaborate apparatus for the production of results, he had never realised the want of a special lamp, but always improvised something to meet the immediate requirements of the occasion.

In this instance he disappeared for a few moments, returning with a piece of "compo" pipe. From this two lengths of about a foot each were cut, bent roughly into ∪ form, with the ends turned at right angles to the uprights, and these formed the whole of the apparatus. Different quantities of magnesium were placed in each to give the principal and auxiliary lights, and two operators stationed at different gas jets on a given signal brought their natural lung power to bear upon the improvised lamps, with the result that a number of really excellent groups were taken. The only additional apparatus employed, if it can be so called, besides the camera and "lamps," consisted of a few sheets of newspaper as reflectors.

Speaking of flash lamps reminds us of a handy little arrangement of home construction that we saw some time ago. It consisted of a plain blow-through tube of brass, simply bent into a suitable shape to hold the powder conveniently; but the special feature consisted in the means adopted for introducing the charge. On to the main tube before bending was slipped a short length of larger tube, fitting rather closely, but loosely enough to revolve with tolerable ease. In the centre of this, and reaching through the inner tube, an aperture a quarter of an inch or less in diameter was pierced, and a small funnel-shaped cup soldered on to the outer tube. Now, when the funnel stood in an upright position, the orifices in the two pipes coincided, and magnesium placed in the funnel fell into the inner tube without trouble, and the funnel being then turned to the right or left or downwards, the communication was cut off, and the arrangement became at once a plain blow-through again. The funnel, or at least its supporting tube, formed, in fact, a closing valve.

THE OPTICAL ILLUSIONS AND LIGHTS AT BARNUM'S.

IN such a much-advertised venture as this "Greatest Show on Earth" there must be among curiosities displayed things that one has not seen before, as well as old friends; so, with a view of taking notice of the Show from an optical point of view, and seeing what was peculiar or new, I visited it the other evening, and was duly entertained as thousands had been before me. The natural curiosities are outside my domain, beyond a passing remark that all the people, great and small, would have looked much better if they had had a background of bunting instead of the plain brick wall, and were better lighted. It is all the more remarkable that they should be thus scantily cared for when the expenditure has been so lavish in the matter of "Nero" and the pageants.

The optical illusions are decidedly good, and include such things as "The Mermaid," "The Swinging Bust," and others, showing the face, shoulders, and arms of a woman, with the lower part of the body and legs hid cunningly in such a way behind a screen or curtain, while an artificial bust is used to keep up the illusion. In the case of the "Mermaid," the tail is attached to the bust. The bodiless woman (Queen Anne) shows a head only, with a large collar round the neck. This, there is little doubt, is produced by passing the head through a large hole in a looking glass placed at an angle of forty-five degrees to the top and back of the box or niche (containing the illusion), which is papered with a distinctive pattern, so that by reflection the top looks, when viewed from the front, to be the back of the box. A capital illusion is the "Galatea" statue, which apparently comes to life—opens the eyes, the colour comes to the face and hair, and then changes to a skeleton. Here, by reflection and a dissolving view principle, the living woman's bust is made to superimpose the statue, and afterwards the skeleton to cover the woman's face and shoulders. The hand-shaking by the attendant who introduces the illusion is remarkable, and should be seen by all your readers, and their own construction put upon it; for it would be unfair to the management to let out all the secrets.

With the lady who apparently disregards the laws of gravity one has a most interesting experience, for she not only supports herself in mid air at will, but revolves with arms and legs extended in graceful attitude without any visible support. This is again done by reflection, a glass being placed at such an angle as to cause an illuminated object placed horizontal (laying down) to appear vertical. The body of the woman is placed in a revolving wheel in such a way that she is supported by the waist, and there is depth enough for the arms and legs to move freely; besides this, there are rollers attached for readily sliding the body backward and forward, so as to come in and out of the field of view. In this way the figure is made to rise up or dive down when required, and thus create a great impression on the audience.

Incandescent electric lights are used to illuminate the outside of the boxes or niches in which the illusions are shown, and as the powerful reflectors are placed so that the light falls on the eyes of the spectators, they are at a disadvantage, and have more difficulty in detecting "how it is done," the figures being illuminated by strong lights hidden behind curtains or screens.

The limelight used in the large hall to illuminate the performers is different to what is used in England, parabolic reflectors being employed instead of bull's-eye condensers for concentrating the light. These, while very good for general illumination over a large area, would probably not be so good as the English plan for single objects or concentrated illumination. Condensed gas is employed, but the cylinders are much larger than the steel ones used in England, and the pressure contained in same is far less than that now in general use here. The side of the lime cylinder next to the reflector is made incandescent, and not the side next to the object as when using condensing lenses. The gas is regulated from the cylinders, and not from the taps or through an automatic regulator, as would be the case if higher pressure gas cylinders were employed; but as Barnum's people make and compress their own gas, portability is (within reasonable limits) not studied. There are twenty-five of these limelights in use for the lighting up of the stage and arena—thirteen for the former and twelve for the latter; and to give some idea of the vastness of the place and the brilliancy produced, there are besides these limelights over one hundred electric arc lamps, fifty-eight of them being in the arena (six in a cluster), eight on the stage, sixteen in the stables and menagerie, and the rest under the gallery and outside the entrances. For the majority of buildings where a limelight is required, I don't think, however, it will be found that the reflecting light is more suitable than the condenser plan. G. R. BAKER.

MISCELLANEA.

THE DECIMAL SYSTEM.

THE employment of eikonogen as a developing agent has been followed by the publication of a great number of formulæ, among which are to be found very many that come from foreign experimentalists. As these gentlemen chiefly depend upon the decimal system of weights and measures for the representation of the quantities of the necessary ingredients, the eye of the photographic student has acquired a close familiarity with their proportions, expressed in grammes and centimetres, which would not have occurred had eikonogen owned to a native origin as a developing agent, like hydroquinone. In this case the foreign experimentalists were tardy in giving their experiences; but when at length they took up the subject, the photographic press teemed with decimal formulæ, not, however, to the extent caused by

its younger and more sensational rival. It is to be hoped that the constant reiteration of these weights and measures, together with their relative proportionality, will have a lasting educational effect. One would not carp at the multiplication of developing agents to the point of dire confusion (which seems to be within probability), if thereby the universal, not less than the photographic, admission of the decimal system was sensibly hastened.

Intimately connected with the immediate subject, however, is the facility with which the photographer, amateur or professional, may procure the necessary weights and glass measures accurately estimated. Such articles are common in general commerce; but in the photographic trade a different state of affairs prevails. The explanation is simple; there is practically no demand. An acquaintance with the transactions of one house enables me to state that, although occasionally—once in twelve months would be a handsome average—there is a call for a set of gramme weights, glass measures graduated to cubic centimetres are less frequently ordered. This is doubtless typical of what is experienced throughout the entire trade. The dealers are so often scolded for innumerable sins of omission and commission by the class of person—with which the little world of photography is remarkably well-stocked—who are never happier than when imparting their ideas upon everything in general to those whose needs of information or instruction they are not competent to satisfy, that perhaps an entry of this extenuating feature will be duly made in the proper place.

Some Phases of Amateurism.

The amateur question has, during late years, been discussed at great length, but, unfortunately, to little practical good. Recently it has recurred in an acute condition. There can be no doubt that the phenomenal spread of photography among non-professional people reacts to the monetary disadvantage of those to whom the pursuit is a means to the end of bread and butter. This is but an individual opinion it is true, but it is based upon a study of the letters and articles relating to the question that have appeared since it drifted into the sore stage, together with a knowledge of several specific cases in proof. In the world of athletics the line between amateurs is clearly and sharply drawn. Deliberate competition for a money prize, among numerous minor causes, instantly hurries an amateur into the curious latitudes of professionalism, from which not all the king's horses with his majesty's men thrown in can recall him. One must not suppose off-hand that photographers of either kind would willingly sink their dignity to borrow hints from youthful propellers of boats and cycles, pedestrians, pugilists, footballers, and the like; but possibly their central idea, namely, that of an *ipso facto* destruction of a person's status as an amateur, is one that could be canvassed among amateur photographers with every prospect of advantage.

The enormous number of amateur photographic societies coming into existence may hasten the institution of a more particular disqualification for membership than now exists. At present, it is to be presumed, nothing short of starting in business as a professional photographer would disqualify an amateur from further enjoyment of the rights of membership of the Society to which he belonged. But if applicants for admission were required to sign a declaration that they had never accepted payment for their pictures, and bound themselves not to do so under penalty of being drummed out of the Society (and the amateur ranks), we should be in a fair way to set up a definition of an amateur photographer, and remove some of the lawful irritation now disturbing many worthy professionals. Of course, this is only a suggestion thrown out in the interests of all parties. By the way, if the term "payment" covered money prizes (and why not?) the generosity of certain photographic organs might be forced to take fresh shape. Let us for argument's sake bracket an amateur photographer with an amateur oarsman, such being one that, to preserve his status, dare not compete for a money prize, and ask ourselves a riddle. AB (an amateur photographer—so-called) wins 1*l.* for six photographs in a newspaper competition; XY (a professional) earns 10*s.* for six pictures done in his studio. Problem: Find the "amateur." Better still, take the peculiar cases of certain makers of dry plates. Their wares are of such excellence and so strongly in demand that (not knowing how to spend the profits) they scatter hundreds of pounds for competitive work done on their plates. AB (as above) wins first prize, 50*l.*; XY (as before), second prize, 20*l.* Problem as before.

Photographic Patents.

Supplementary to an editorial note on page 18, it may interest the "Filer party" to know that, according to the list given in the current Almanac, there were 257 applications for patents in connexion with photography during the period between November, 1888, and November, 1889. In the corresponding period, 1878–1879, the number derived from a similar source was twenty-six.

These figures adorn their own tale; and are, besides, eloquent of far-reaching effects wrought by the gelatine process. Of the number first quoted it would be instructive to know how many of the applications were granted; what proportion of them were pure re-inventions; to what extent invalidation by reason of prior publication or other causes prevailed; and so forth: quite a fruitful field of conjecture is opened up to us in fact. Glancing down this and the lists for the few preceding years, one is forced to confess that the landscape camera, not by any means an intricate item of cabinetware surveyed within the angle of ordinary requirements and utility, has been grievously maltreated by the mob of "inventors." Truly Mr. Haro and Mr. Meagher may well be allowed to indulge in a little mocking laughter (arranged as a duet) at watching the unprofitable metamorphosis of the instrument they did so much to perfect in the long long ago. Although the prescribed season for the distribution of good wishes has gone by, it is perhaps not too late to append one that has an appropriateness for all times. Especially is a vein of benevolence to be approbated now, when a callous editor is airing his scepticism of the capacity of very many patents for holding water. The present good wish is: May all holders of photographic patents get the moral of the Shakespearian sentiment, beginning "Where ignorance is bliss" thoroughly well to heart. For my part, if I held a "patent" for a printing frame, a roll holder, a film carrier, an instantaneous shutter, a platinum printing process, a pneumatic release, or a score of other "inventions," "too numerous to mention," and there came a capitalist anxious to buy at a good price and take all risks, I should open my arms to him, also my pocket for his gold. We are all waiting for the legal duel that shall end in unmistakably up-upholding the validity of a photographic patent—a duel in which the contestants are well armed, eager for the fray, and sworn to fight it out to the bitter end.

Marston Moor.

ON DEVELOPMENT WITH PYROGALLIC ACID IN CONNEXION WITH AMMONIA IN VAPOUR.

The use of vapours in picture making was one of the first methods. The polished silver plate being exposed to iodine vapour to make it sensitive, and after exposure to that of mercury to develop the image, was the process of early days.

Since then there does not seem to have been any use of vapour, except for fuming silvered albumen paper.

In the use of ammonia vapour I have found by a few crude experiments that the modern dry plate may be developed by soaking for a minute or so in a plain solution of pyro in water, and then exposing to the fumes of ammonia, again returning it to the pyro bath, followed by the ammonia vapour, thus alternating until sufficient density is obtained.

There does not seem to be much difference when the vapour is used before the bath (of course, first wetting the plate), though more careful experiments may show an advantage.

I find that a plain strong pyro solution acts most rapidly, but too powerful a vapour acts too strongly, and is liable to produce red and green fog.

I think that a solution of pyro with any preservative that could be used with ammonia as the alkali might also be used with ammonia vapour, and the alkali, having been kept separate from the pyro, might be used repeatedly, as the action goes on mostly while under the influence of the vapour, and it seems to be necessary only to swab the plate with the pyro solution.

Perhaps the most valuable quality of this process is the ability it gives to localise and control development, as any part of a plate may be built up while other parts are left nearly or entirely undeveloped. By holding the plate film side down over an open bottle of ammonia (which may be warmed a little to increase the vapour) the image is slowly or rapidly developed, according to the distance above the mouth of the bottle. Four or five inches high diffuses the vapour sufficiently for uniform action

over a 5 × 7 plate, and for local action down to half an inch, according to the strength of the vapour.

An open dish can be used, and probably a small hose from the mouth of the bottle would work for local development with film upwards.

The above process is equally applicable to intensification with bichloride of mercury solution, and the action can be carefully watched, so that only those parts needing extra density need have full exposure to the fumes.

It seems necessary that the plate should be evenly wet or damp all over to get uniform action, but I found no difficulty about that.

The advantages seem to be especially the local action without hard lines, and the pyro does not darken even in plain solution nearly so quickly as when the alkali is mixed with it; and probably by the use of a swab or brush, without immersing the plate in the solution, it could be preserved and used over and over again. THEO. H. LUDERS.

—*American Journal of Photography.*

THE NEW ROLLABLE TRANSPARENT FILM.*

I MAY here say, in passing, that the Eastman Company develop and strip no less than 25,000 negatives per week, and that this average extends over a period of fully eighteen months; that the process is done (at least in London) mostly by lads under sixteen years of age, who have never had any previous knowledge of photography, and who never had more than one demonstration of what was necessary. Furthermore, fully ninety per cent. of this enormous number have been fairly good, if not superior, printing negatives.

That the Company is greatly indebted to many thousands of its customers, of all races and in all lands, goes without saying, for against all prejudice and all discouragement there have ever been men and women who have freely given it the benefit of their exceptional experiences and their valuable suggestions. Most prominent among them stands out a figure, long absent from our midst, but who is still, as of old, a strong, candid, earnest soul, ever battling for that which he thinks is right and true and just—I mean our comrade, Professor W. K. Burton. He said publicly in these rooms, in my presence, that he had tried every conceivable way with stripping films and *failed* until he followed the printed instructions of the Eastman Company, whereupon he *immediately succeeded.*

The aphorism that "Genius is the power of taking infinite pains," or, as Carlyle has it, "Genius, which means transcendant capacity for taking trouble," may or may not be a correct or sufficient definition of that condition which enables man to perform with accuracy, celerity, and apparent ease, feats which command the admiration and applause of mankind, and yet the idea as expressed is an old one, that had more or less fixed itself in the minds of men before either Carlyle or Renan gave it to us in his own language.

Certain it is, however, that a most cursory glance at the few facts known to us of the lives of great men of all ages reveals at once that *splendid* power of projecting or concentrating themselves upon the most minute details of a problem.

There is still another prolific cause of failure in the working of any film that comes from the use of unsuitable apparatus for exposing them; and notwithstanding the well-known fact that the Eastman Company have steadily aimed at the perfection of the roller slide as the only efficient means for exposing films, there are those who, for reasons best known to themselves, have used so-called roller slides which contain almost every conceivable element necessary to ensure the *failure* of the film. This is not a suitable place or occasion to enter into any details concerning what are nothing more nor less than evident attempts at evasions of features which the experience of thousands of workers have found not only advisable but necessary.

I am so fully impressed with the importance of this branch of the subject, that I think it only just that you should have a synopsis of some of the *principal* features to which, in the effort to perfect the roller slide, the Eastman Company has given the utmost attention, and which form a by no means unimportant part of its system.

ROLLER SLIDES.

1. Relating to rolls or spools of sensitive photographic film, either with or without a central core or support, permitting of its insertion into a roller slide without the necessity of rewinding.

2. Relating to a regulator controlling the tension upon the film *automatically.*

3. Relating to devices for holding the free ends of rolls of films to prevent their unwinding during the operation of placing the spools in position or removing the exposing portion from the roller slide.

4. Relating to the construction of roll holders in such a manner that the mechanism in connexion with the supporting frame or back can be removed from the case.

5. Relating to the use of any device for holding the edges of films in roller slides, flat within the focal plane.

6. Relating to any mechanical indicating device which shows upon the outside of a roll-holder case the position of the films.

7. Relating to the combination of a measuring roll with an indicating device.

8. Relating to the automatic stopping or locking of the winding apparatus by mechanism actuated by the movement of the film.

9. A visible recorder or index, worked either automatically or by hand, to show the number of exposures made.

10. Relating to the making of the roller slide a part of the body of the camera.

11. Utilising the movement of the slide shutter in opening or closing to mark the divisions between the negatives.

12. Relating to devices whereby a coil of films can be used with or without a fixed roll or arbor.

13. Relating to the use of a frictional device applied to the back of a film in such a way as to cause a measuring roll to revolve.

14. Relating to the use of a sheet of glass, or its equivalent, slightly removed from that portion of the film which is in position for exposure to ensure the film lying with approximate accuracy within the focal plane.

15. Relating to a method of fixing or fastening the free end of a film to a core or fixed arbor.

16. Relating to frames or supports for roller-slide mechanisms, permitting of the entire frame being hidden within the body of the camera case.

17. Relating to the application of end pressure to the rollers or to the spool, or to the receiving roller, by springs or their equivalents, whereby slack or loose winding is prevented.

18. Relating to the adjustment of such pressure by set screws.

19. Carrying the pivots or the bearings of the rollers upon or by means of springs or spring arms, whereby the pivots or arms become self-adjusting.

20. Relating to the combination in a receiving or winding roller of a non-detachable fitting with a ratchet.

21. Relating to the use of a hand-pricker or perforator to indicate the limits of the several exposures.

22. Relating to the use of a pawl or detent to enable the film to be strained.

23. Relating to self-capping shutters, whereby a shutter may be set without exposing the sensitive film or plate.

The above list is by no means complete, but the mere enumeration of them will, I hope, convey some idea of the importance the Company attaches to the part played by the roller slide and its attachments.

W. H. WALKER.

(*To be continued.*)

* Continued from page 92.

NOTES FROM NEWCASTLE.

THE event of the week has been the opening of the Annual Berwick Club Exhibition of Fine Arts, which event took place on the 7th instant, the Mayor and Sheriff officiating at an interesting function, but a critical examination on that evening was out of the question. I have since paid a quiet visit, and am able to endorse the generally expressed press opinion that the present Exhibition is an advance on previous years. The Berwick Club, founded in honour of the celebrated engraver, contains on its membership-roll the names of several excellent painters; their reputation may be, for the most part, more local than general, but their works are invariably accepted at the Royal Academy, and Newcastle is proud of men of the calibre of Emmerson, Jobling, Ralph Hedley, Surteis, Chambers, Charlton, and Hodgson Campbell, and several others. It also contains the names of a numerous section, "hangers on," so to speak, of art, whose names would be quite free from objection if they kept their "studies" to themselves, and did not expect their work to be thrust under the public eye; however, its a case, I suspect, of loaves and fishes with the Club, and to reject these frames would be to lose the "shekels." Other well-known painters are G. F. Watts, R.A., Orchardson, R.A., Herbert Schmalz, Blandford Fletcher, Meissonnier, and Marsh, R.W.S.

Messrs. Barkas & Son, of the Art Gallery, are advertising their branch of the Photographic Exhibition extensively, and I have reason to believe with some promising results. A good exhibition of apparatus would be a very attractive feature, as Newcastle swarms with amateurs who like nothing better than gazing at and handling apparatus.

Mr. Pike's demonstration of *Photo-Micrography* before the loca

Chemists' Association on the 5th was a great success—the paper not too long, the attendance good, and the exhibition of photo-micrographic slides much appreciated. Two plates were exposed on an insect which occasionally troubles the human flesh, and the operations carefully performed were watched with much interest. Mr. Pike acknowledged his indebtedness to the Rev. T. F. Hardwich, M.A., and Mr. Andrew Pringle, for an admirable set of slides.

The remarks of a writer in a contemporary with regard to the "*entente cordiale*" existing amongst the members of the Newcastle Society, as a professional and amateur body, would have more point but for the fact that the Association named numbers only about one professional to nine amateurs. It is a strange and melancholy fact that out of a list of twenty-two photographers published in Kelly's latest directory for Newcastle, not one is a member of the local Society.

Apropos of my remarks on the invariable success of the North may be noted the fact that at the Royton Photographic Exhibition, from Cullercoats to Hexham, we have won "all along the line."

The weather just now is really very fine, and photographers *ought* to be busy. We have had very tempting days for the camera lately. I had the pleasure of looking over a few "interiors" the other day, the work of a local amateur; with one or two exceptions they are by far the best I have seen for a long time, as the size was 8 × 6 inches, and I was informed the lens only cost a guinea. I have seen much inferior work with a lens costing four or five times as much, and made for the purpose. D. D.

Foreign Notes and News.

Sometime ago we devoted a paragraph to an account of how General Boulanger had been interviewed by a representive of the *Figaro* during his residence in Jersey, and instantaneously photographed a number of times during the interview. It would now appear, however, that the alleged interview took place not at Jersey but at Brussels, and that the photographs by which it was illustrated were not instantaneous but a series of carefully arranged poses. The whole series was originally intended to form a Boulanger album to be published on the eve of the elections to excite popular enthusiasm in the General's favour. The expenses of such a publication, however, probably contributed to prevent its appearance, and the negatives were ultimately utilised by the *Figaro*. It seems as if the ex-General were never to escape being surrounded by a lambent halo of absurdity, for in some of the "instantaneous" photographs he appears with striped trousers, in others with checks. If these were all taken during one interview the General must have favoured his visitors with a change of habiliments executed in their presence, which must have put his dignity to a severe test.

Dr. Eder communicates as usual a great deal of interesting matter to the last number of the *Photographische Correspondenz*. He has recently been experimenting with a light in which the line of the ordinary oxy-hydrogen light is replaced by a small plate of zinc oxide confined in a platinum ring. The zinc oxide appears to be very refractory, not being in the least bored into or acted upon by the flame. The plates, however, have a tendency to break, and as they are somewhat costly, this tends to make the light rather expensive. The same thing was originally observed with plates of zirkon, but was obviated by reducing their size, which, as the light issues from a small point, did not injuriously affect the illumination. Probably a similar reduction in the size of the zinc oxide plates would also prove beneficial.

Dr. Eder has also been experimenting with rods of magnesia, manufactured by Plössl & Co. These rods were made in the form of an ordinary lead pencil inserted into a brass holder, and introduced at the point into the oxyhydrogen flame. The light so obtained was *at least* equal to the zirkon light in intensity, but the magnesia being less refractory than zirkon got slightly bored, a circumstance, however, of small importance, as the pencil could be easily turned, and even if it were not, the hole formed interfered but little with the light. Dr. Eder further extended his experiments to a spectroscopic examination of the light emitted, the result proving that both were pretty well alike in blue and violet intensity; the magnesia light, however, showed a slight superiority in ultra-violet rays.

According to Herr A. Stieglitz, a quick method of toning aristo paper, so as to obtain good black tones, is given by the following bath:—

Brown chloride of gold	0·25 gramme.
Uranium nitrate	0·25 "
Bicarbonate of soda	5·00 grammes.
Distilled water	100 c.c.

The fixing is accomplished entirely in a soda bath, to which a little ammonia is added.

Our Editorial Table.

Caldwell's Instantaneous and Time Shutter.

(By W. Wray, Optician, Highgate, N.)

This shutter, like some others which we have known for many years, is constructed to work between the lenses of a double combination, although the shutter idea is carried out in a manner differing from some of them. Its position is immediately behind the diaphragms, whether these are Waterhouse or Iris. The exposure is made by two thin light wings, each containing a hole the full aperture of the lens, and arranged so as to work in opposite directions, and with any degree of



rapidity, which may, by setting a hand or pointer at a dial, range from a long period to the one hundred and fiftieth of a second. When the check action necessary for very long exposures is not brought into play, the slowest exposure may be estimated at one second. It is set by a thumb nut, shown in the cut, just below the exposure aperture, the speed being, as we have said, determined by setting the hand at the brake screw at the bottom. It is operated by a pneumatic ball and tube. Having tested it thoroughly, we can speak with confidence of its good qualities. The workmanship is all that it ought to be.

Abraham's Photographic Annual and Catalogue for 1890.

In the compilation of this, Mr. Abraham (81, Aldersgate-street) has made a new departure, inasmuch as he has prefaced the catalogue portion by articles on developing, printing, chemicals, and other topics of current interest, by various writers, together with excellent, practical hints and formulæ applicable to some of the goods in which he deals. The catalogue is comprehensive, and contains a large list of cameras, lenses, shutters, stands, lamps, and apparatus in general by most of the best-known makers. It is well illustrated and nicely printed.

Coloured Masks for Lantern Slides.

Diversity of colours in the slips for binding the edges of lantern slides has for some time been recommended and adopted, but Mr. A. R. Wormald, of Sutton, Surrey, has extended the idea by applying it to the mattes also. He sends us a few examples in green, pink, cerise, yellow, brown, and other colours. The idea is an excellent one, as it enables a good and distinctive classification to be made of slides which might include castles, abbeys, statuary, French, English, Scotch, Irish, or American views.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 1854.—"Combination Hand Camera." H. L. Young.—*Dated February 4, 1890.*

No. 1857.—"Exhibiting Photographic Transparencies in an Ordinary Lamp Shade, which he proposes to call 'A Combined Lamp Shade and Transparency Exhibitor.'" J. V. Elsden.—*Dated February 4, 1890.*

No. 1938.—"Improvements in Apparatus for Holding and Exhibiting Photographs and other like Views." F. Kitto.—*Dated February 5, 1890.*

No. 1950.—"An Improved Form of Iris or Contracting Diaphragm for Photographic Camera Lenses and Microscopes." J. Swift.—*Dated February 5, 1890.*

No. 1956.—"A New or Improved Method of Producing Coloured Photographs." E. Ireland and C. Ireland.—*Dated February 5, 1890.*

No. 1998.—"Improvements in the Production of Magic Photographic Pictures." G. W. Secretan.—*Dated February 6, 1890.*

No. 2023.—"Improvements in Enlarging Cameras." W. Griffith.—*Dated February 7, 1890.*

No. 2034.—"Improvements in Walking Stick Camera Tripods." A. G. RIDER.—*Dated February 7*, 1890.

No. 2039.—"Improvements in Photographic Hand or Instantaneous Cameras." A. F. BANNISTER.—*Dated February 7*, 1890.

No. 2100.—"Improvements in Photographic Cameras." T. P. WATSON and W. MOSCROP.—*Dated February 8*, 1890.

No. 2101.—"An Improvement in Reflectors used in Photographic Portraiture." G. BISHOP, F. BISHOP, and J. P. KIRK.—*Dated February 8*, 1890.

PATENTS COMPLETED.

IMPROVEMENTS IN OR RELATING TO CHANGING SLIDES FOR PHOTOGRAPHIC CAMERAS.

No. 18,357. HENRY HERBERT, 119, Hartfield-road, Wimbledon, Surrey.—*January* 15, 1890.

THE object of this invention is to provide means whereby a considerable number of plates, say, for example, a dozen, can be carried, exposed, and changed in one apparatus instead of the two plates usually carried in the ordinary dark back.

In carrying this invention into effect I provide a suitable box or case which may be adapted to slide in the back of the camera or in a separate frame of its own which may be attachable to the camera in the ordinary way or may be used separately where required. The sliding box is made of suitable size and shape, and contains the required number of plates whether exposed or not, and is preferably provided with a closing shutter and a narrow slit or opening at the inner end, through which each plate as it is required for use can pass. This opening may be closed with an automatic shutter, which, upon the removal of the case from its frame or the camera, at once closes the opening and prevents the entrance of light into the case. In the back of the camera or frame I prefer to provide a spring-controlled hinged plate or equivalent device, preferably of wood, which is pressed back into a suitable recess or receptacle upon the insertion of the sliding case, and upon the withdrawal of the case springs forward.

In using this apparatus the sliding case is first charged in the usual manner with the sensitised plates, and is then inserted into the frame or camera, the automatic shutter withdrawing from the aperture in the end of the case as it enters. The case having been pressed home, and it being desired to place the plate in position for exposure, the case is withdrawn, the bottom plate passing through the slit in the casing and remaining in the camera or frame as the case is withdrawn. The spring back is locked by a suitable detent, but when the sliding case is withdrawn sufficiently far from the frame or camera the detent is automatically released, and the spring back then moves the plate forward to its proper position for exposure, where it is held securely by the sliding case, which is now returned into the frame or camera. After exposure the sliding shutter is withdrawn and the plate falls back into the sliding case with the other plates; the shutter is then closed again. To expose the next plate the sliding case is withdrawn as before, leaving the next plate in the frame; this is brought forward as already described, and the sliding case is again returned, and after exposure the second plate is replaced in the case by the withdrawal of the sliding shutter as before, and so on until all the plates have been exposed, when the sliding case may be removed and a new one already charged substituted, or the sliding case can be relieved of the exposed plates in the dark room, recharged with fresh plates, and replaced as before.

In the frame or camera, at the opposite end to that by which the sliding case enters, I prefer to have a spring-controlled rising bottom carrying two suitable guides, so arranged that when the plate is pushed forward by the hinged back it must of necessity come into the right position for exposure. When the sliding case is inserted it pushes back the rising bottom.

IMPROVEMENTS IN CONNEXION WITH DIAPHRAGMS OR STOPS FOR USE WITH THE LENSES OF PHOTOGRAPHIC CAMERAS.

No. 1334. JOHN STUART, The Hollies, Clapham Common, Surrey, and GEORGE HARROP, 30, Russell-road, Holloway, Middlesex.—*January* 11, 1890.

THIS invention relates to the stops or diaphragms known as the "Iris," and has for its objects to enable the diaphragm or stop and its holding and operating rings to be contained entirely within a lens tube or mounting of the usual size, and also to provide means whereby the operator can (without necessitating reference to a scale) with great facility and certainty adjust the diaphragm or stop definitely to any set size of aperture without danger of its accidentally becoming altered. To effect this the ring, to which one end of the component members' leaves or strips are centred is made of a size to fit in the lens tube or mounting, and the ring to which the other ends of the said members' leaves or strips are centred is provided with slots extending from the inner circumference to near the outer circumference, where the said ring is strengthened by a supplementary ring or annulus, preferably at right angles thereto. A stem attached to this slotted ring or the supplementary ring projects through a slot in the tube or mounting for enabling the operator to adjust the aperture.

In a suitable part (for instance in a ring secured within the casing which contains the diaphragm) notches or recesses are made, with which engages a spring or catch secured to any suitable part (for instance, to the ring which is slotted as aforesaid). The free end of the spring catch that enters the recesses or divisions in the ring allows the ring to be rotated, but as it comes opposite the notches or recesses the operator is aware that the diaphragm or stop then presents a certain known and definite aperture, in accordance with the recess or notch with which the catch is engaged.

The tube or mounting of the lens may be provided with divisions marked so that the position of the stem corresponding with any given aperture may be ascertained by reference to the scale, or projections, recesses, or the like may be used instead of the scale, or in addition thereto, so that by running the finger over them they may be readily counted, and the aperture thus ascertained in a dark place.

APPARATUS FOR CONTROLLING THE EXPOSURE OF PHOTOGRAPHICALLY SENSITIVE PLATES WHEN USING FLASH LAMPS.

No. 2723. FREDERICK WILLIAM HART, 8 and 9, Kingsland-green, London.—*January* 11, 1890.

THE object of this invention is for controlling the exposure of the sensitive photographic plate or plates in lighting single or grouped objects to be photographed by flashing light or lights. It has been found that some persons and lower animals involuntarily move either the body or more frequently close the eyelids very shortly after the flash commences. To render this movement of little or no moment I employ a stop-cock with two separate ways, or two separate stop-cocks actuated simultaneously by one lever or turnkey; each way is connected with a separate air chamber in which is air or gas under pressure, one conducting tube for air goes to the flash lamp, and the other to the pneumatic release of an exposing shutter; their relative times of discharge are so adjusted that the shutter exposure takes place at the early part of the flash or combination of flashes, and according to the volume of light provided, so the actual exposure of the plates may be reduced to a very small fraction. It has been found impracticable for many to accomplish the double movement for flash and shutter by simple hand pressure on balls at the right instant of time. It has also been suggested to connect the exposing shutter release with the same air ball or chamber that discharges the magnesium; but as the air does not escape at the shutter release, but exerts pressure, and, on the other hand, the tube to the flash lamp is practically open, it is seen that such an arrangement could exert no practical pressure at the shutter release.

IMPROVEMENTS IN WHAT ARE KNOWN AS INSTANTANEOUS PHOTOGRAPHIC SHUTTERS.

No. 3398. JAMES HEBER TAYLOR, Little Trinity, Cambridge, M.A. Queen's College, Oxford, M.A. Trinity College, Cambridge, B.Sc. London.—*January* 18, 1890.

THE first particular of improvement consists in giving a balanced action to the pneumatic or other release, so as by preventing any displacement of the centre of gravity and by opposing the acting forces to prevent the shocks and tremours commonly induced by the unbalanced actions in general use.

The next particular of improvement consists in so arranging the mechanism which operates the leaves that the times of uncovering and of recovering the lens shall be both small fractions of the whole time of exposure, itself very brief, and adjustable so that the whole time may be varied, the ratio of the times of opening and of closing to the full time of exposure remaining approximately constant.

The modes of effecting this end, in principle identical, may be varied according as it is desired to use simultaneous movement of (1) rectilinear sliding leaves, (2) pivoted leaves or independent movement of leaves with either kind of motion for opening and closing the shutter.

To effect the simultaneous movement of two leaves opening from and closing to a given diameter of the lens mount I employ a circular disc, rotated by a coiled spring or other suitable means, which disc carries pins, one on each side, towards opposite extremities of a diameter and at equal distances from the centre, which work the leaves of the shutter by means of cams so designed that the pins, starting from fixed positions, gradually impress a considerable velocity on the leaves, which, owing to their overlap, do not begin to uncover the lens till the pins have undergone an angular displacement α, then, during a succeeding angular displacement β, the pins rapidly drive the leaves off and uncover the lens, after which, while the pins undergo another angular displacement γ, their action on the leaves is gradually reduced to zero and there reversed, then through another angular displacement γ it is gradually increased, the lens still remaining uncovered, after which, by the velocity thus impressed upon the leaves, the lens is again covered during a succeeding angular displacement β of the pins, and, the lens continuing closed, the movement is finally reduced to rest during the succeeding angular displacement α.

In the angular distance 2γ I carefully avoid bringing the leaves to rest by making part of the cam concentric with the centre of the then movement of the leaves, because the effect of this free passage of the pins would be to shorten the duration of full opening of the lens relatively to the whole time of exposure, *i.e.*, it would act directly contrary to the stated object of the invention, and besides this the strains on the leaves, pins, &c., caused by driving them by sudden impact from rest, would damage the works.

Sometimes, and especially for larger sizes, instead of forming the cams of full size in the leaves of the shutter I form them on a smaller scale in pieces of sheet metal constrained to slide to and fro in a straight line, and by a system of levers or other suitable means, multiply their movement on the leaves of the shutter. In this case also I avoid a protracted interval of rest of the leaves, which would be still more injurious than in the simpler construction.

The angular movement of leaves about a pivot or pivots is effected by acting on them by a pin either directly or through links, the pin being constrained to move along a line, but controlled as to its movement by a cam slot, into which it takes, in a circular disc, driven by a coiled spring, or by other suitable means, the cam being so formed that the leaves, if they are intended to recover the lens by reversing their motion, go through phases of angular motion similar to those described above in the case of rectilinearly moved leaves, or if the smoother movement of a somewhat larger piece of apparatus be preferred, the leaves, after passing the zero, may develop a movement in the same direction and sweep on continuously to close the opening of the shutter.

Lastly, in the case of shutters whose opening and closing leaves are independently driven I secure the same end by arranging that detents suitably driven at adjustable intervals release first the opening and then the closing leaves.

In each and every form of shutter I arrange the moving parts so that there is no displacement of the centre of gravity, and that the forces are as nearly as may be balanced.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 18.....	North London	Myddelton Hall, Islington, N.
,, 18.....	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 18.....	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 19.....	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 19.....	Bury	
,, 19.....	Hyde	
,, 19.....	Manchester Camera Club	Victoria Hotel.
,, 19.....	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 19.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 20.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

FEBRUARY 11.—Annual meeting.—The President (James Glaisher, F.R.S., &c.) in the chair.

The report of the Council was taken as read, and its acceptance was proposed by Mr. J. SPILLER, and seconded by Mr. SCAMELL.

Mr. A. MACKIE said that the report mentioned and papers read at the meetings of the Society did not refer to the discussions; the discussions had, in fact, always been cut short, and not time enough was allowed for them. This was to be regretted, as he considered that they were often of more value than the papers. The statement that the technical meetings have maintained their popularity, with a steady attendance of members and friends, he considered inaccurate, the attendance being on an average not equal to that at several other societies. He considered that the annual exhibition was the main feature of the Society, and that if that were done away with the Society would fall to pieces directly. The final paragraph of the report, in which it was stated that the Society takes a leading part in all that is connected with the scientific or artistic applications of photography, he denounced as a piece of bombast.

Mr. W. BEDFORD said that although he could not altogether go with Mr. Mackie, there was a good deal in what he said. In many respects the Society had been surpassed by others. He thought the Council had not shown sufficient energy. There was the question of affiliation with other societies. Had the Council considered that question? If they had, it had been merely to defer it. Then, again, in the question of a photographic museum nothing worthy of mention had been done—they were no farther forward than they were last year. Then the question of standards had not been advanced. If, however, we acknowledge that more might have been done Mr. Mackie would not have spoken in vain.

Mr. S. G. B. WOLLASTON thought that the papers read had been for the most part of too exclusively scientific a character. Of those mentioned in the report he could only select two as having much direct practical interest, such as was needed for a popular society.

Mr. G. DAVISON said that the Photographic Society of Great Britain took its stand as a royal or central society, and the more scientific and abstruse were the papers the more dignified was the position of the Society. Mr. Belford had remarked that Mr. Mackie's objections constituted a severe indictment of the Society. He (Mr. Davison) thought that these objections were trifling; he did not see that the report could deal with the discussions. The Society's exhibition, too, stood alone in its importance and dignity. Mr. Belford had referred to the question of affiliation. The question was what was to be considered affiliation? If affiliated societies were to pay, the members of those societies would be using this Society for all the purposes and enjoying all the privileges of members. He concluded by saying that Mr. Mackie's remarks might have been made in a more friendly tone.

Mr. MACKIE said that with reference to tone he might point out that he had written a letter to the Council, and received, as he expected, a severe snubbing.

The report was adopted *nem. con.*

The Treasurer's report was then read, from which it appeared that there was a sum of 139*l.* carried to the credit of the Society, making the present capital 794*l.* The average annual increment for the last ten years was 48*l.*, and for the last two years 134*l.* The exhibition had yielded an excess of receipts over expenditure of 161*l.* The cost of receiving, hanging, and returning exhibits—52*l.*—had been complained of as high, seeing that it came to about three shillings per frame, but inquiry had not led him to hope for any more economical way of getting the work done. He referred, finally, to the wonderfully altered character of the Society's journal, which, during the last few months, and especially in the current number, had contained abstracts of every important photographic publication at home and abroad.

Mr. MONTEFIORE proposed, and Mr. MACKIE seconded, the adoption of the Treasurer's report, which was carried *nem. con.*

The progress medal which had been awarded to Captain Abney was then presented by the President. Captain Abney himself was not able to be present, but was represented by his son.

Mr. WOLLASTON said that the progress medal was connected with a question which he wished to bring forward. He moved a resolution, "That this Society, whilst fully of opinion that Captain Abney should receive a progress medal, has no power under the present rules to grant such a medal, and that the Council by their independent action have been acting *ultra vires*."

Mr. MACKIE seconded this motion, which was put to the vote, two voting for and fifteen against.

Mr. L. WARNERKE wished that the members would by a vote define the meaning of the phrase in one of the rules as to the management of the Society. He therefore proposed a resolution to the effect that the management of the Society comprises everything which assists in the advancement of photography and the practice of art connected therewith. If it were not so understood, the Council could do nothing, and might as well be represented by a couple of officials to do routine duty.

Mr. T. SAMUELS considered that such a resolution was in the nature of an amendment or alteration of rules, which could only be done after due notice.

Mr. BIRD thought that there was no violation of the rules. It was extremely desirable to obtain the meaning of that phrase at the end of Clause 2.

Mr. T. S. DAVIS thought that there had been a considerable amount of doubt amongst the members of Council, and the members of the Society generally, as to what was included in management, and that that doubt ought to be removed.

Mr. BEDFORD thought that there was no doubt that the rule was passed in its present form with the express design of putting it out of the power of the Council to do the things that members might do as a Society.

Mr. Warnerke's resolution was then passed by a majority of twenty for to three against.

The results of the election of officers were then read as follows:—*President:* Mr. James Glaisher, F.R.S.—*Vice-Presidents:* Captain Abney, Messrs. T. Sebastian Davis, H. P. Robinson, and John Spiller.—*Council:* Messrs. G. L. Addenbrooke, W. Bedford, V. Blanchard, Lyonel Clark, F. Cobb, A. Cowan, T. R. Dallmeyer, Major L. Darwin, Messrs. G. Davison, W. E. Debenham, W. England, J. Gale, H. Chapman Jones, Captain A. M. Mantell, Sir — Prescott, Sir David Salomons, Messrs. J. W. Swann, J. Traill Taylor, L. Warnerke, and H. Trueman Wood.—*Treasurer:* Mr. W. S. Bird.

After the customary votes of thanks, Dr. LINDSAY JOHNSON read a paper urging the Society to acquire permanent premises, and to establish a photographic institute which should comprise a museum and should be for instruction and research in photographic matters. The consideration of this paper was deferred to the next meeting.

Mr. Enrico Resta was elected a member.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 6,—Mr. J. W. Zachnsdorf in the chair.

A negative was shown possessing the characteristic markings that occur on a varnished gelatine plate that has been exposed to water, and Mr. A. HADDON offered, as an explanation, the suggestion that wherever there was a fragment of dust in the varnish there was a path for the moisture, which thus started from such fragments as centres, radiating and forming lines until these met with similar lines proceeding from other centres.

Mr. W. E. DEBENHAM did not find the explanation satisfactory, and pointed out that the most distinct fragment of dust—one which was, in fact, a thread or other morsel of vegetable fibre—lay across some of the markings without acting itself as a centre or nucleus.

Mr. HADDON thought that, in fact, there were lines proceeding from the fibre in question.

Mr. T. E. FRESHWATER read a report of the engineer and manager of the oxygen works at which the recent fatal explosion had taken place, from which it appeared that there was reason to believe that the bottle which had exploded contained a mixture of oxygen and hydrogen. As a preventive of the possibility of such an accident occurring in future, the fittings of the hydrogen bottles were being altered so that the oxygen supply could not be applied to them, or *vice versâ*.

Mr. J. H. LEAPE showed a bottle containing a black powder which he said he had purchased as eikonogen and not used. The colour had changed to black within a few weeks of its purchase.

Mr. A. COWAN remarked that the bottle in which the substance had been placed had, probably, been damp. He had some eikonogen of the crystalline form which had been left open for some time without becoming much discoloured.

Mr. DEBENHAM had had a similar experience.

Mr. HADDON suggested rapidly rinsing the contents of the bottle, and on doing this the superficial blackness was washed away and apparently useful crystals left behind.

Concerning the question in the last week's box as to the important photographic inventions attributed to the late Professor Joule, Mr. HADDON said that he had not been able to find any reference to them in Dr. Joule's works, and the President of the Physical Society was not aware of any photographic inventions of the late Professor.

Mr. J. B. WELLINGTON proposed to make a large screen for lantern work, and inquired whether bamboo would be suitable for the framing.

Mr. F. A. BRIDGE said that it would not be suitable, it gave way too much. Pine rods were best, and it was convenient to make a framing in four-feet lengths with four extra pieces of two feet each; the lengths could then be fitted up in various sizes, to suit the place where they were to be used. He thought calico the best material for covering, and it could be obtained up to one hundred and twenty inches in width.

Mr. FRESHWATER said that with bamboo, as the rods were of different sizes, the ferules must be numbered, and could not be used as they came. Another drawback was the difficulty of obtaining parallel pieces. He had had occasion to make a bamboo frame, and had the opportunity of selecting from over one thousand rods: even then he could not get a perfect set.

It was mentioned that at an early meeting, to be duly announced, Mr. Haddon would give a practical demonstration of glass blowing as used in the Chemical and Physical Laboratory.

Mr. A. C. Pemberton was elected a member of the Association.

CAMERA CLUB.

ON Thursday, February 6, a paper contributed by Sir David Salomons was read. Mr. E. R. Shipton was in the chair. The paper contained formulæ for ascertaining exact distance of lantern from screen when a certain amplification with a given lens is desired, and for finding focal length of lens to employ for a fixed distance and enlargement.

Some remarks upon the paper were made by Messrs. H. M. Elder and G. Davison.

An exhibition of lantern slides followed, views in the Netherlands, by Messrs.

Elder, E. G. Spiers, and W. A. Greene, being first shown. These were succeeded by a set of New Zealand scenes by Mr. Wray Palliser, and the first Club Loan Collection of slides, sixty in number, contributed by various members. Other sets were shown by Messrs. Andreæ, Dresser, Harding, Fitly, Payne, and Shipton, nearly three hundred slides in all being brought up by members for exhibition.

At the commencement of the meeting the Hon. Secretary handed round an instrument (sent up by Mr. Dresser) called the lanternscope, an apparatus devised for the effective viewing of lantern slides. In form and use the lanternscope is like the stereoscope, but without the means of securing stereoscopic effect. The transparency is viewed through a magnifying eyepiece, the picture having behind it a piece of ground glass for diffusing the light from the lamp.

There was also exhibited (sent by Messrs. Hinton & Co.) a large, unusually effective photograph of the Eiffel Tower, taken by M. A. Pepper, of Paris.

The paper on Thursday, February 20, will be one communicated by Mr. W. K. Burton, *On One or Two of the Tenets of the Naturalists.* Meeting at eight p.m.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 4,—Mr. J. Douglas in the chair.

The SECRETARY stated that the demonstration on *Bromide and Alpha Printing* was fixed for April 18, and not for February 18, as stated in the JOURNAL for last week; the former date had been inserted by mistake in his report to the papers. He also stated that all members of the Society should receive full particulars of the *conversazione* during the week; any member not receiving the printed form was requested to communicate with him at once, as several members had changed their address.

Mr. LEWIS MEDLAND then proceeded to give his lecture, entitled *A Day at the Zoological Gardens.* The lecture was illustrated by upwards of two hundred lantern slides, all prepared by himself from negatives taken by him during the last two or three years. The lecture was a most interesting one in many ways. The slides were all that could be desired. The lecture was an excellent one in natural history, and, being interspersed with many anecdotes of the lecturer's own experiences in many lands and in securing the negatives at the Zoological Gardens, gave great enjoyment to all the members and friends who were present.

A hearty vote of thanks was accorded to Mr. Medland for the trouble he had taken in preparing and in giving such an excellent lecture.

Mr. HUDSON then showed and explained the action of a detective camera just brought out by Mr. Abraham, of Aldersgate-street. The novel method of changing the plates by one simple up-and-down motion was admired. Mr. Hudson also showed a metal ring which he had had made for encircling a lens mount and preventing the stops from slipping out and also any light from entering the slit.

Mr. A. MACKIE stated that he thought Mr. Hudson would find that several patents had been taken out for a similar contrivance.

The next meeting will be upon Tuesday, February 18, which will be a technical evening, and members are requested to bring any work which they may have to show, and to be prepared with questions upon any difficulties, &c.

HOLBORN CAMERA CLUB.

FRIDAY, February 7, was devoted to the instruction of beginners. The opening remarks were made by Mr. F. Brocas, who was followed by Messrs. Bayston, Smith, and Jones. It is to be hoped that the practical information then given will result in the production of some good work during the coming season.

Saturday, March 1, the Club will hold its annual exhibition of members' work at Anderton's Hotel, Fleet-street. In conjunction with the same will be held a Cinderella dance, tickets for which can be had from any member of the Club or of the Hon. Secretary, 100, High Holborn; single, 1*s.* 6*d.*; double, 2*s.* 6*d.*

SHEFFIELD CAMERA CLUB.

THE election of officers of the above Club took place on January 27, when the following gentlemen were elected:—*President:* Mr. G. T. W. Newsholme, F.C.S.—*Vice-Presidents:* Messrs. T. H. Morton, M.D., and J. H. Rawson.—*Council:* Messrs. William Gilley, jun., W. Jenkinson, H. Lowell, J. A. Manton, L.R.C.P., M.R.C.S., T. S. Yeomans, and Professor Arnold.—*Treasurer:* Mr. B. W. Winder, F.C.S., F.R.M.S.—*Hon. Secretary:* Mr. G. E. Maleham.

The inaugural meeting of the new session takes place on February 26.

LIVERPOOL UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

FEBRUARY 3,—Dr. C. A. Kohn, the President, in the chair.

Dr. J. L. HOWARD read a paper on *Orthochromatic Photography.* The paper, which was illustrated by lantern slides and experiments, traced the history of orthochromatic photography up to the present time, and gave the results of the chief workers—Vogel, Eder, Bothamley, &c. Dr. Howard mentioned the chief dyes used on the plates, and showed slides comparing the effects of each. He also explained the use and action of the yellow screen in orthochromatic work.

Mr. HIGGS then gave his results with orthochromatic plates, mentioned the dyes he used, and showed several fine photographs taken by himself of the lower end of the spectrum.

Two fine enlargements of Professor Rowland's spectrum photographs, and several fine photographs of nebulæ and stars by Mr. Isaac Roberts, F.R.A.S., were exhibited.

Dr. J. C. BROWN then gave some excellent advice to the members of the Society, encouraging them to take photographs of natural objects—*e.g.*, faults in rocks, boulder stones, lightning flashes, &c.—which photographs he said would be likely to prove of great value in furthering geology and physics.

The next meeting will be on Wednesday, February 26, when Mr. Paul Lange will read a paper on *Detective Cameras.*

BRADFORD PHOTOGRAPHIC SOCIETY.

THE first *conversazione* of the above Society was held in the Church Institute. Admission was by complimentary ticket, and there was a large attendance of members and friends.

In opening the proceedings, the PRESIDENT (Mr. Alexander Keighley) said the Society was established in 1881 as a society of amateur photographers, and it could show a record of good and useful work, as was evidenced by its annual exhibition in the Bradford Art Gallery. During the past few years growing interest had been taken in photography, and amateur photographers had largely increased in number. The roll of membership of that Society had not, however, grown in the same proportion. It was the object, therefore, of calling the attention to the existence of the Society that that evening's *conversazione* had been projected. The aim of the Society in holding the *conversazione* was not only to provide social enjoyment for an hour or two, but to induce amateur photographers who had not already become members to join its ranks.

The principal feature of the *conversazione* was an exhibition of photographs, lent for the occasion by members and friends from a distance; there was an extensive display of views lent by the Autotype Company and the Woodburytype Company; and among other professionals by Messrs. W. W. Winter, of Derby, and J. P. Gibson, of Hexham. The amateur members of the Society exhibiting were Messrs. Alexander Keighley (President), H. Forsyth, Duncan G. Law, W. H. Scott, Walter Leach (Secretary), W. Halstead, W. S. Smith, J. Sonnenthal, H. Judson, George Firth, and the Rev. T. Mellodey. Transparencies and stereoscopes were shown by Mr. Forsyth; another interesting feature was the exhibition of lantern slides; Messrs. Appleson and Mr. Grayson also showed specimens of photographic apparatus, among which were camera sets, ranging from 15×12 downwards, of considerable novelty; microscopes lent by members of the Microscopical Society were also on view.

During the interval a short programme of music was contributed by Miss Clara Marshall, Mr. C. Forsyth, Mr. W. Watson, and Mr. Johnson, of Wakefield.

Owing to the success of the exhibition and entertainment it was decided to repeat them the following evening.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 5,—Dr. Anderson (Vice-President) in the chair.

The chief business of the evening was a paper by Mr. WILLIAM STEWART, jun., *On the Various Methods of Working Bromide and Alpha Papers.* Samples of work on various brands of these papers developed with pyro, ferrous-oxalate, and hydroquinone were handed round, and Mr. Stewart then exposed and developed a few prints on samples of both papers.

Messrs. Fry & Sons sent samples of work on their bromide paper, and also a specimen print on their new "ivory celluloid film."

GLASGOW PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 6,—Mr. William Lang, jun., F.C.S. (President), in the chair.

The following new members were elected:—Messrs. Paul Rottenburg, James Richardson, C. J. Anderson, and J. T. Darling. Ex-Provost Clark, of Paisley, was elected an honorary member.

In the question box the following questions were found:—1. "Can any one give any information about the explosion at Polmadie? Is there to be any public or scientific report to be made regarding the same?" 2. "What method of varnishing celluloid films is the best?" 3. "Can any one mention a formula for toning Alpha lantern plates?"

Regarding the first question, after some discussion it was thought that the authorities would be sure to investigate the matter. The second question was to a large extent unanswerable. It was understood that the Eastman Company were working to produce a suitable varnish.

Professor E. J. MILLS, D.Sc., F.R.S., then gave a communication—*Some Practical Notes*—in which reference was made to eikonogen, its discovery, chemical constitution, and its *rôle* as a developer. Several interesting novelties were shown by Dr. Mills, notably a lens mounted in aluminium.

Mr. H. M. Smith, representing the Eastman Company, exhibited the new Kodak, celluloid film negative, new glass tray for developing same, &c.

These two gentlemen received the thanks of the members.

Specimens of a new glass etching process (Malloch's patent) were next passed round, and the proceedings closed with a series of photographs illustrative of the various Photographic Conventions, forwarded by A. Pringle, Esq., hon. member, and some micrographs by the same gentleman, being shown by means of the Society's lantern.

FROM a letter in our Correspondence columns it will be seen that a meeting for the formation of an Optical Lantern Club is to be held in one of the rooms of the St. James's Hall Restaurant on the 20th instant. All favourable to this project should attend.

THANKS to the hurried and almost undecipherable caligraphy of the esteemed friend who sent in the account of the Royton Exhibition in last week's issue, we were made to say that the attendance on the lantern evenings was "very good," whereas it should have been that it was *expected* to be so.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE EXPLOSION OF A GAS CYLINDER.

To the EDITOR.

SIR,—Another compressed gas cylinder has burst, this time in Scotland, and this time, too, when *not in use*. Up to the time of writing there is no very reliable information as to the direct cause, but it is certainly a fact that the cylinder did contain *mixed* gas. It may be remembered that immediately after the Dublin explosion I published a letter in THE BRITISH JOURNAL OF PHOTOGRAPHY wherein was suggested the only practical method for preventing the mixing of the gas by accident, that of having the nozzle of each cylinder for the different gas of a *different diameter and thread*, say, half an inch for the oxygen (as it is now), and three-quarters of an inch for the coal-gas cylinder, and that each oxygen company or firm should be compelled by law to adopt this system on all their filling machinery. It would then—if properly carried out in an engineering-like manner—be impossible for the *employés* of the various gas companies to charge a cylinder with the wrong gas, and there ought to be a relief valve (a safety valve) on the filling machinery delivery tube, weighted (and locked up, so that no tampering could take place) so that at, say, 120 atmospheres it would "blow off" like a safety valve, and thus make it impossible for the man in charge of the machinery to put in the cylinder a greater pressure than the valve was weighted to. I know of a case where a friend of mine took his cylinder to be filled *while he waited*. It was a little inconvenient to fill at that particular time, but my friend said it was most important, and a small silver coin to the man made it *quite convenient*. The man was so pleased at seeing a *real* gentleman, he allowed the pumps to go on filling to far beyond the standard pressure. "Hold," said my friend, seeing the gauge; "there is enough in." "Oh, it's all right," said the man; "you can have a bit extra and get a good light." Now the fact is that had my friend given another sixpence he could have had his cylinder burst. This kind of thing ought not to exist; the man ought not to have the power to charge the cylinder to more than the standard pressure.

It is all very well to paint the cylinders black and red, and still better to paint on the letters OX. and HY., as I suggested in my previous letter, but that does not give us security, the different size nozzles would; and as sure as my name is what it is it will have to come to that.

Gas testers may be all very good *when they are used*, but as a practical lanternist, having the acquaintance of scores of other lantern operators, I am quite sure the more complicated the apparatus the less they will be used, and they ought not to be required; there is no necessity for them if the first principles were carried out as I have suggested. As I object to use these columns for advertising purposes, I now refer the reader to the columns for that purpose. W. I. CHADWICK.

To the EDITOR.

SIR,—As I anticipated, when sending my communication to this Journal last week, the cause of the explosion in gas cylinder at the Scotch and Irish Oxygen Works was due to oxygen and hydrogen gases having been inadvertently *mixed* in the cylinder. From the report of the engineer of the Company, which I have seen, I learn that it was shown that the cylinder had been filled with hydrogen without the cylinder being coloured red, and afterwards only partially emptied, when it was mistaken for a new empty cylinder and attached to the oxygen pump and filled up. It is so far satisfactory to the users of compressed gas that the strength of the cylinders cannot be questioned, for the cylinder did not *burst* from over-compression or weakness, but exploded from combustion brought about by the heat generated by compressing the *mixed* gases.

It is proposed that all hydrogen connexions shall have *left*-handed threads, while oxygen fittings remain as they are. This will mean adapters for guage and regulator; but as the precaution will ensure additional security, it is hoped that users of compressed gas will fall in with this arrangement.

As some of the fillers of gas cylinders have not yet adopted the distinctive colour (red) for hydrogen, it is to be hoped they may be induced to do so now they see the risks they run themselves, as well as those that use or fill them afterwards, unless they are perfectly emptied. If the overtures about to be made to these fillers and dealers are successful, I should propose a special meeting of the Photographic Society be held, and a resolution sent to each strongly advocating the adoption of a recognised system of marking.—I am, yours, &c., G. R. BAKER.

To the EDITOR.

SIR,—A good deal of unnecessary alarm has been caused by the lamentable accident which occurred rather more than a week ago at Glasgow through the bursting of a cylinder. There is no occasion either for alarm or surprise when the facts of the case are known. If we hear of a man who deliberately throws a lighted match into a barrel of gunpowder, we are neither alarmed nor surprised at the results. This is exactly what has occurred at Glasgow. The unfortunate man who lost his life charged hydrogen into a black cylinder (in direct contravention of the Company's rules), and afterwards, forgetting that he had done so, put oxygen into the same vessel; the result was an explosion, which took place at the first slight concussion which the cylinder received. A piece of the cylinder which was picked up four yards from where the accident occurred was quite hot, showing conclusively that ignition had taken place, and there could have been no spontaneous ignition if the two gases had not been present.

Every precaution is taken by the Companies to prevent the possibility of oxygen and hydrogen getting mixed. Under no circumstances will they fill hydrogen or coal gas into a black cylinder, or oxygen into a red one, neither will they put the one gas into cylinder which they even suspect has ever contained the other.

With a view, however, of making it absolutely impossible for two gases to be put into the same cylinder, it has been decided by this Company, and also by the Scotch and Irish Oxygen Company, and the Manchester Oxygen Company, to fit all hydrogen cylinders with a left-hand thread, so that they cannot be filled at the oxygen pump, and, in the same way, it will be impossible to fill oxygen cylinders at the hydrogen pump. All consumers are earnestly requested to send their hydrogen cylinders, either to the Companies or to the agents through whom they obtain their supplies of gas, to have the alteration made, and the smallest possible charge will be made for taking off the present valves and fitting on new ones. After a certain limit of time, of which notice will be given, no hydrogen or coal-gas cylinders not provided with the new thread will be filled.

In some quarters the fear has been expressed that the accident at Glasgow occurred through over-pressure. Any such apprehension may be immediately dismissed from the mind. Explosion from such a cause is impossible. The cylinders are tested to double the pressure at which they are ever filled, and it is impossible to exceed the standard-filling pressure of 120 atmospheres. They are also re-tested periodically. For years past the Government have been using high pressure cylinders for ballooning purposes, similar to those in use at present. They had them in the Egyptian and Boer campaigns, and they have frequently been rolled from the top of a hill to the bottom, bounding from point to point, and in no single instance has an accident occurred or a cylinder burst.

In conclusion, I would remind you of the fact that since oxygen and hydrogen have been supplied in high-pressure cylinders—now some three or four years—only two accidents have occurred, and these at the works; whereas when bags were in vogue, accidents, in many cases fatal, frequently took place. Only last week in America a lecturer on chemistry and ten or twelve of his pupils were seriously injured by the bursting of a retort in which oxygen was being made by the old-fashioned chlorate of potash process.—I am, yours, &c.,

T. N. HEISTER, *Secretary to Brin's Oxygen Company, Limited.*
Connaught Mansions, Victoria-street, Westminster, February 7, 1890.

ONE-HUNDREDTH OF AN INCH.

To the EDITOR.

SIR,—Mr. T. R. Dallmeyer, in your last issue, endeavours to present to your readers as my idea the very absurdity which is implied in the paper of Sir David Salomons, and which is one of the reasons for my strictures upon the application of the arbitrary measurement of the one-hundredth of an inch as the limit of necessary sharpness of focus. He says that if I and "Free Lance" consider the question, we "may be persuaded that the subject is not one of absolute dimensions, but one involving angular measurement." It is just because this is the case that I have, in former discussions, pointed out that measurement must depend upon varying circumstances, particularly on the size of the picture, and that whilst for a large picture to be looked at from a distance the hundredth of an inch confusion may not sacrifice desirable sharpness, whilst for a small one that is to be examined closely, it is, especially for some subjects, altogether inadmissible.

This argument is now recognised by Mr. Dallmeyer, who says that the original table may be taken as correct for a lens of seventeen inches focus, but that for another instrument the stop may required to be cut down to one-fifth of the calculated diameter. It, of course, also follows that for intermediate lenses varying alterations of the table would be required.

In Sir David Salomons' paper there was no reference to any alteration of the permissible circle of confusion for lenses of different foci, but all calculations were made for the one-hundredth of an inch for lenses of all foci, and pictures of all sizes.

Mr. Dallmeyer says that I have fallen into an "error," in my paper on *Selecting Focal Distances with Detective Cameras*, in speaking of "the absurdity of setting up some standard of a permissible amount of confusion, such as that of one-hundredth of an inch, and then proceeding on the assumption that all parts of the picture in which that amount of confusion is not exceeded are in focus." I presume that the "error" Mr. Dallmeyer refers to is the application of the word absurdity to the proceeding spoken of. Whether Sir David Salomons' paper and table constituted an absurdity or not may be judged from the following facts:—

1. The title of the paper was *The Distance beyond which all Objects will be in Focus with any given Lens*, and objects were assumed to be in focus if they were only out of focus so much as to represent points by circles of one-hundredth of an inch in diameter. As a matter of fact, objects are *not* then in focus, and the fetish one-hundredth of an inch is a perfectly arbitrary amount, so arbitrary indeed, that when it was attempted to adopt a standard in France for the same thing, a measurement differing as 250 to 100 was selected.

2. There was no indication in the paper or table as to any modification of the figures for lenses of different foci, involving, generally speaking, as this difference would, a different size of picture and different angular magnitude, as the distance of observation varies, but all lenses were treated in the same procrustean way.

3. There was no reference in the paper to the want of sharpness from other causes, curvature of field particularly, that would affect all but the centre of the photograph, and that if the dimension of one-hundredth of an inch was to be insisted upon all over the picture, would necessitate much greater stopping down than that indicated by the table.

4. That after all such calculations have been made, subjects are constantly occurring when the nearest object will not be good enough to stand at the distance required, and therefore we must put up with a loss of sharpness somewhere, a loss which we can minimise, or in some cases even hide, without reference to any table, by stopping down the lens as much as the circumstances will permit.

Mr. Dallmeyer asks whether, because I "can see the sun at an easily measurable angle, I imagine it would subtend the same angle at the distance of, say, one of the nearest fixed stars?" There is really no excuse in anything that I have said or written for putting such a childish question, and it is the more unwarrantable as Mr. Dallmeyer was present at a meeting when Sir David Salomons read a paper which involved this curious proposition, as I pointed out by a reference to the fixed stars and the sun or moon. Mr. Dallmeyer did not think it necessary then to denounce the proposition in question, although it was commented upon both by Captain Abney and by me.

The assumed inferiority in us implied by Mr. Dallmeyer's frivolous reference to Sandford and Merton, and affectation of necessity for confining himself to words of one syllable in argument with me and "Free Lance," is an impertinence which will probably not impose upon many readers, not enough one would suppose, to compensate for the feelings likely to be aroused in those who understand the subject, and take the trouble to read the papers and correspondence in order to form a judgment thereon.—I am, yours, &c.,

W. E. DEBENHAM.

To the EDITOR.

SIR,—Mr. Dallmeyer writes under some misapprehension. I have made no attack on him whatever, and I have nothing to do with any previous remarks of Mr. Debenham. There were three parties to the discussion, as quoted in the paper of THE BRITISH JOURNAL OF PHOTOGRAPHY (the only source of information for an anonymous critic writing for its readers everywhere is, for obvious reasons, a published report).

With regard to that discussion, I am quoted correctly as making two assertions. First, that there "was much talk wide of the mark" at the discussion. There was! Who denies it? Second (a double assertion), "Mr. Debenham was perfectly right in his remarks upon the relative deviations permissible according to the focus of the lens, the point at issue being really a function of the focus and angular aperture." Mr. Dallmeyer knows as well as I do that the "distance beyond which all objects will be in focus with any given lens" *is* "a function of the focus and angular aperture."

Mr. Debenham's only remark about the "relative deviations," &c., as given in this JOURNAL, were "that even with a stop of *f*-12 there would be an appreciable difference of focus when the lens was racked one-eighth of an inch in or out." I again assert that here he was perfectly right, and Mr. Dallmeyer will not deny it. I referred to no other remarks, nor can my words bear the interpretation put upon them. For Mr. Dallmeyer to state that "Free Lance" "*in toto* supports Mr. Debenham" is a figment.

I have no concern to enter into any quarrel between these two gentlemen, and I pass by, as conveying no meaning to me, Mr. Dallmeyer's saying I "pose as Mr Debenham's looking glass." If I catch the latter gentleman tripping I shall have my weapon into him as readily as any other, whether in dialectics or optics.

FREE LANCE.

PLATE MARKINGS.

To the EDITOR.

SIR,—There is no doubt that tannic acid, which is, I believe, used in the manufacture of leather and leather-cloth, is the cause of the markings upon plates left in the dark slides were these materials are used for hinges. I find the plates only seem to be affected in hot weather, and more especially when the material is new; some brands of plates are affected more than others.

I made some whole-plate double backs for a gentleman, who, after filling them, allowed them to stand some weeks before exposing, when all were marked with a band across the plate the width of the hinge; the material used was the best leather-cloth. I replaced these with a material of linen texture which is now being used by several of the best makers, and I presume the same kind of material which Mr. D. W. Hill refers to as now being used by Mr. G. Hare, with the result that while —— plates were not the least affected by long keeping in the slides, —— plates were marked even by this material.

I quite agree with Mr. Dunmore that turpentine is not the cause of the trouble, and if dark slides were occasionally allowed to be left exposed to the air, many plates would be the better for it.

Leytonstone, February 8, 1890. W. G. ROBERTS.

To the EDITOR.

SIR,—The entire art of photography depends on such extremely delicate and sensitive chemical processes, that it is of the utmost importance not to neglect any condition which may modify and affect the results. As it seems to me that some such conditions have not received the consideration they deserve, may I draw attention to them, leaving the subject to be worked out by more capable experimenters?

An equilibrium that can be upset by a feeble ray of light is also often susceptible to impulse from various atmospheric conditions, and it is on these I would remark, the correspondence on "emanations," &c., in photographic serials, with numerous other mysterious troubles and phenomena continually written about or observed, furnish ample illustration, and, I think, receive explanation, if we accept the statement that wherever active oxygen is at work, products may exist which are by no means neutral, and which, in a degree, may cause similar results to those produced by the action of light.

In this mischievous category I would especially place printers' ink, oily or terebinthmate varnishes and paints. Sensitive paper or plates should very carefully be kept from contact with newspapers or newly printed books. Unsuitable varnish or paint in our cameras, slides, and boxes may be a common cause of deterioration and fog. I should even suspect the waxed paper occasionally used to wrap dry plates as a possible source of danger rather than a protection, and zylonite is not necessarily inert.

It was recently pointed out that mildew produced damage. I think this is explainable by the same theory.

I might easily enlarge in various directions, but wish my remarks to be mainly suggestive. It is of the first importance that every material in contact with sensitive films should be in a chemically inactive state.

That moisture accelerates change, and dryness retards it, may, under ordinary circumstances, be accepted as an axiom, the most familiar instance of this being the well-known fact that sensitive albumenised paper keeps better in proportion to the absence of dampness, and the success of platinotype chiefly depends on carefully avoiding chemical action induced by moisture. In the latter case, special means are taken with this in view, but it seems to me that in other cases we might also secure much benefit by devising and practising some mode of *keeping our powder dry*.

Chloride of calcium is not the only substance available in a drying box, and I do not see why some non-deliquescent salts, such as dried carbonate of soda, sulphate of soda, &c., should not be usefully employed to absorb moisture.

Blotting paper soaked with a soda solution and dried has commonly been recommended as a preservative, and I am convinced that its action depends on its power to re-absorb water of crystallisation that has been driven off in the drying, and thus produce the protective neutral and dry atmosphere which I now advocate.—I am, yours, &c.,

Scarborough. JOHN WHITFIELD.

ARMSTRONG'S ILLUMINATING CHAMBER.

To the EDITOR.

SIR,—It always seems to me to be a great pity that the most innocent correspondence on scientific (or sporting) subjects produces so much irritation and unnecessary heat. Surely there was nothing in my letter anent the above to cause an explosion. I have not seen Mr. Armstrong's chamber—I beg pardon, his "patent" chamber—I said so. I further said I knew nothing about it, but its description reminded me of other days, and also brought to mind a simple appliance which might be new to many readers, and useful to a still larger number. Further, I never asked for the privilege (so curtly refused) of education at Mr. Armstrong's hands. I am too old to go so far north to school now, and so, while recognising that he is "the people, and wisdom will die with" him, I am content to remain in my ignorance. But *magna est veritas et prævalebit*, as we used to learn when young, and it would be of interest to many students of the illuminating science to be told how a burner which is doing its best, *i.e.*, giving its maximum light—these are Mr. Armstrong's own words—can be made to do a better best and give a greater maximum Words are not yet meaningless, though Talleyrand may have been right in saying that they are made to conceal our thoughts.

I had no desire to disturb anybody's serenity, but only to offer a natural and legitimate criticism, while making a suggestion which I hoped might be of some general service. If, however, Mr. Armstrong be above criticism, altogether on too high a plane of existence, I hope he will, in future, keep to his own ruling, and "never reply to anonymous correspondence." Meanwhile, I cordially, in a figure, shake hands with him across the border, and wish him and his compatriots long life, and many

and successful patents. They at least benefit the national revenue.—I am, yours, &c., STILL "AN OLD HAND."

[This subject has now received sufficient illumination.—ED.]

PHOTOGHAPHERS' FIRE INSURANCE.

To the EDITOR.

SIR,—You have again raised this question in this week's issue of THE BRITISH JOURNAL OF PHOTOGRAPHY as one requiring amendment, and as insurance matters of all kinds are my business, and photography has been my cherished amusement for thirty years, I may, perhaps, be able to offer a few remarks, putting the matter in an impartial light on both sides.

The general complaint is that the rates charged are excessive, and that they ought to be reduced now that the gelatine plate has rendered the "stock-in-trade" of the professional photographer less combustible—not to say "explosive"—than in the old days of wet collodion work, when, in addition to collodion stock (stored for "ripening") most operators held stocks of alcohol and ether. But though collodion is not now so generally used, I imagine most professional workers keep some in stock, if only for enamelling and transferring purposes, in the uniodized condition, so that such risks cannot be said to be free from that element of danger.

Photographers complain that the rates of insurance are excessive, but I have never yet seen it stated in print by any complainant what is this excessive rate per cent., and without such information it is arguing the subject somewhat in the dark; but I may, perhaps, be able to throw such a side light on the matter as to clear up some doubtful points as to the risk the offices have to bear and the view they take of the matter, as they are guided entirely by the experience they gain by the misfortune of past losses, which in the old collodion working days were often very severe.

There are three principle points to consider in a professional photographer's risk—(1) Construction of premises, (2) character of "stock-in-trade," (3) additional tendencies in the same building.

(1) The nature of building construction is invariably highly combustible, studios being built of wood and glass, and the fittings—in shape of curtains, blinds, backgrounds, and accessories—are all easily inflammable, so that if a fire accidentally starts in a studio the destruction is generally rapid and total, especially as the altitude generally selected for the sake of light makes it very difficult for any fire brigade to get at the premises for its prompt suppression by water. Such premises must also be warmed in cold weather, and fire-stoves are the means usually employed, which again adds to the risk of starting a fire.

(2) The perishable nature of the "stock-in-trade" and costly character of good instruments also makes the risk an undesirable one, because there is so little chance of "salvage." The greater portion and most valuable part of a professional photographer's "stock-in-trade" (apart from instruments) consists of glass or paper, glass negatives, glass and earthenware utensils. Now, in the event of a fire what happens? If the fire gets fair hold before the arrival of extinguishing appliances, the negatives are certain to suffer, either by fire, or, after the fire is put out, by water—probably the more destructive agent of the two, especially if much heat has been created near them, and wherever they are stored are certain to be ruined. Then comes the difficult matter of estimating the value of such "stock;" the photographer sets his own value on them from their probable use in the future for printing purposes, though not one in a hundred may ever be actually required for reproduction of portraits; the office assessor looks on them as so much old glass, and between the two much disputation may arise before a settlement can be arrived at, and this becomes so serious a consideration that many offices would rather be without such risks at any price than to incur the trouble and annoyance of settlement with (possibly) people who are disposed to take an exaggerated view of their loss, and to spread bad reports of their treatment by the offices, after the event, which may become injurious to their connexion; and such cases have come under my own actual experience.

The only equitable method of arranging such "stock" insurance is on the understanding that in the event of loss by fire only a certain sum (to be agreed upon) shall be claimed for any one negative, in the same way that pictures, when insured in a general furniture clause, are restricted to 5*l.* or 10*l.*, unless such are specially named and valued in the policy—then both sides know exactly what they are about. But it would add greatly to the improvement of any photographic risk if negatives could be stored in some detached building, or some room rendered so far fireproof that the risk of loss in their case would be minimised, as the element of uncertainty in valuation would be greatly reduced.

It will be seen that insurance offices "stand to be shot at" to a considerable extent in settlements of this kind, and such being the case, if they are to get a profit on their business—for "business" it is with them—they must put such a price on the "risk" as in their previous experience is shown to be warranted.

(3) There is another element of risk not usually thought of. Photographers' premises in towns are almost always at the top of some high building, the lower parts of which are let to other persons in trade, and these "joint tenancies" are always a source of objection to fire offices—the greater the number of sub-tenants the greater the objection, and the higher the increase of the rating, to say nothing of the fact that any "business" of a hazardous kind carried on in rooms within the same building as the photographer occupies will become the ruling point of rating and over-ride his normal rate, so that photographers must take into account the nature of the trades or businesses carried on (within the premises they occupy part of) before they assert that they are charged excessive rates on their own property.

Apart from any "photographic" risk, the usual rate of insurance upon any building (or its contents) constructed of wood and glass is 5*s.* for 100*l.* Greenhouses and conservatories, heated by hot-water pipes or hot-air flues, are perhaps the simplest illustration of such class of risk, and this may be taken as a fair "normal rate" to start upon, and I doubt if any good office would object to accept such a rate if there were no further complications in the shape of fire-stoves, joint tenants, or any large stock kept of collodion, alcohol, or ether.

Now let those who complain of excessive charges state what they have to pay, or are asked to pay, and if we can find out just where "the shoe pinches," I will (with the editor's permission) try to point out a remedy, or an equitable form of proposal by which they may be able to approach their individual insurance companies, and which might possibly facilitate business, and prove a benefit to both sides; or, failing success on their part, I might be able to put them in a possible track to get it done.—I am, yours, &c., LUX.

[We invite photographers to take advantage of this kind offer.—ED.]

PROPOSED FORMATION OF AN OPTICAL LANTERN CLUB OR ASSOCIATION.

To the EDITOR.

SIR,—Permit me to notify that a meeting will be held in the Upper Regent Saloon of the St. James's Hall Restaurant (Regent-street and Piccadilly) on Thursday, February 20, at 8 p.m. prompt. I may say that we shall esteem it a favour if you can yourself attend.

I have one more request—if you will permit it?—viz., to ask for those who can attend to send in their names either to the Hon. Slingsby Bethell, Chelsea Lodge, Chelsea, or to myself, before that day. Possibly there are those who will have engagements who, nevertheless, are in sympathy. We shall be glad also to have a word from them before the 20th, as it will be useful. Any suggestions which any gentleman may have, and will embody in a brief letter, shall be put before the meeting.—I am, yours, &c., T. H. HOLDING.

46, *Chesilton-road, Fulham, S.W.*; 7, *Maddox-street, W.*

P.S.—Upwards of forty gentlemen have already given in their names.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange Burrows & Colton's Book on *Retouching* for *Naturalistic Photography*, by Dr. Emerson.—Address, THE PHOTOGRAPHIC STUDIO, Kirkintilloch, N.B.

Will exchange balustrade with lattice-work, in good condition, for interior background or grass mat, in good condition.—Address, E. WAITE, Photographer, Radcliffe, near Manchester.

Wanted, detective camera and type writer in exchange for photographs and sixteen-candle power Edison-Swan lamp and battery (bichromate).—Address, J. RIGBY, Howick House, Burscough, near Ormskirk.

Will exchange nine BRITISH JOURNAL *Annuals* and five *Photographic News Year-books*, also lot of JOURNALS, *News, Weeklies*, and *Amateur Photographers*, for other books not photographic.—Address, SAMUEL WELLS, Airmyn, Goole.

DEATH OF MR. EDMOND V. BOISSONNAS.—We have been very sorry at receiving a letter from Mr. G. Cramer, the eminent plate manufacturer of St. Louis, U.S.A., in which he announces the death of this talented young man. When Mr. Cramer was returning home from a visit to Europe last year, we spent a pleasant evening here with him and several genial friends, including Mr. Wilfrid French, Mr. W. H. Walker, and Mr. Boissonnas, who was then in the vigour of manly strength. The letter from Mr. Cramer is dated January 27, and is as follows:—"Mr. Edmond V. Boissonnas, from Geneva, Switzerland, who came with me last spring when I returned from Europe, and was in business with me since that time, died Saturday, January 25th, after a short illness, of typhoid fever, in his twenty-eighth year. He was a young man of remarkable talent, rare ability, and a highly honourable character, a worthy son of his father, who made the name "Boissonnas" famous among photographers. His sudden death will be one more great bereavement to his family, and particularly to his aged mother, the father having died one year ago. The funeral will take place this afternoon at two o'clock. President Bain, and other members of the St. Louis Camera Club, Mr. R. Benecke, my son Ernest, and representatives of my factory, will act as pall-bearers. You will please mention this notice in your JOURNAL, and oblige—Yours truly, G. CRAMER."

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2 *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—
W. H. Midwinter, Bristol.—*Three photographs of Moses Philip Manfield.*
F. Johnson, Douglas.—*Photograph of the wreck of the barque "Thorn" in Douglas Bay.*
A. J. Lovell, Whitehaven.—*Photograph of group taken at Whitehaven Castle.*

DIFFUSION and OLD STAGER.—See leading article on another page.

C. HOLDEN.—Messrs. Marion & Co. supply cardboard cutting machines such as that shown in the sketch.

W. S. W.—Zinc suitable for zinc etching may be obtained from any of the dealers in lithographic materials.

W. WALE.—We have seen racks and pinions in several dealers' lists. Those of Lancaster and Fallowfield are all we can at present remember.

J. G. W.—So far as we are aware, none of the opticians supply lenses on the "hire-purchase system;" nor do camera makers supply cameras on those terms.

G. H. A.—Fix the finder on the top or the side of the camera, or anywhere else where it will be out of the way and easily seen through. Its position is not important.

D. BEGG.—The uneven or mottled effect on the negative arises from the solution not being kept in motion during the development of the image. The remedy is obvious.

C. J. W.—Try the effect of increasing the proportion of alkali. This will make the solution work quicker. Either formula may be made more energetic by this treatment if required.

J. W. S.—The spots are caused by particles of foreign matter which have acted perniciously on the print. What they may be it is impossible to say by merely looking at the picture.

R. THOMPSON.—If you wish to learn the wet collodion process you had better get an old manual that deals with that subject. Our space in this column is too limited to give such elementary instruction as would be of any real value to a learner.

A R. C. inquires what is the recognised time for a youth to be apprenticed for in the photographic profession.—So far as we are aware, there is no rule in the matter; it is a question more of mutual arrangement. Sometimes it is for three, four, or five years, sometimes even seven.

BEGINNER (Durham).—1. Four ounces of hyposulphite of soda to the pint of water is the best strength to employ.—2. Use a fresh solution each time.—3. The mealiness of the prints arises from over-toning them.—4. You cannot do better than keep to the acetate toning bath, but do not tone so much.

R. MATTHEWS.—If you employ the vehicle exclusively for business purposes, and use it for no other, it is exempt from duty; but if you use it only occasionally, even once or twice a year, for pleasure, then it will become liable. If it is kept strictly for trade purposes you can appeal against the tax, and it will be allowed.

O. C. HALL has been informed that dry plates of the quarter-plate size can be made to sell at a profit at 4*d.* per dozen. He asks us for a formula for making these plates. We certainly cannot tell him how the thing can be done for the price. We should recommend our correspondent to apply to his informant who told him the thing could be done.

F. H. R. says he does not see the use of a clearing solution when making enlargements on bromide paper, and sends an example in which it was omitted.—The specimen sent is an undeniable proof of its necessity, as the whites are quite of a yellow tint from the reduced iron. This would not have been present had the "clearing solution" been employed.

E. R. (York).—You are quite under a misapprehension. The fact that you have photographed the building and made the picture copyright will not prevent any one else photographing it, and from any position they like. Your copyright is in your work only, and not in the building itself. Of course you cannot stop the publication of the other man's pictures.

ENAMELLER asks: "Will you please inform me, through your 'Answers to Correspondents' column, the best medium for mounting enamelled photographs after first being mounted on thin cardboard?"—If the prints be already mounted on thin cardboard, common glue may be employed to cement them on stouter boards. The glue should be applied sparingly.

PRO writes: "I notice the American takes revenge on the bad customers who leave their photographs unpaid by selling them for show. There are far too many of that class, and I have thought of sending them due notice that if their photographs were not paid for at such a time they would be exhibited with a request to call and pay for the same. Would some provincials give us their experience with those characters?"

LIGHT.—If the tube of the rectilinear be shortened the lens will then cover a larger plate, that is, it can be made to include a wider angle, but then it will have to be used with a much smaller aperture. We should not advise you to cut the present tube, but to get a shorter one made, into which the lenses may be screwed at will; then the glasses can at any time be returned to the proper tube and the instrument restored to its original condition.

W. says: "I should esteem it a favour if you would inform me, through your 'Answers to Correspondents,' what is the best method of making a thick solution of guttapercha."—Dissolve the guttapercha in bisulphide of carbon.

JAMES COLE says: "1. I want a pair of lenses for stereoscopic work and that will transfer to the box for viewing same, on Mr. Chadwick's plan.—2. Also the best lens for half-plate outdoor work."—In reply: 1. Any good single achromatic lenses of about six inches focus will answer. They may be either plano-convex or slightly meniscus in external form.—2. The lens most generally useful for this purpose is a doublet of the "rapid" class of from nine to eleven inches focus.

C. STOKES.—This correspondent complains that after adding common salt to the washing waters from the prints the chloride of silver will not settle down, and the water continues to appear milky for days.—This is a very common complaint with the washings from some samples of ready-sensitised paper. If a few ounces of nitric acid be added and the contents of the vessel is violently stirred for a few minutes the silver will quickly subside. With the washings from this character of paper hydrochloric acid is a better precipitant than salt.

W. C. writes: "To your correspondent 'G. H. A.' I would suggest, instead of scratching a negative with a penknife (a very delicate operation), to sharpen a piece of soft wood like a pencil, moisten the point with methylated spirit, and gently rub the spot, moistening with spirit as often as seems necessary. I always keep a soft piece of pine or deal amongst the retouching pencils, and find this most useful to remove those black spots which occasionally occur so annoyingly in a negative. If carefully used, with a little practice spots can be removed without injury to the film, generally leaving a clear spot, which is then covered with retouching medium, and retouched up to density of surrounding parts."

W. T. (Palermo) writes: "In your JOURNAL of January 3 Mr. Warnerke is reported as having said that the formula he adopted was:—Boiling distilled water, one hundred parts; eikonogen, ten parts; sulphite of soda, forty parts; caustic potash, ten parts. This was a concentrated developer, and he diluted with from two to nine parts of water, &c.; but in your JOURNAL of January 17 he is reported as having said at another meeting that the formula he adopted was:—Boiling distilled water, one hundred parts; eikonogen, twenty parts; sulphite of soda, forty parts; caustic potash, twenty parts, &c.; diluted with from three to ten parts of water. Kindly say which is correct."—Both reports are correct. One solution is more concentrated than the other, and consequently will require more dilution for use.

W. M. writes: "I am in the habit of getting 12×10 opal enlargements made by a trade enlarger, and working them up and forwarding them by parcels post to an agent in another town safely packed in wooden boxes such as the trade generally use; and, for additional safety, I pack them with patent corrugated packing paper both top and bottom, and make them so as not to shake about. The boxes have 'Glass' written on them in large letters. I have sent about fifty during the last twelve months. At the suggestion of the agent I have for the last few months got them insured. One that I sent packed as above about Christmas time got broken; it was insured. Upon the agent sending in a claim for compensation, they sent an official to see the broken opal, and to see if safely packed. He told the person in the house at the time that he thought it was well packed. What was the agent's surprise to receive a note from the Post Office saying they could not give any compensation, as the opal had not been safely packed. There was a cabinet negative packed with the opal, which was not broken. I think the box must have had a fall, and the concussion broken it. The stamps were put on a tie-on label tied loosely to the box. I should be pleased if you could tell me the use of insuring if the postal authorities can get out of it in this manner? They would save both themselves and others considerable bother by not having such a useless institution as insurance by parcels post."—If a parcel is not insured the compensation is limited to one pound; but if insured by a penny fee, compensation to the extent of five pounds is given, and for a twopenny fee ten pounds. By reference to the *Post Office Handbook* it will be seen that "The Postmaster-General will (not in consequence of any legal liability, but voluntarily, and as an act of grace), subject to the rules hereinafter mentioned, give compensation for the loss and damage of inland parcels." Hence there is no legal responsibility in the matter. One of the conditions of the Parcels Post is, the contents of the parcel must be securely packed in a case of a nature to preserve it from damage. It may be argued that if the contents of a box get injured without the box itself being damaged, that the picture was not safely packed. The conditions of insurance of parcels will be found in the *Post Office Handbook*, which may be had at any post office for a penny.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, February 19, *Lantern Illuminants*, including the new benzoline limelight.

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THE BRITISH

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DEVELOPMENT BY MEANS OF VAPOUR.

One of the most remarkable circumstances in connexion with photography, to which allusion has been frequently made, is the manner in which old and nearly forgotten ideas crop up again and again with a curiously comic appearance of novelty. An instance of this occurs in the article by Mr. Theo. H. Luders which we printed last week from the *American Journal of Photography*.

Against the writer's discovery that "the modern dry plate" is susceptible to the action of pyro in conjunction with ammonia vapour we have nothing in the world to say; on the contrary, we have ourselves many years not only shown the possibility of so working, but have reduced the method to practical shape. What we have now to call attention to is the tendency on the part of the modern "discoverer" to utterly ignore all that has been done by his predecessors in the same line.

Mr. Theo. H. Luders commences by premising that "the use of vapours in picture making"—we presume he means *photograph* making—"was one of the first methods;" and, after briefly referring to the Daguerreotype process, proceeds to say that there does not seem to have been any further application of vapour since then, except for fuming silvered albumen paper. In that statement the writer exhibits what we think his own compatriots especially will deem a singular ignorance of facts.

It will, no doubt, surprise Mr. Luders, but will scarcely be news to any who, ever so cursorily, read the history of photography, that the very process which he has just discovered was, to use his own expression, "the first method" of what is known now as alkaline development. He appears to have forgotten, or perhaps never to have been aware of, the fact that as far back as 1860–1, Anthony, in New York, discovered the fact that tannin plates were capable of development by the mere action of moisture and ammonia vapour; and that from this beginning, thanks to the labours of numerous subsequent investigators, the present system of developing modern dry plates sprung.

So much for the writer's ignorance on the early history of alkaline development, and of facts occurring, so to say, at his very door. But the application of ammonia vapour by no means ceased there. Many years later, and we cannot say that that formed the next consecutive publication of researches in that direction, Lieutenant Plücker, in Belgium, published a method of development particularly applicable to the use of travellers using dry plates—in this case collodion plates being specially referred to. In this method the plates were prepared, if we recollect rightly, with an organic preservative, such as tannin, pyrogallic, or gallic acid, and a small proportion of glycerine, sugar, or other hygroscopic agent; after exposure, if the film was gently breathed upon, or exposed for a short time in a moist atmosphere, it absorbed sufficient moisture to render it amenable to the action of vapour of ammonia, and could be developed by shutting it up in a box along with an open vessel of liquid ammonia.

We need not enter into minute details of the working of the process, which received considerable attention at the hands of Lieutenant Plücker, and which was also fully described by ourselves at the time; but this mention of it will suffice to show that even anterior to the advent of "the modern dry plate" the developing power of ammonia vapour was fully recognised, and in a practical manner.

But we may go further, and state that we have ourselves developed very many gelatino-bromide plates precisely in the manner described by Mr. Theo. H. Luders, and we are under the impression that a full account of our experiments were given in these pages, though we are unable at the moment to fix the precise date. The method adopted consisted in first moistening the gelatine film with pyro solution, with or without the further additions of bromide and sulphite of soda, and subsequently exposing it to an ammoniacal atmosphere until fully developed. That the process is a practical one there is not the slightest doubt, but that it has its weak points also is no less true; still, these would no doubt disappear when greater familiarity was attained in this mode of working.

By resolutely working out a really practical method, Mr. Theo. H. Luders may still deserve the thanks of his fellows, but we think he will have to relinquish the *rôle* of discoverer.

SOME FALLACIES ABOUT RESIDUES.

It might be thought that this subject had been treated sufficiently fully and frequently to need no more attention being given to it for some time to come; but we have recently had proof that such a view would be erroneous. Possibly the continual accession of new recruits to the ranks of the amateur photographer may have something to do with the matter. There was lately sent to us—we write with it before us as a kind of text whereon to found a useful discourse—a printed set of instructions from an assay office, appealing to photographers, in which occur several recommendations that are fallacious, and the following of which would give needless trouble.

We read that "films from dry plates are of no value." If the assayer meant to say were not worth the cost of reducing, he might be within his own province in giving such a dictum, and might be correct; but, as a matter of fact, there is in a

dry plate an appreciable, if not a large amount of metallic silver. It is stated that ammonia, hypo, or cyanide, prevents precipitation of the silver from print washings. The latter two chemicals truly have that effect, though the caution should be given that, in case of such an accidental admixture occurring, the plan to adopt would be to add the contaminated washing water to the hypo waste; there would then be loss. But as to ammonia preventing precipitation, this is a complete fallacy. It is founded upon another fallacy, namely, that common salt is the best and cheapest material to use for precipitating chloride of silver from waste nitrate solutions. So far is it from being a fact that ammonia prevents precipitation, as, for example, in "ammonio-nitrate" solutions of silver for printing, &c., that the very opposite may be said to be true; for when the most suitable precipitant—hydrochloric acid, known also as spirit of salts, or as muriatic acid at the drysalters—is added, it at once neutralises the ammonia, and forms chloride of ammonium, any excess of silver being thrown down as chloride, and in a form far more easy of treatment than when common salt—chloride of sodium—is used.

Those who recommend this latter substance for the purpose forget that chloride of silver is soluble in a solution of chloride of sodium, which, indeed, has so considerable a solvent action as to have led to its use as a fixing solution for prints before "hypo" came into use. Hydrochloric acid has no such action, and it can be bought at a ridiculously low figure.

Another fallacy, almost universal, in connexion with chloride of silver is that zinc is the most suitable metal to use when it is desired to reduce it to the metallic state where it is intended to dissolve the silver for after use. True, zinc is cheap, and easily obtainable, but iron is still cheaper, still more easily obtainable, and is better for the purpose. We state from our own experience, and on the authority of a chemist having the management of an important assay office, that iron is far better than zinc, from the greater readiness with which the last trace of foreign metal is removed than when zinc has been employed. Probably almost every one who has had a little experience with the reducing of chlorides—always an interesting subject to the photographer with chemical knowledge—will, as a matter of course, use carbonate of soda as a flux; but it is quite a fallacy to look upon this as a typical reducer. A mixture of chalk and charcoal forms an excellent material wherewith to mix the dry chloride before placing it in the furnace. Some of the earliest experiments we ever took part in were made in a blacksmith's forge, the crucible being placed in the fire and the bellows urged until our silver lay at the bottom of the vessel. But even here, with every facility to observe the action, and decrease the heat when wished, there was considerable difficulty from the tendency to intumescence displayed by the contents of the crucible.

Here *en passant* we may note that where reduction by the use of alkaline carbonates is adopted, the substance to use is the crystallised carbonate, not the so-called bicarbonate or sesquicarbonate of the shops.

We are inclined, however, to believe that the greatest fallacy of all in connexion with residue reducing is that of attempting, when the material is not on a manufacturing scale (except as a single experiment or two done for the purpose of obtaining knowledge), to bring the residues into the metallic form before obtaining value from the refiner. We have lately been afforded the opportunity of going over the list of assay notes received at periods extending over a long space of time by a well-known professional photographer; and we note that although at one time he did not even go to the trouble of having his paper clippings and old filters burnt, the general average of cost in having reduced paper chlorides and sulphides was, in round numbers, five per cent.

This sum, it must be remembered, included all chemicals employed, the cost of labour and fuel, of crucibles, and the risk of waste, which in unaccustomed hands is very considerable. For example, we were once appealed to for help by a gentleman who had been reducing his own residues to the metallic state and had met with a misfortune. He had a very large crucible full of flux and metal, but as the whole was not quite limpid he gave a little more time and a little more heat. In a while he again examined the result, and thought the bulk had diminished, a thought soon reduced to a certainty. The crucible had cracked, and the contents were oozing away before he removed it. We told him all he could do was to collect the ashes from the furnace and get the metal from them. He informed us there were about two bushels of ashes. The whole mess was sent to the refiners, but we never heard the result; possibly the balance was on the wrong side. We may safely predicate that this batch of residue was not reduced for so small a cost as five per cent.!

CARBONATE OF SODA AS A DESICCATING AGENT.

Our attention has been called by several correspondents to a suggestion made by Mr. John Whitfield, in a letter in our last issue, with regard to the employment of carbonate of soda, amongst other things, in place of chloride of calcium for desiccating purposes.

It does not appear very clear why, in Mr. Whitfield's mind, chloride of calcium is an undesirable agent to employ for the purpose. Of its efficiency there can be no shadow of a doubt, but from the writer's reference to the employment of "non-deliquescent" salts, we are led to assume that it is this property alone which he objects to. Certainly, when a quantity of calcium chloride has been in use some time the pasty mass becomes rather a nuisance, and it would decidedly be more pleasant and convenient if we could employ an equally efficient non-deliquescent agent.

But when we consider that the drying powers of calcium chloride, as well as of quicklime, sulphuric acid, and, indeed, all substances used for this purpose, depend directly upon the powerful affinity of these substances for water, it is not quite intelligible how their functions are to be usurped by other agents possessing no such special attraction for moisture. But in selecting the salt mentioned above, carbonate of soda, Mr. Whitfield, it is pointed out by our correspondents, and we cannot help agreeing with them, is particularly unfortunate, for not only is it, as usually obtained—*i.e.*, in crystals—a non-deliquescent salt, but it actually possesses the very opposite property. In other words, it "effloresces," or gives off its water of crystallisation when exposed to the atmosphere, or in the presence of other matters having an affinity for water; consequently, its action would be the reverse of *drying*.

Our correspondents have, however, one and all overlooked the fact that sodium carbonate exists in a state in which not only does it not effloresce, but in which it has a pretty strong affinity for moisture, not so great certainly as calcium chloride or anhydrous lime, but still it will rapidly absorb water if allowed the chance. We have little doubt that in proposing carbonate of soda Mr. Whitfield referred to the anhydrous salt

employed by chemists for purposes of analysis. He speaks of "dried" carbonate of soda, but does not say to what extent the drying is to be carried. If to the extent of rendering the salt anhydrous, then "ignition" is the term a chemist would employ, since nothing short of heating to redness under suitable conditions will effect that purpose.

Assuming that to be his meaning, we doubt very much whether photographers would be willing to accept the substitute. The drying of a mass of moisture-charged chloride of calcium, by simply putting it in a dish or plate in a hot oven, is a far simpler and easier operation to the non-chemist than ignition in a crucible, and the product obtained in the former instance would be infinitely superior, as regards desiccating power, to the sodium carbonate, which, to have any considerable drying power, would, we imagine, have to be re-ignited each time it was required for use.

Mr. Whitfield's reference to blotting paper soaked in carbonate of soda, as applied to the preservation of sensitised paper, is another point on which he is taken up by more than one correspondent. That the preservative action is due to any drying power such paper may possess seems quite impossible, for, as we have already shown, *anhydrous* carbonate of soda produced by ignition is alone possessed of such power, and it is obviously impossible to submit blotting paper to such conditions.

Even if the anhydrous salt in solution were used to saturate the blotting paper, it would retain on drying the usual quantity of water of crystallisation; and though this, after exposure to the air, or contact with hygroscopic paper, or repeated dryings by heat, might grow less in proportion, still the carbonate would only eventually reach its lowest possible state of hydration short of ignition, in which condition it would be neutral and useless.

Until that point was reached, unless any other influence were at work, the carbonated paper would rather hasten than arrest the decomposition of the paper by supplying it with moisture; so that, "taking one consideration with another," we cannot but feel that stronger arguments require to be brought in favour of the suggested use of sodium carbonate.

Among the specifications of patents published this week will be found one of a somewhat extraordinary nature, it being for the insertion of a lens of positive or negative form to alter the focus of a combination. Probably the patentee was not aware that hundreds, nay, thousands, of such lenses have been manufactured and sold over a period of time ranging from the days of F. Scott Archer, who was the first to introduce an additional lens for shortening or lengthening the focus of the objective. This was in 1853. Who has not heard of the triple lenses of more than one London and Continental optician? Why, they were at one time in almost universal use; and little pocket cabinets of supplementary lenses were issued by some foreign makers in order that by their insertion in a place in the mounts adapted for their reception the possessor of an objective had it in his power to lengthen or shorten the focus at will. Our estimate of this new patent may be inferred from the foregoing.

Here is a subject to which we have before referred. Is it not a mistake for photographers to send out so many proofs of a portrait as some artists are now doing? Setting aside altogether the question of the extra expense entailed, and the conveying to the mind of the customer the idea that the artist's time is of little value, and the cost of material must be small, is it good policy? We put this question once more, as we happened to be at a friend's house the other day when the proofs of the portrait of one of the lady members of it were received from a high-class establishment. There were four of them, in different poses, and they had all been finished—*i.e.*, the negatives elaborately retouched, and the prints mounted on expensive cards. All the pictures were good, the poses were artistic, and the likeness excellent. The proofs were sent for choice, the sitter having the option of selecting any two for the number ordered. The criticism on the pictures by the assembled company was interesting: some liked one, and some liked another; but all were considered satisfactory pictures. Ultimately it was decided that the lady would sit again, and be taken with the figure in the same position as in one picture, but the head as shown in another, and also to wear another dress for a duplicate position in another, it being understood that in the event of the proofs not being considered satisfactory resittings would be given. This, it is true, could be afforded from the high price paid for the portraits; but was it good policy?

In the case above cited we have no hesitation whatever in saying that had a couple of proofs only been submitted—and it mattered not which out of the four, for all were good—both would have been considered satisfactory, and no resitti g would have been desired. But when so many were shown, the idea was created that certain portions of one picture combined with those of another would be an improvement, hence a retake was decided upon, in this instance simply from the fact that so many proofs were sent on approbation.

For six weeks now London has been in possession of an illustrated daily paper. Although it is not to be expected that the cuts would compare with those in the more expensive weekly issues, still the *Daily Graphic* is a surprising pennyworth. Of course, most of our readers are aware, from what has appeared in our columns during past years on photo-mechanical methods, that the majority, if not all, of the illustrations are produced by photographic agency—photo-etched zinc blocks made from hand drawings. Many of the cuts clearly bear evidence, to those familiar with the work, of being, as they often must be, produced at "high pressure." We imagine, as we suggested in a recent article on a kindred subject, that better results would accrue if the sketches were made on a larger scale to begin with. This need not entail more time with artists *au fait* with the work, and the lines would not appear so coarse in the finished block as they do at present.

What would have been thought only a few years back if any one had the temerity to prognosticate even the possibility of a daily illustrated paper containing the incidents of the previous day? Also, what would photographers themselves have said if they had been told such a thing must be dependent upon their art-science for its execution?

We have received several letters, as we usually do at this time of the year, from provincial photographers as to what is likely to be the prevailing style in portraiture in London studios during the forthcoming season. We can only say that, so far as we are aware, there is not at the present time anything specially new in portraiture anticipated. Usually, fresh novelties originate in the provinces or on the Continent. London establishments generally appear to be very conservative, and are slow to adopt any innovation until it has become well established elsewhere. That there is room for something new just now goes without saying; but what shall it be? By way of a suggestion it might be well to reconsider some of the old styles or processes, which, although they were good, did not "take" at the time of their first introduction, perhaps only for the reason that the time was inopportune; and there is a good deal in that. One thing, however, is certain, namely, that the cold tones and matt surface of the platinotype and bromide paper will be still more extensively adopted for the higher-class work during the present year than at any previous period in the annals of photography.

The recent advent of bright weather has caused many an apparatus which has lain dormant during the winter months to be unearthed with a view to its early employment. Photographic apparatus which has lain by for any length of time should always be carefully overhauled before again being taken into use. Especially is this a necessity with

some of the cheaper forms, particularly if it has been stowed in a damp place, or an abnormally dry one. The joints of the camera should be carefully examined, as well as the bellows, and in particular where the latter is attached to the work both to the back and the front. The slides, too, should be critically looked to, not only at the corners, but the shutters as well. The examination is best made in direct sunlight. The camera with the head covered with the focussing cloth and the screen removed, and the dark slides while standing in a doorway into which the sun is shining. The neglect of these simple precautions has frequently led to the loss of an entire day's pictures.

One thing in particular requires examination before being employed after it has been out of use for a few months—the instantaneous shutter. A little swelling of the woodwork, or oxidation of the metal parts, will have a material influence upon its speed. Again, if its working parts have been lubricated with oil, this may have become oxidised, which will also render the apparatus much slower in action. Dust, too, may have accumulated in the working parts, or associated itself with the oil, so that they will scarcely work at all. We recently saw a shutter of excellent construction which had been stored away for several months, which, from this cause, was quite useless for rapid exposures. When set to give the twentieth of a second's exposure it took fully a second or more to do the work, and when set for slower than this it would scarcely act at all. On taking the apparatus to pieces it was found that the working parts were completely clogged up with oxidised oil and dust, so that they had to be cleaned with benzole before fresh oil could be applied. The mechanism of some shutters is as delicate as watch work, should be treated as such, and only watchmakers' oil used for its lubrication. This oil does not dry up or oxidise. Next to watch oil, *pure* almond oil should be employed.

A possibility of error in astronomical work was pointed out at a meeting of the Royal Society, when a paper by Mr. E. J. Spitta was read. The brilliancy of stars is well exhibited in a photograph by the varying sizes of the discs in the negative; but for eye observations other processes have to be used, a recent one of great value being by means of the wedge photometer, the star being observed through a wedge of glass at various portions of its thickness, and the intensity of the light judged by its extinction at various points. The image of a star being a point in good instruments, no objection from the shape of the intercepting medium arises; but when a planet is viewed whose image occupies an appreciable width, one portion of it is seen through a thicker part of the wedge than the other, and so error arises. Mr. Spitta gets rid of the difficulty by using two wedges, one sliding over the other; the image then is thrown on, practically, a piece of glass with parallel sides. At least, it will be so if the adjacent sides of the wedges be lubricated with a suitable medium to obtain optical contact —another method which can be borrowed from photography with advantage, if it has not already been adopted.

AN ILLUMINATING REFLECTOR FOR COPYING PURPOSES.

The piece of apparatus I propose to describe differs materially in its character from that recently brought forward by Mr. T. N. Armstrong under the name of an illuminating chamber, and is designed for a different purpose, though it was recalled to my memory by his arrangement.

I may say that some fourteen or fifteen years ago I constructed, from a description given in "Foreign Notes and News" in the Journal, a precisely similar instrument to his, though I fancy mine would prove more perfect in use. The basis of mine was the invention of a Russian officer, Lieutenant Tablowski I think was the name, speaking from memory, and it consisted of a chamber of such form that an opaque object could be illuminated in cross directions, artificial light being employed, falling upon the object or picture to be reproduced at angles of about 45°. My main variation from the form of the original instrument consisted in substituting for the rectangular chambers enclosing the light, reflectors formed by bending sheets of tin, covered with white paper or paint, into a roughly parabolic curve, at least in one direction, by which means I got a better and more even illumination.

This arrangement was used by a friend and myself for the purpose of reproducing a large series of pictures, some of which were photographs, chiefly unrolled, and others drawings on paper of varying degrees of roughness, our object being to reduce the "texture" of the surface to a minimum. In this we succeeded fairly well, but with artificial light the exposures necessary with collodion plates were so protracted that we started off in another direction with the object of utilising daylight.

Roughly described, the apparatus we constructed had the form of a long rectangular box open at one end, into which the camera was pointed, the objects to be reproduced being fixed at the opposite end. At each side of the box, and at the end where the picture was placed for copying, was a window glazed with ground glass, and a wooden lid or reflector was hinged outside each, the hinges being at the *camera* end of the windows. Thus, when the two reflectors were opened at an angle of 45°, or thereabouts, they formed with the body of the box or tunnel a rough representation of the letter Y, at the top of which was the picture to be copied, and at the bottom the lens.

Now it will be plain that when this arrangement was pointed with what I may call the open mouth of the Y to the sun, sky, or other bright source of illumination, the rays—if the reflectors were set at 45°—would be bent at right angles into the interior of the chamber. Supposing the windows to be unglazed or filled with clear glass, the rays would pass from one reflector to the other, and from that again out of the instrument in the direction of the source of light, but a small portion exercising any illuminating effect upon the picture; but by interposing ground glass, tissue paper, or other translucent medium, the two windows became radiants, which diffused a clear and bright light into the copying chamber, the brightness being enhanced by the obscurity of the tunnel portion of the arrangement.

It will also be remarked that not only is the cross-lighting thus produced calculated to annihilate the texture or roughness of the surface to be copied by lighting up the shadows cast in opposite directions, but also it will be marked by great evenness, as supposing the reflectors to be similar in dimensions and placed at the same angle, any inequality produced by one reflector will be precisely neutralised by the other. Such was the theory on which we constructed the apparatus, and such, in fact, to a very satisfactory degree proved to be the result in practice, and we were enabled to make exposures even shorter than would have been required *en plein jour*, and practically free from the objectionable texture that would have been shown under such circumstances.

In use, the apparatus, fixed upon a long board, with the camera placed in the tunnel and covered in, though that was scarcely needful, with the focussing cloth, was directed sometimes towards the sky or even straight at the sun; but more frequently it was easier to point it horizontally at a white-washed wall that was handy, the latter, when lighted by sunshine, being more rapid than a clear sky.

It was never judged necessary, though possibly a better result might have been attained if we had provided windows and reflectors on all four sides of the tunnel, the effect would have been to give, perhaps, more light; but scarcely, I think, any greater uniformity of illumination. Certainly the apparatus would have been rendered more complicated and cumbersome.

For making enlargements or reductions from negatives, the same arrangement with very slight modification would be equally available, though "texture" being then absent no advantage would accrue over pointing an ordinary enlarging arrangement direct at the sky or the usual reflector. With artificial light, however, it seems to me that the arrangement would be more convenient than M. Tablowski's or Mr. Armstrong's, since there would be no necessity for confining two powerfully heating illuminants in a closed chamber. These would be out in the open room, and by varying the distances at which they were placed from the reflector, all the advantages of graduated illumination claimed by the latter gentleman could be obtained when required. With ordinary bromide paper or modern lantern plates, and using a couple of duplex lamps, or, better still, the more powerful forms of Defries' Safety, I imagine very brief exposures could be made.

Another and important use could also now be made of such an arrangement, namely, in orthochromatic work. Not only would the shadows and inequalities caused by cracks and brush marks in old or rough canvases be overcome, but by tinting the ground-glass windows, converting them, in fact, into coloured screens, all the advantages of the latter would be secured without any of the loss of definition that occurs when the screen is placed between the lens and picture. When a large amount of this sort of work is done, or pictures of great size are in question, the studio itself might easily be converted to the purpose.

One other application I may mention, which, though not so frequently cropping up nowadays, may occasionally prove useful. I refer to the copying of Daguerreotypes, and perhaps, also, the reproduction of works of art in polished metal. It is quite easy to so arrange the proportions and positions of windows, reflectors, and camera, that upon placing a mirror in the position for copying, a very long exposure will give a picture of the dark end of the tunnel, showing little more than a faint image of the lens mount. In the case of photographing a Daguerreotype, or other object placed in the illuminated portion of the chamber, the subsidiary image would be so comparatively feeble as to produce not the faintest effect upon the plate during the exposure necessary to impress the object itself.

I cannot say with accuracy what were the precise measurements of the apparatus constructed by my friend and myself, but it answered the requirements even of copying a Daguerreotype. The dimensions were, however, something like as follow:—Background or "easel," twelve inches square, windows about fifteen, and reflectors about eighteen long, the latter being hinged eighteen inches from the easel, and about three inches of the extreme end of the box being opaque. It is a very simple matter, however, to plot out on a sheet of paper the proper positions of the various parts, so that when the eye is placed in the situation of the lens no direct light comes to it from the windows or reflectors.

It struck me that the arrangement I have described might prove of some use at the present time, and so I offer this description.

W. B. Bolton.

SILVER PRINTING BY SUBSTITUTION.

Although the "substitution principle" in photographic printing dates back nearly half a century, which is equivalent to placing its origin not far behind the introduction of practical photography itself, it has not, with one notable instance in exception, received so large a share of attention as it would appear to many to deserve by right of its undeniable usefulness and possibilities. The exception will, of course, be evident to those having the most cursory familiarity with the theories of modern printing processes; while it must be not less plain to them that, but for the substitution principle, the perfection of a system of printing in platinum would have been retarded if it had not been neglected as impracticable.

If the means of arriving at approximate accuracy of results were forthcoming, it would no doubt be found, upon investigation, that by far the greater part of positive printing now executed was in silver, and this notwithstanding the considerable sway of other rivals besides platinum. Of the two silver emulsion processes, one requires the aid of development, the other, like the albumenate method, is a printing-out operation. The practical details of all three are matters of common knowledge.

Now, were it within our power to produce pictures in both these ways, alike in all apparent respects, that is, to get, say, on matt paper, the depth and range and colour of deposit associated with developed bromide, both plans of printing would still commend themselves to us on the score of their respective advantages, the one being at hand for exposure to natural light, the other to artificial illuminants. In no manner, however, are we able to set up the parallel, and hence, taking due regard of the present tendency to desert "surface" methods for other reasons, we may recognise in this failure one cause of the undoubted decline of albumen-silver printing. For similar, but not identical reasons, perhaps, we are justified in assuming that "matt surface" silver paper lacks any appreciable share of popularity.

In these days, when simplicity of working is the rule and not the exception, it is idle to expect that the albumen-silver process will escape the fate of institutions which, in the old phrase, have had their day. The constantly impugned keeping qualities of the prepared paper, the necessity of toning (which is an operation that to all but those skilled above the average is still a matter of difficulty), the prolonged washing required—these and other features seem, to my mind at least, to disqualify it for any lengthened existence. Nobody, in short, can be blind to the fact of its gradual decay, and its comparative disuse is probably but an affair of a few years.

Nevertheless, it by no means follows that the platinum and developed bromide processes will be the only two methods of positive printing of any account in the future: I purposely omit reference to the various carbon processes, which are beyond the present scope. There is, in fact, plenty of room for experiment for a printing-out silver process which shall give results differing in essentials from those to which we have so far been accustomed, and probably the adoption of the substitution principle as a field for research would afford us material assistance in the endeavour to obtain what, for intelligibility's sake, may be termed platinum effects by printing in silver.

We must for the moment ignore the feasibility of coating paper with a silver compound, which upon exposure would exhibit a platinum-like image that simply required immersion in water to finish it, as being too near our ideal for profitable discussion on this occasion, and confine ourselves to the subject under notice as being likely to assist us to obtain results within handier reach.

The germs of a silver printing process by substitution are already in our possession, and are, in fact, of no recent origin. Some of the experiments in substitution printing are of high historical value. We read that in 1842 Herschel sensitised paper with ammonio-citrate of iron, and that on the parts reduced by light, silver was deposited. It seems strange that this line of research was not followed up, and it would be curious if at this late date we should find it of value to revert to these ancient principles.

The well-known fact that we may deposit silver upon a ferrous image undoubtedly constitutes an excellent starting-point for experiments in silver printing by substitution. The advantages of the introduction of such a method capable of fulfilling our requirements, of which it is not an exaggeration to say that the platinum process is the accepted standard, should be an incentive to experimental work. A silver process that did away with the necessity for toning, that obviated the employment of the dreaded hypo, that afforded us latitude in "development," and some influence over the qualitative results, and that, at the same time, compared in other respects with platinum and developed bromide pictures, would seem to be not beyond practical accomplishment, and I do not think would be a superfluity in modern photographic practice. With the decline of the albumen process the ground is being very effectively cleared for its appearance.

As this brief article is not designed to be of any but a suggestive nature, one does not feel called upon to deal with the practical aspect of the matter on this occasion. A future opportunity may, however, occur. In the meantime, and while these lines are being penned, I notice the publication of a formula by Dr. Nicol, of Birmingham, which appears on the surface to respond in a very great degree to many of the foregoing ideas, or rather, to be more in order, to illustrate them. I have long canvassed the possibility of working out a silver printing process by substitution, and trust that in this allusion to Dr. Nicol's formula I shall simply be understood as appropriating a convenient illustration, and nothing more. It is a case of his ounce of practice and my ton of theory.

Thomas Bedding.

ON THE DANGERS OF FLASH-LIGHT COMPOUNDS.

Within the last two years the community of Philadelphia has been startled by a series of fatal accidents occurring during the manufacture of magnesium flash-powder, a compound well known to photographers, whereby in all five human lives have been lost. On three several occasions explosions have taken place, each with fatal results, the last and most recent of all resulting in the death of three persons. As a natural consequence, considerable attention and inquiry have been attracted to the subject of flash-powders and their probable dangers, and the writers of this paper were requested at a recent meeting of the

Photographic Society of Philadelphia to prepare a report upon the subject.

The composition of the particular powder which was the cause of this disastrous loss of life is understood to have been powdered magnesium, chlorate of potash, picric acid, and bichromate of potash. No one of these ingredients is in itself explosive except under extraordinary circumstances, and may be considered as safe; but the moment that they are mixed, an element of danger is introduced.

Many finely powdered metals are prone to rapid oxidation; give them the oxygen, and the reaction takes place rapidly, and is frequently accompanied by heat and flame. Powdered magnesium and powdered zinc have been known to become sufficiently hot to ignite material in contact with them on being wet with water. The addition to magnesium of a chemical rich in oxygen, or holding oxygen loosely, so to speak, increases its susceptibility to rapid change. For instance, a match applied to some of the powdered metal will fail to ignite it, or occasions a mere glow from slow ignition; but let the magnesium be mixed with chlorate of potash or nitrate of potash to furnish it with oxygen, and the whole mass will flash with almost explosive violence. Again, mix with the magnesium and chlorate of potash some carbon, and under some conditions a dangerous explosive will be formed. For instance, oxygen gas is made safely from the heating together of chlorate of potash and oxide of manganese; allow some carbon to be accidentally mixed with the two ingredients and heated, and a violent explosion will probably ensue. The rubbing together of chlorate of potash and some organic substances is accompanied with a crackling noise, and frequently explosion, as instanced in the combination with sugar or tannin.

Such compounds as we have spoken of are known as explosives, as typically illustrated by gunpowder, a mixture of nitrate of potash, carbon, and sulphur. Another and more dangerous class of chemical compounds which may be formed under some circumstances are known as detonators; that is, compounds the component parts of which are held together under so strained a condition of high tension that a very slight cause, such as a light, sharp blow, will occasion them to fly apart violently with a sharp, loud report; in other words, they detonate. The force of an *explosion* is felt at a greater distance than that of a *detonation*, but the disruption of surrounding bodies is greater and more complex with the detonation than the explosion. An explosion is generally accompanied by fire and smoke; a detonation is not.

Many detonating compounds may be heated and burned until consumed without discharge, whereas the detonation or snapping of a common pistol cap in contact with, or near them, may detonate the entire mass; such is the method adopted in the explosion of mines, &c.

Picric acid is in itself, we might say, perfectly safe, as it can be burned without danger, and will detonate only when confined. In compound, however, with some other bodies it produces a class of very dangerous substances, notably picrate of potassium, picrate of sodium, picrate of barium, picrate of strontium, picrate of magnesium, and picrate of lead. These substances are extremely unstable in character, and liable to explode with slight percussion or friction with the liberation of immense volume of gas. Sarran states the relative force of picrate of potassium, when exploded, as compared with gunpowder is as 1·98 to 1·00—almost twice as great. A mixture of 0·5 kilogrammes of potassium picrate and 0·5 kilogrammes of potassium chlorate evolves through its combustion 352 litres of gases. One kilogramme of gunpowder evolves but 200 litres under the same circumstances.

Picrate of magnesium is, when dry, one of the most unstable of its compounds, and therefore highly dangerous to handle. It may be made in a wet way by double decomposition, or by the intimate mixture of the powdered ingredients. Time is, of course, an important factor in the latter process of manufacture, but a microscopical examination of the mixture after long standing will show that the metal has entirely disappeared, and the explosive compound been formed. There is no doubt but that this combination may be greatly assisted by the presence of atmospheric moisture. Powdered magnesium is quite hygroscopic, and has a tendency to cake together in loose masses, or adhere to the sides of a bottle, if exposed to a moist atmosphere. Picric acid, when powdered, is also rather sticky in character, and it can be readily seen how if these two substances existed together in a mixture they would be attracted to one another; then, given the elements of time, moisture, and perhaps some slight warmth, and a chemical combination would inevitably occur. That this is not simply theory, but fact, can be substantiated by a fact lately mentioned to one of the writers of this article by Professor Henry Leffmann, of this city, in a personal conversation. He stated that some time previous, while microscopically examining a sample of flash-powder which contained picric acid, he was surprised to notice an entire absence of metallic magnesium, the yellow crystals of picric acid being alone prominent. On dropping the powder into water, however, an abundant sediment of metallic magnesium was deposited, showing its presence, and a closer examination of the powder showed that the particles of magnesium were completely enveloped in a yellow coating of picric acid. Of course these circumstances afforded a most fruitful opportunity for the conversion of these two substances into the explosive picrate of magnesium.

Herein is the probable explanation of the late calamity at the laboratory of Wiley and Wallace. A bottle containing in the neighbourhood of several pounds of flash-powder, made after the before-mentioned formula, some eighteen months previous, was being emptied into a drain for the purpose of getting rid of it. No fire or other chemicals were known to have been present. Water had been thrown upon some of it to aid in its being carried down the drain. Experiments subsequently made proved that the presence of water would not occasion sufficient heat to ignite it. The most reasonable supposition is, therefore, that a small portion of the powder was detonated by an accidental blow, and from thence the entire mass was detonated. No smoke or burns appeared upon the bodies of those killed, or surrounding objects, thus proving the absence of fire. For the preceding disasters by the same powder, another theory must be advanced, as they occurred at the time of the mixing of the ingredients, and previous to the probable formation of the picrate of magnesium. In the first case there was an explosion during the process of grinding the material; in the second case, while the powder was being sifted. In the first case it can readily be seen that an explosion would be the natural sequence. In the second case, it is probable that some clogging of the sieve occurred during the mixture of the materials. The loss of these five lives is a terrible caution against the use of the especial compound which caused the explosion, and a sufficient reason to regard with suspicion any powder the formula of which is not made public and known to be safe. This especial formula produced a compound which was alike unsafe to make, to use, or to keep. To sell such an article, therefore, for ignorant and unskilled persons to use, or to induce any one to attempt its manufacture, places a fearful responsibility upon those who knowingly undertook such a risk.

It is much to be regretted that the formulæ of most of this class of preparations are not published, and it is highly probable, in many cases, that their ingredients have been combined with but little regard to their chemical properties and the chemical reactions which might occur from their admixture. The fact that the compound may bear a label proclaiming it "safe" is but a slight guarantee when its composition is altogether unknown.

It seems hardly necessary now, in view of all that has been said, to raise a note of warning in regard to the use of all these flash-powders, but the statement has been already made, that while this one particular compound was unsafe, other compounds are harmless. The writers wish to state, therefore, that they consider *all forms* of flash-powder dangerous, the difference between them being only in the degree of danger involved. As has been said, they are all composed of substances liable to rapid decomposition when in contact with each other, they are liable to form new compounds often possessing dangerous and unknown properties, their combustion is attended with an intense degree of heat, involving risk from severe burns, and they are liable to spontaneous explosion or ignition. This danger is greatly augmented when they are made or kept in mass, and the probable reason why a greater number of fatal accidents have not occurred is because the powders have mostly been made in comparatively small quantities, and put up in separate packages, each containing but a few grains of the mixture. They contain, in most cases, chlorate of potash, bichromate of potash, permanganate of potash, ferrocyanide of potassium, nitrate of potash, amorphous phosphorus, and other highly organized compounds, the very purpose of their admixture with the magnesium being to increase its inflammability and the rapidity of its combustion. This can only be done by making the combination more unstable, and thus introducing at once a large element of danger. A simple mixture of magnesium and chlorate of potash which has been claimed to be harmless, if placed in a confined situation, as in a pistol, and discharged by a cap, will detonate, and there is probably no compound of this character which does not possess some elements of danger.

Since the introduction of the different forms of the magnesium lamp, in which pure metallic magnesium can be burned with absolute safety, there seems to be but little reason why the use of flash-powders should be continued, and as the only possible advantage in their use over that of the lamp is that a slight amount more of speed may be obtained, the question may well be asked whether the possible advantages to be gained are worth the additional risk involved in the use of the flash-powder.

In conclusion, the following quotation from Eissler's work on *The*

Modern High Explosives may well be cited here, more particularly in reference to combinations into which potassium chlorate enters :—

"In mixing these compounds great danger is attendant, and too much circumspection cannot be used. They explode instantly upon any violent stroke, very often by friction alone ; sometimes spontaneously, as when in a state of rest, and no known cause for their combustion can be assigned. Many are deluded as to its safety by so-called experiments with freshly made powder. Manufacturers of the compound may attempt to show its safety by hammering it and cutting it, and similar tests ; but let the powder be exposed to the natural atmospheric action, attract some moisture, then get dry, and the least friction or blow will cause an explosion."

The writers hope that the knowledge of the dangers attending the use of flash-powders is now so diffused that no further accidents will result from their use, and that their manufacture will eventually be abandoned.

JOHN G. BULLOCK.
CHARLES L. MITCHELL, M.D.

[The above paper on the dangers attending the use of magnesium flash-powders was read at the January meeting of the Photographic Society of Philadelphia. While admitting the force of the argument that the employment of complex compounds of an unstable character may be attended with risk, we cannot admit the conclusions of the authors that all such powders should indiscriminately be condemned. There are many valuable compounds of chemistry which are indeed indispensable in the arts, notwithstanding some danger is assumed by their careless use, but such compounds are not rejected because of such risks. It has been demonstrated time and again that magnesium alone is *not capable* of giving the same actinic force as it does when combined with those chemicals which are necessary to increase its energy. For photographing living objects the pure magnesium powder alone is not capable of giving instantaneous exposures, and so we believe that photographers will continue the use of flash powder for such purposes. It is, therefore, hardly just to condemn the use of *all* such powders or to maintain that they should never be used simply on the ground that there is danger attending their careless handling. The danger to the photographer using the flash-powders would be very slight indeed, as he only handles them in small quantities, there being but a few grains used at an exposure ; and the manufacturer selling it as he does only in ounce packages, which are again subdivided into twenty smaller ones, reducing still farther any chance of damage in using such powders.—ED. *American Journal of Photography*.]

THE NEW ROLLABLE TRANSPARENT FILM.*

FORTUNATELY the new film does not require exceptionally skilful manipulation. Probably no radically new product of similar importance was ever more simple in construction, or more tractable when intelligently manipulated ; but such peculiarities as do exist require reasonable attention and provision. Without these requirements the film may be a needless cause of vexation and loss, while a little precaution will enable it to be manipulated with the utmost ease and certainty.

As has been repeatedly stated with reference to the stripping film, a cut sheet is *never* recommended excepting for single exposures with small stops, as no practicable device has yet been produced which will hold a cut or free sheet sufficiently flat within the focal plane; but a roller slide, if properly made and adjusted in conjunction with a proper film, will perform the feat sufficiently well for all practical purposes.

The roller slides sold by the Eastman Company during the past five years vary somewhat in detail, but all have certain fundamental devices, some of which require with the new film, *not* alteration, but adjustment, which any one possessed of an ordinary pocket-knife may accomplish in five minutes.

1st. The Rollable Transparent Film does not require and will not endure an excessive tension in the direction of its length, and in some cases, where the resistance-brake is too powerful, the film will be stretched out of its normally flat condition. Therefore, to reduce this tension in all the roller slides (excepting those originally made with the internal metallic frame), spring open the crescent-shaped wire which causes the resistance by inserting the edge of a knife-blade between it and the circular groove within which it lies, and also place within the groove a single drop of salad oil.

2nd. By far the largest number of the Company's slides are of the wooden-frame variety, and have on the outside of the case a brass spring alarm actuated by a projection on the periphery of the indicator dial. This alarm spring is fastened securely at one end of the wood by two screws, while near the dial there is a third screw by which the resistance offered to the revolutions of the dial may be increased by running the screw further into the wood, and the contrary effect obtained by partially withdrawing it. Therefore, if by any chance the resistance-brake within the instrument case should be *too weak*, and thereby permit the film to slip over the measuring roll (*i.e.*, the roll having the perforating pins at its ends), we obviously have another means of correcting an error.

Development.—Nothing could be simpler than the development of th new film ; it is so thin that it should, when properly soaked, adhere to the flat bottom of any ordinary developing dish ; but if for any reason any difficulty occurs, it is evident there are many simple devices which will cause it to remain perfectly flat. For this purpose has been invented a cheap and simple developing tray, which fully answers any conceivable requirement, and which will reduce the amount of developer ordinarily used to such an extent as to more than pay for its cost with the first spool of film used with it.

Development may be conducted with any approved formula, but we must recommend that contained in the printed instructions which accompany each packet.

In drying, we have not found it necessary to resort to any other expedient than simply suspending the negative by one or more of its four corners from ordinary pins. In drying, the negatives may curl inwards; but when dry simply roll them, film side out, over any cylindrical surface, and there allow them to remain for about an hour, after which they will remain flat.

In damp climates, like that of England, the use of a bath of glycerine to ensure flexibility is not recommended.

When not in use, the films should be kept flat between the leaves of books, or in the Company's film-negative boxes, which will soon be ready for sale. These boxes will enable many thousands of negatives to be stored within a remarkably small compass, and by a simple classification any one of the series may be obtained without displacing any of the others.

The Company's factory in America, specially designed for the manufacture of this film, is daily increasing its output, which at present is a serious task, as there are fully 25,000 instruments of its production requiring supplies.

The English Company, however, are pushing forward with all possible speed their proposed English factories, which will be planned upon such lines as will ensure a continuous supply, while both Companies will work in entire harmony with each other to prevent undue shortage.

In closing, may I say that it is not for one moment assumed that the experience of the future will not be fully as valuable as that of the past, and that the Company continue to rely upon the kind forbearance of its friends to aid it in determining the true cause of any alleged defects, for without this information progress is greatly retarded?

I may perhaps add that, in addressing you this evening, I am fulfilling a promise made long since to your Committee, and that it is a genuine pleasure for me to appear before you in connexion with this subject; but if I have wearied you with a tedious repetition of detail, I trust you will pardon it, in the recollection that we can only be frank, open, and candid with those whose good opinion we value most. W. H. WALKER.

* Concluded from page 104.

STEREOSCOPIC PHOTOGRAPHY.

[A Communication to the Dundee and East of Scotland Photographic Association.]

STEREOSCOPIC photography is, apparently, about to experience a period of revival, and that notwithstanding what has been recently written by Mr. Andrew Pringle. One is really at a loss to understand how any one could deliberately decry stereoscopic work, and go out of their way to advise amateurs to eschew it.

Let me say, to begin with, that in my humble opinion any comparison between picture making with a single camera and stereoscopic work, if not impossible, is a highly unprofitable subject for discussion. The objects and aims of the two kinds of photographic art are very different. To hold that one is altogether better than the other may be excusable if the holding is kept to oneself, but to seriously advance the idea of inferiority of one or other in photographic publications is to prove to the world that the possessor has a squint, physical or mental. Comparison between single camera work and stereoscopic work may be likened to a comparison between, say, a short-focus symmetrical lens and a landscape lens. The field of work of each lens may overlap, yet they lie much apart, and are both best in their own particular department. The advantages, and particularly the natural beauty of stereoscopic work are so apparent, that I am very much surprised that any one having a photographic reputation would attempt seriously to decry it.

According to Mr. Pringle, art may appear in the half of a stereoscopic picture. Mr. Pringle does not say whether it is the right-hand half or the left. It is a wonderful admission, however, considering that stereoscopic work is one of Mr. Pringle's pet aversions. Somehow or other, by mounting two artistic pictures on one card the art is diminished, and when the double picture is put in a box and looked at through two lenses

the art altogether disappears. By a lens or lenses in a box the work of art is produced; on looking through lenses in a box at the work of art in the box the work of art disappears. There is something mystic about this, after the nature of—and as mystical as—the motto of the homœopaths, "*Similia similibus curantur.*"

Is it necessary to remind Mr. Pringle that the box with lenses is not necessary to stereoscopic impression? so that the wretched toy complained of is at once removed. It is possible in two ways, without the aid of any instrument, to get stereoscopic impression. One way is to cross the axis of vision of the eyes, so that the right eye looks at the left picture and the left eye at the right picture. To some this process is difficult, but to many, after a few trials, it is possible to get the impression almost instantly upon looking at a double picture. One may object to this as an unusual and unnatural way of looking at pictures, and as temporarily disfiguring to the countenance, and it is hardly to be thought of for a moment that the pretty cousin spoken of by Mr. Pringle could with any feeling of propriety be asked to cross the axis of vision of her fair blue or hazel eyes in order to fully appreciate the beauties of our productions. The other method is to look at the right picture with the right eye, and the left in like manner with the left. Some people can do this. I personally cannot, and I think it by far the most difficult method to most people.

Looking at the matter fairly, it is surely more natural to look at a double pictorial representation than at a single. It certainly is nearest nature to do so. One picture for the one eye and one for the other is what we experience in ordinary vision. It should not be forgotten that the most of us habitually look at things with two eyes. It cannot be out of place to produce by photography what is clearly intended that each eye should have, namely, a picture for itself as in nature.

Strictly speaking, the making of a picture with a single camera, and the looking at it with two eyes, cannot be compared to the method of making two pictures, one for each eye, as in nature. It is well to settle this question before going further. Just at first sight it may appear more natural to make one picture than to make two; but that idea arises from the fact that it is in many cases much more trouble to make two pictures than to make one. Where the trouble of making a double picture is not very great, there can be no question about the double picture being everything that art and nature could desire.

It is obvious, as regards art productions by means of the brush, that single pictures must be the rule, but the conditions making that almost a necessity in brush work does not hold with the camera. It is just here that in certain a measure the camera has the advantage; it can with a minimum of trouble give a double picture. The artistic faculty having been brought into requisition in the choice of a view or position of sitter, the rest is purely technical and mechanical. It appears to me that amateur photographers have not quite risen to what is within easy grasp in the stereoscope.

In the article from which I have quoted there occurs a sentence which leaves one with the impression that Mr. Pringle labours under the impression that binocular vision—that is, vision giving the appearance of solidity—requires that each eye looks at the object from a different standpoint. This, however, is not necessary, as may very easily be proved. One may mount two prints from the same negative, and such prints will give the appearance of solidity when viewed either by the unaided eye in the manner already mentioned, or through the stereoscope. If one considers the construction of the binocular microscope it is at once apparent that the appearance of solidity or stereoscopic impression does not rest on the fact of each eye having a different picture for itself. To enjoy stereoscopic impression it is necessary that each eye have a picture for itself, but not necessarily from a different standpoint.

An effect inferior to, but much resembling binocular vision may be had with one eye. How often does one in the enjoyment of a picture try the little hole trick so disliked by Mr. Pringle? This little hole trick is simply the result of an instinctive desire to have a picture for an eye. The impression of surface must always obtrude when one looks with both eyes at a picture. The wonderful effect produced by looking at a picture with one eye is virtually caused by the partial suppression of surface. One eye is amply sufficient for seeing the picture, but one eye has not the power of localising the surface of the picture, and, of course, is more easily led away by the devices of the artist for giving the effect of perspective. That one eye has a very defective power towards localising may be proved by shutting one eye and with the other trying to bring the forefinger down pretty quickly on some spot previously arranged.

As all have seen, it is possible to get a certain stereoscopic effect with one eye. We might call this negative stereoscopic effect, or an approach to the effect of binocular vision. This is accomplished by the simple device of suppressing the surface.

We have already seen that a true perception of solidity may be obtained by looking at two duplicate pictures, and have given other instances of stereoscopic perception without the necessity of looking round the corner, as Mr. Pringle puts it. In what, then, does stereoscopic vision consist? That is a very difficult question to answer. We know the conditions, or some of the conditions, under which we have such vision, and can only say it is the natural state of matters set up in the brain itself by the combination of two distinct impressions. When we look at a stereoscopic photograph we become aware that we are imitating nature, we feel we have a near approach to natural vision. By the well-known device of taking two pictures a little distance apart we take another step forward. In viewing such pictures we become aware of very perfect stereoscopic impression. There is greater solidness and relief.

I can only speak to my own impressions, and I say that a good stereoscopic view gives me very great satisfaction indeed. Mr. Pringle says that stereoscopic impressions are only fit to amuse children or savages a few times. It is a long time since Mr. Pringle looked through a stereoscope. If progress has been continuous, one is awed in contemplating the height of civilisation to which he must have arrived at this moment. Compare this condition with the deplorable state which still permits of continued enjoyment of the stereoscope.

One might be tempted to think, having two pictures photographed at about the average distance of the eyes apart, that hardly any difference would be observable between nature and the delightful representation as seen in the stereoscope, yet there is considerable difference. In looking at nature the eye has to adjust itself in focus for the near and the far-away objects. Every photographer knows that while photographing a near object the back of the camera has to be drawn out further than in the case of a far-away object. Some have gone the length of maintaining that our knowledge of distance when looking at a view is mainly due to the brains interpreting the continuous stream of telegrams intimating the various focussings of the eye. That, however, will hardly hold good, as in a stereoscopic picture all the focussing is already accomplished. The picture being really on the flat the eye has no focussing to do.

Any one possessed of a stereoscopic picture of some place to which they can get access may easily carry out an experiment on this point. Comparing their impressions of nature with the impressions as derived from the stereoscope, one quickly finds that the action of the eyes is decidedly different in each case. In looking at nature the eye has work to do and feels the distance, so to speak, between each object. No such action takes place in the stereoscope.

But one may explain stereoscopic vision to their heart's content, and, after all, there remains the element of the wonderful in it. We confess to as much of the child or savage as to permit of a feeling of wonder at the possibility of combining two impressions by the mechanism of the brain itself. It appears to me there is something so many-sided about this fact as to indicate its being a fruitful starting point for many investigations—anatomical, physiological, psychological, and metaphysical. It at least permits of a slight insight into the working of the occult mechanism which lies between the action of the eye and the final translation of the eye's messages to our consciousness.

In conclusion,—Is stereoscopic work suitable for the amateur? I venture to say it is eminently suitable. While it allows of the exercise of as high art as any other branch of photography, it gives an undoubted helping hand to the worker who does not aim high, who may work under circumstances where high photographic art can hardly be looked for. In shorter language, its range is wider, and it gives hope of more return for labour. The amateur rank and file do not aim at large work. The conveniences necessary for large work are not to be lightly estimated by any one limited in one way or other by space, time, or cash; and one or other of these things, in the case of three out of four amateurs, comes in to limit his effort. I shall state the advantages of a stereoscopic outfit from the amateur's point of view:—

(1) Compactness of apparatus. (2) Great certainty of producing a pleasure-giving result under disadvantageous circumstances. (3) Suitability for production of lantern slides directly. (4) Suitability of apparatus for taking single pictures of artistic proportions, and large enough for most amateurs.

G. D. Macdougald.

FOUR DIFFERENT PRINTING PROCESSES SUITABLE FOR COPYING TRACINGS.

[A Communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

I will briefly describe four different processes by which an exact copy of a drawing on tracing paper can be made. First:—

Colas's Process, which gives a black line on a white ground, is now greatly in use for copying tracings; it prints quickly, and is very simple to work.

The exposure ranges from five to ten minutes in the sunlight, and from twenty to forty minutes in the shade. I find the best results are got on a bright day, and printing in the strongest light. I have very often to reduce large drawings made on yellow tracing paper to a small scale to transfer to a stone for lithographic purposes, and use this process to get a more suitable copy to photograph from. To make a print, you put the tracing face downwards in the printing frame, and place the sensitive paper on the top of it, then a piece of thick felt, and then the backs, and put a good pressure on by means of screws, which are much better than springs, as you are able to get a more even pressure. To ascertain if sufficiently printed, lift up one corner, and if the greenish-yellow tint has disappeared, except where covered by the lines, it should be taken out and immersed face upwards in a bath composed of gallic acid, twenty parts; alcohol (methylated), 200 parts; and water, 1000 parts; and remain for about three minutes; at end of time the lines will be up strong and black; it should then be thoroughly washed in running water for a quarter of an hour, and surface rubbed with soft sponge; then taken out and hung up to dry. The following will be found a good formula for sensitising the paper :—

Water	300 parts.
Gelatine	10 ,,
Perchloride of iron	20 ,,
Tartaric acid	10 ,,
Persulphate of zinc	10 ,,

Apply this by means of either a broad, flat, camel-hair brush or a fine sponge to a hard, well sized paper, then hang up to dry in a dark room. To over-expose a print means losing the lines, and under-exposure gives a very dirty neutral tint ground and very faint lines.

Pellets's Process.—This is the best process I know of for copying tracings, it being much quicker than any other, and giving a brighter result, although there is more trouble in finishing the print, as it requires developing on a saturated solution of yellow prussiate of potash. The print must be allowed to remain for half a minute, then lifted out of bath, and hung up by means of American clips until the lines have developed up to a strong dark blue; then immediately lay face down in a tray of water to stop the action of the developer, and by means of an indiarubber pipe splash water on the back of print. It must then be placed, and completely covered, in a bath composed of one part hydrochloric acid to ten of water for five minutes; now take out and well wash the surface, and rub with broad camel-hair brush to remove the loose blue sediment that would otherwise remain; after again rinsing, hang up to dry, and the result will be a beautiful clean white ground with strong blue lines.

Ferro-prussiate Process gives a white line on a blue ground, but is not so suitable for copying tracings—(1) because you cannot very well alter anything on the print, and (2) a mechanical or architectural drawing cannot be tinted as in the other processes previously described, although it is a cheap and rapid method of printing from negatives of drawings giving a blue line on a white ground, the exposure only taking from five to ten minutes in a good light. The great advantage is, the prints require neither toning nor fixing; all that is needed is to wash in a plentiful supply of clean water until the lines are dark and ground perfectly white. Or if a copy from a tracing, the lines should be quite white and ground a good dark blue.

Messrs. Holden, of Manchester, supplies a paper which gives a similar result to Pellets's, and only requires to be immersed in one bath containing red and yellow prussiate of potash, and then rinsing in clean water. I have not been able to give this paper a fair trial since it was introduced to me, but have made one or two very fair prints. J. E. Goold.

Foreign Notes and News.

Both brenzcatechine and pyrocatechine seem to have found enthusiastic supporters across the Channel. Although, admittedly, dear, the former of these developers is strongly recommended in a recent number of the *Bulletin de la Société Photographique*, and it is pointed out that in practice it comes cheap enough, as one gramme of brenzcatechine suffices to develop 120–150 plates. This developer is specially suitable for toning, as it takes up but very little space. For this purpose the *Bulletin* recommends the following :—

Solution A.

Brenzcatechine	1 gramme.
Water	100 c.c.

Solution B.

Soda	20 grammes.
Water	100 c.c.

For developing, one c.c. of A with ten c.c. of B, and add sixty to eighty c.c. of water. This developer is stated to possess the following advantages:—1. It gives negatives of excellent tone. 2. The plates never cloud. 3. Acts quickly, even at low temperatures. 4. Does not dirty the fingers. 5. Is cheap. 6. The various substances are easily soluble, which permits of the solutions being prepared with rapidity.

To judge from the following delightful story, given in Liesegang's *Photographisches Archiv*, photography would seem to be regarded by youthful Germany somewhat in the light of a touchstone for the tender passion: —A clergyman's seven-year-old daughter is looking at the well-known print of Jacob and Rachel at the well. "There, papa!" she exclaims, "one can easily see that Jacob was fonder of Rachel than Leah, or he wouldn't have been *photographed* with Rachel!"

A Society entitled the Union Photographique has recently been established in France, the meeting of the founders having been held last month at the premises of Messrs. Braun & Co. The object of the Association is to supply a means of mutual insurance against accident, illness, &c., similar to that afforded by ordinary friendly societies in this country, to all photographers who become members. The Committee of organization includes the names of Messrs. Andouin, Balagny, Berthund, Braun, Block, Michelet, Nadar, and Gauthier-Villars, under the presidency of M. Léon Vidal. Steps have already been taken to render the new society as extensive as possible. We venture to wish it a prosperous future, and to express the hope that its existence will be fraught with benefit for our colleagues across the Channel.

Some rather amusing experiences are supplied to the *Photographische Correspondenz* by Herr W. Linde, who has recently established himself as portrait photographer in Cairo. It would appear from his experience that the appreciation of photography requires a preliminary period of development (no pun intended) and cultivation like that of other arts, and that the merits, or even interpretation of a portrait are by no means evident to the "natural man." The Arabs appear to have flocked in large numbers to be photographed, but when shown the resulting proofs, generally proceeded to admire them upside down, until shown by Herr Linde which was the proper position. We hope no disparagement of Herr Linde's technical ability is implied hereby; as he was a pupil of Dr. Eder this is hardly likely. It also appears that the Arabs like to be printed as light as possible, so as to resemble Europeans. To effect this Herr Linde has to cover the faces while printing. It thus seems that part of his Cairo business consists, if not in washing blackamoors white, at any rate in photographing them white.

Dr. Eder relates an interesting instance of the judicial application of photography in the case of a manuscript which had been rendered illegible by ink poured over it. The document was photographed in the *Lehranstalt*, and after various trials regarding the proper period of exposure, very good results were obtained. An erythrosine silver plate properly exposed by gaslight, and developed by pyro-soda developer, with addition of bromide of potash, showed the hidden characters with considerable clearness, photography being thus enabled to supply important evidence, which, but for its aid, would not have been forthcoming.

Liesegang recommends the following developer for instantaneous plates:

A.	Pyro	30 grammes.
	Bromide of ammonium	15 ,,
	Distilled water	240 ,,
	Nitric acid	3 drops.
B.	Solution of ammonia	30 c.c.
	Water	210 ,,

C. Dilute 30 c.c. of A with 600 c.c. of water.

D. Dilute 30 c.c. of B with 450 c.c. of water.

To develop, take equal parts of C and D, but pour D over the plate first.

Our Editorial Table.

Amateur Photographer Prize Pictures.—No. 1.

(London: Hazell, Watson, & Viney, Limited.)

Five photographs by Alex. Keighley, together with an essay on photography as a recreation, by the artist, form the contents of this first number of an excellent half-a-crown's worth. From an advertisement of Waterlow & Son's we learn that the prints are Woodburytypes by this firm. Pictorially speaking, the best of the five photographs is *Who's Coming?* representing three girls gossiping in a

country lane and becoming aware of the approach of some ones, who turn out to be their little brothers. The other pictures are *Times is Bad* (a flower-girl sitting in a doorway lamenting her bad luck), *A Thorn in the Foot* (boy with foot on his knee), *See-Saw*, and *Gee-Up* (children at play). In his essay Mr. Keighley recommends photographers to study drawing and the principles of art. It is not wise, he says, for the photographer, any more than for the art student, to ignore the thought and experience of men whose genius and skill the world has acknowledged—men whose whole lives have been devoted to the study of nature and its means of representation within the limits of art.

It is well printed in large bold type.

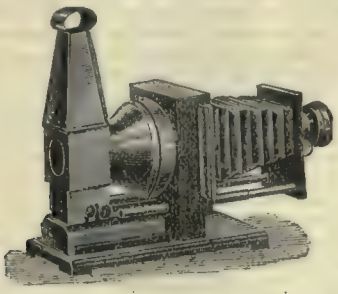
The Cantilever Enlarging Apparatus.

(By William Hume, 1, Lothian-street, Edinburgh.)

Previous to having seen this instrument we had been made aware of certain advantages it possessed by friends whose competence to judge we could not dare otherwise than to fully admit, more especially as their judgment was based upon what they had achieved as actual possessors of the "Cantilever." We are now in a position to estimate the value of such information.

Being very strongly made, the apparatus is suitable for workshop or *atelier* use, but having a somewhat elegant appearance, and constructed in the main of mahogany French polished, it is very far from being out of place on the parlour table.

With the aid of the adjoining cut we shall give a detailed description of the instrument, making critical remarks as we go along.



First, as regards the illumination: and harking back a few years, it may be remembered that at the first Conference of the Camera Club in the Society of Arts, in February 1887, we read a paper on amateur enlarging, in which we recommended the flames of two fishtail gas burners, separated nearly an inch apart, and placed *flat side* towards the condensers, as an effective means of illumination. Even when enriched by a hydrocarbon, one flame will scarcely answer, as it is still thin and poor, but when backed by a second one it answers well. Mr. Hume, in his Cantilever, has adopted this principle of illumination, but carries it into practice in a different and more convenient way, namely, by having a petroleum with two burners of the duplex type, which emit a combined flame that is dense and powerful. This lamp is enclosed in an iron casing fitted with conveniences for examining and regulating the flames, and the light is transmitted to the condensers through a metallic cone. The whole is so arranged that the lamp, with the cone, may at any moment be lifted off and replaced without the possibility of its going out of centring. This, we think, is a very valuable feature in its construction. The condensers are five inches in diameter, the special instrument now being described having been constructed for enlarging from quarter-plates.

The object glass is supported on a stout front, which, in turn, is affixed to a pair of strong, parallel, tubular bars for rough focussing, and which permit of any degree of extension to suit the requirements of the lens, which, in the instrument before us, is one of the Petzval portrait combinations fitted with rack and pinion. But even if there were no adjustment power in the lens itself a fine quick-acting screw adjustment is provided, so that between it on the one hand, and the parallel bars on the other, the most delicate focussing can be effected with any lens.

The bellows body is so constructed as to be capable of being lifted off, thus leaving a large space in which prisms, tanks, or anything else can be placed for experimental purposes.

For the special end for which it is made the Cantilever will make friends everywhere, on account not alone of its efficiency as an enlarging instrument, but also for its compactness and the ease with which its services can at any moment be brought into requisition. *This* one is also fitted with the limelight, and all that has been said respecting the mechanism of the oil lamp applies to it also.

Finding the duplex burner gave such a well and evenly lighted disc, we were led to try the Cantilever as an ordinary optical lantern, and find, as we anticipated, that it answers the purpose very well indeed for parlour purposes, or when too large a disc is not demanded to be filled. The fitting and centring throughout has been very carefully done, and hence we cannot refrain from welcoming it as a useful addition to the appliances of the photographer.

Sun Artists.

(London: Kegan Paul, Trench, & Co.)

The second number of this quarterly is devoted to Mr. H. P. Robinson, four photogravures of his best-known works being given. These are *Carolling* (known to our readers from a full-page engraving we lately gave), *A Merry Tale* (probably the best picture ever produced by this artist), *Dawn and Sunset* (a group comprising extreme youth and old age), and *When the Day's Work is Done* (an elderly man in smock frock poring over a large book, presumably a Bible). These are all considerably reduced in size from that of the originals, and all form excellent pictures, although scarcely so well printed as we should have liked to see them or as we have seen some others by the same printers. The text, written by Mr. Pringle, gives an interesting outline of Mr. Robinson's pictorial labours. The general get-up and style of *Sun Artists* is worthy of the publishers.

"Autocrat" Magnesium Powder Flask.

This flask, which is introduced for this purpose by Mr. George S. Martin, Bream's-buildings, Chancery-lane, is similar to the pistol gunpowder flask of the boyish days of those who were the fortunate possessors of that small firearm. Its nozzle is regulated to hold five grains of magnesium powder, which nozzle is filled by capping it with the finger point, pressing back the trigger, and inverting the flask. It contains fifty charges, and will be found handy.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2122.—"Improved Means of Attaching and Securing Caps or Lids to Photographic or other Lenses." W. Bentley, M. H. Smith, and F. Walsh.—*Dated February* 10, 1890.

No. 2124.—"Improvements in Magic Lanterns." A. E. Lewis.—*Dated February* 10, 1890.

No. 2178.—"Improvements in the Decoration of Looking Glass by the Aid of Photography." S. Gurney and C. P. Small.—*Dated February* 11, 1890.

No. 2260.—"Photographic Cameras." J. Martyn.—*Dated February* 12, 1890.

No. 2425.—"An Improved Photographic Shutter." F. Galopin.—*Dated February* 14, 1890.

No. 2484.—"An Apparatus for Producing a Flash of Artificial Light." J. Martyn.—*Dated February* 15, 1890.

No. 2485.—"An Apparatus for Holding during Development and otherwise Manipulating Photographic Negatives and Positives." W. H. Humphries and E. A. King.—*Dated February* 15, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 4716.—"Cameras." Communicated by Pusset. Johnson.—Price 8*d*.

No. 5207.—"Photographic Pictures." Andresen.—Price 6*d*.

PATENTS COMPLETED.

Improvements in Photographic Lenses.

No. 1261. Hugh Blackwood, Sidney Cottage, Beckenham, Kent.—*January* 18, 1890.

In order to take portraits or views by photography in a proper and effective manner, the essential points to be attained are: The option of rapidity, width of angle, combined with flatness of field, clearness of definition, and depth of focus (or field), with a comparatively large stop (or wide orifice).

It has, however, hitherto proved exceedingly difficult to satisfactorily attain all these points in one lens; an improvement has been effected on one point, with a more or less contrary effect upon another point.

Even the lenses of Dallmeyer, Ross, Voigtländer, and other well-known makers, which have been produced with the object of obviating these defects, have not entirely done so, but the improvement is so great that these lenses are much sought after, notwithstanding the great cost of the same; and at this very heavy expense (with added weight when travelling) different lenses have to be used, and have hitherto had to be purchased separately from these makers for the various subjects to be photographed. Thus, for instantaneous and general outdoor work a comparatively narrow-angle lens is used, whilst for indoor work and confined situations a wide-angle lens is required, and for indoor portraits a portrait lens.

Now the object of my invention is to entirely overcome the difficulties above mentioned by simple means, at a small cost.

In carrying out my invention, I employ an extra lens, which I place just in front of the rear lens, or it may be inserted in the stop itself, different sizes and strengths being thus optional.

This extra lens by preference consists of a biconvex and a biconcave, which may be cemented together or arranged with a small air space between. I prefer the latter arrangement, as I can thereby substitute for one or both a stronger or weaker glass, according to the effect it is desired to produce, as by the addition of stronger biconvex lenses the focal length may be shortened down to such an extent that the sensitised plate may almost touch the lens.

The glasses which I employ for my extra lens are ordinary eye glasses that can be purchased for a small sum almost anywhere.

The strength of glass which I find most suitable varies from No. 5 to No. 16 (French numbers), according to the class of lens to be used; thus, for a whole-plate rapid rectilinear, or half-plate Lancaster meniscus lens, Nos. 7 or 8 are most suitable, while for a portrait lens the strength may vary from Nos. 5 to 16, according to results required. By the addition of my extra lens, a narrow-angle Ross or other maker's narrow-angle lens is converted into a wide angle, whilst a Dallmeyer or other maker's wide-angle lens may be converted into a narrower angle of any required degree by substitution of a stronger biconcave. Also, if objects at a great distance are to be photographed (say, from the top of a hill), flatness of field and depth of focus (with a large stop or orifice enabling instantaneous effects) will be attained. A Voigtländer or other portrait lens becomes by addition of my lens applicable for all known purposes, as the good qualities previously sacrificed, to get the greatest possible rapidity, are regained. Similarly, any ordinary lens with addition of my lens becomes increasedly efficient for purposes of enlargement.

I also find that whilst with the lenses of Dallmeyer, Ross, Lancaster, and other well known makers, my adaptation produces greatly improved results, it with some French and other lenses acts as a detective in case such glasses are badly paired or the lenses be of poor marginal definition, though at the same time it practically removes this defect, as it permits of the lens being stopped down to overcome the defect, but with a larger stop than could be otherwise used.

I have found that with many meniscus lenses, by the mere addition of one biconvex glass of No. 8 strength I obtain rapidity (shortened focal length), width of angle, clear definition, and flatness of field, but in most cases I prefer to use the compound lens.

Similarly, with an addition of one No. 1 or 2 short-sight eye glass inserted in the stop, an ordinary quarter plate portrait lens will cover a three-quarter or 7 × 5 plate at the same focal length (viz., six and a half inches) as before with a large (seven-eighths of an inch) stop, yet with flatness of field and depth of focus, or a Dallmeyer 2c baby lens will cover from a whole-plate to a 12 × 10 plate with a larger orifice than at present, and attaining increased rapidity and brilliant effect.

In all cases a diaphragm will be placed between the extra lens and the rear lens in the combination.

[Some remarks on this patent will be found among our leaderettes.—Ed.]

Improvements in Photographic Cameras.

No. 4716.—James Yates Johnson, 47, Lincoln's-inn-fields, Middlesex.—*January* 25, 1890.

An improved photographic camera according to this invention is provided with a magazine containing a number of sensitive plates which are capable of being pushed towards the front by a spring. These sensitive plates are separated from each other by plates of ebonite or other material not liable to be affected by the chemicals employed in the developing process, which may be performed in the interior of the camera as hereinafter explained. The plates are pressed together by the action of the spring, and a partition working in suitable guides, so as to push forward the plates without inclining or tilting them, may be interposed between the plates and the spring at the back.

To charge the magazine with plates, a slide at the back is drawn out so as to disengage a sliding cover, which, being drawn back horizontally, exposes the interior of the magazine so that the plates can be inserted, after which the magazine is closed by returning the slides to their original position. When a plate has been exposed it is pushed by means of a flexible slide or curtain into a light-tight bag underneath the magazine. The plate can then be passed through an opening in the lower part of the back into a dish on the bottom of the camera, in which it can be developed, the process being watched through an opening covered with ruby glass in the top of the camera. The interior of the camera is lighted during the operation by means of one or more ruby glass windows or openings in the side or sides. These openings may be provided with dark slides or shutters.

The developer is introduced into the dish through a rubber tube fitted to a short tube attached to the bottom of the dish. This short tube protrudes through an opening in the bottom of the camera so arranged as to admit of the necessary movements of the dish.

The camera is provided with a sliding shutter, which is retained in the closed position by a spring catch. A rubber spring tends to pull down the shutter and uncover the lens. By means of a rod the spring catch can be caused to release the shutter, which thereupon descends and uncovers the lens. A pin on the shutter then comes in contact with a horizontal rubber spring or band, the elasticity of which causes the shutter to rebound and return to the closed position, where it is retained by the spring catch. The shock is absorbed by a spring provided for the purpose.

To exclude light from the magazine, the flexible slide or curtain hereinbefore referred to is arranged to close the opening between the magazine and the camera, and extends downwards through an opening in the bottom of the magazine sufficiently to cover the opening hereinbefore referred to in the lower part of the back of the camera. The opening in the bottom of the magazine for the passage of the shutter is closed by a spring shutter when the slide or curtain is drawn up. This flexible slide works in a vertical groove in the front of the magazine, and in a horizontal groove in the top of the latter.

The camera may be provided with two focus finders, in which the image is projected by a lens on to a mirror which reflects it on to ground-glass screen in the usual way. One of these focus finders is used for pictures taken with the longer axis of the plate vertical, the other serving for pictures taken with this axis horizontal. The apparatus is further provided with a focus finder of special construction, composed of a convex mirror receiving light through an opening in the front of the camera, and which can be seen through an opening in the top of the camera. A small hole is formed in the centre of this mirror, and a thread or wire extending diagonally across the opening in the front carries a register mark, such as a small glass bead. In order to direct the camera on an object it is held under the arm in such a position that the register or bead coincides with the hole in the centre of the mirror. This mirror may be made of glass, tinned or simply blackened at the back.

Improvements relating to the Development of Photographic Pictures.

No. 5207. Momme Andresen, 44, Melchiorstrasse, Berlin, Germany.—*January* 25, 1890.

My invention relates to the development of photographic pictures by means of diamidonaphthaline $C^{10}H^6\begin{cases}NH^2\\NH^2,\end{cases}$ amidonaphthol $C^{10}H^6\begin{cases}OH\\NH^2,\end{cases}$ and dioxynaphthaline $C^{10}H^6\begin{cases}OH\\OH,\end{cases}$ as well as their sulpho-acids:—

Diamidonaphthaline monosulphonic acid	$C^{10}H^5\begin{cases}NH^2\\NH^2\\SO^3\,OH\end{cases}$
Diamidonaphthaline disulphonic acid	$C^{10}H^4\begin{cases}NH^2\\NH^2\\(SO^3\,OH)^2\end{cases}$
Amidonaphthol monosulphonic acid	$C^{10}H^5\begin{cases}OH\\NH^2\\SO^3\,OH\end{cases}$
Amidonaphthol disulphonic acid	$C^{10}H^4\begin{cases}OH\\NH^2\\(SO^3\,OH)^2\end{cases}$
Dioxynaphthaline monosulphonic acid	$C^{10}H^5\begin{cases}(O\,H^2)_2\\SO^3\,OH\end{cases}$
Dioxynaphthaline disulphonic acid	$C^{10}H^4\begin{cases}OH\\OH\\(SO^3\,OH)^2\end{cases}$

As is well known in photography, it is the practice to treat the sensitive plates (prepared with chloride, bromide, or iodide of silver, or with two or all of the salts) after exposure with a developing solution, in order to bring to view the image produced on the sensitive plate. The developing solution hitherto employed for this purpose has usually consisted of a solution of oxalate of iron, pyrogallic acid, or hydroquinone.

Now I have found by experiment that the before-mentioned substances—diamidonaphthaline, amidonaphthol, and dioxynaphthaline, as well as their sulpho-acids, are exceptionally suitable for developing photographic pictures produced on the said sensitive plates, and give better results than can be obtained with an alkaline pyrogallol developer, and excel the latter by giving the plates a blue-black tint similar to that produced when developing in a bath of oxalate of iron without in the least colouring the sensitive plate, but enabling the plate to better resist the alkaline action of the bath. I thus obtain the advantages possessed by known developing baths without their disadvantages.

A developing bath prepared with my naphthol developer, in which it is intended to immerse the sensitive plate after having been exposed, for the purpose of producing a visible picture, is for instantaneous photography advantageously composed of the following ingredients:—

5 grammes of the hereinbefore described naphthol developer; 15 grammes of sulphide of soda; 250 grammes of distilled water; and 5 grammes of potash.

The above proportions can, however, be varied, or one or the other of the ingredients can be substituted by others providing the essential part, namely, the before-mentioned naphthol developer, is contained in the developing bath.

Instead of potash, soda carbonate, soda lye or potash lye may be used, in which case it is preferable to replace the before-mentioned five grammes of potash by twenty drops of a concentrated or saturated soda or potash lye, and this is especially recommended when diamidonaphthaline or its sulphonic acids are used. In the same proportion the quantity of sulphide of soda can be advantageously increased when alphanaphthol derivatives (such as amido-alphanaphthol) or their sulpho-acids as mentioned above, are used.

The before-mentioned five grammes "naphthol developer" may be used with any of the above combinations.

As any one of the "naphthol developers" is suitable for the present purpose, I find it is not absolutely necessary to restrict myself to the use of only one of the "naphthol developers" for the bath, so that the quantity of "naphthol developer" to be used refers also to mixtures of the above-named "naphthol developers."

After having immersed the photographic plate in this bath till the picture becomes completely developed, it is then fixed in the usual way.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—The process herein described of developing photographic pictures on coatings of chloride of silver, bromide of silver, or iodide of silver, or of any two or of all three of them in combination, such process consisting in treating such coatings in a developing bath containing diamidonaphthaline, amidonaphthol, or dioxynaphthaline, or their sulpho-acids.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
February 24	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 25	Great Britain (Technical)	5A, Pall Mall East.
,, 25	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 26	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 26	Burnley	Bank Chambers, Hargreaves-street.
,, 27	Burton-on-Trent	The Institute, Union-street.
,, 27	Halifax Photographic Club	Mechanics' Hall.
,, 27	Liverpool Amateur	St. George's-crescent North.
,, 27	Oldham	The Lyceum, Union-st., Oldham.
,, 27	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 13,—Mr. G. W. Atkins in the chair.

Mr. J. B. B. WELLINGTON said that a question had been asked at a previous meeting whether reversal of the image from over-exposure takes place with collodio-bromide as with gelatino-bromide. From experiments that he had made he should say that it does not. He showed three collodio-bromide plates that had been exposed under a sensitometer screen for periods of one and three minutes respectively to diffused daylight and for one hour to direct sunlight. The plate having one minute's exposure showed all the numbers of the screen, and there was no reversal on either of the other plates. The power of the sunlight at that time he estimated to be from three to four times that of the diffused daylight, and the plate exposed to sunlight might, therefore, be taken to have had two hundred times the exposure received by that which had been exposed for one minute to diffused light.

Mr. PEMBERTON suggested that with wet collodion and with gelatine plates there was a certain amount of moisture present which was wanting in dry collodion, and that might account for the absence of reversal in the latter case.

Another member did not think that that had anything to do with it; Daguerreotype was a dry process, and solarisation was well known in connexion with it.

A question from the box was read:—"In the development of plates known to be over-exposed, is it better to begin with the usual amount of pyro and bromide and a small quantity of ammonia, or to employ weak solutions and add the pyro by degrees?"

Mr. WELLINGTON preferred to use normal developing solution and to flood the plate with citrate as soon as the details appeared.

Mr. A. COWAN said that Mr. Edwards had recommended beginning with the ordinary developer and then going on with a solution containing a large amount of pyro and a very large quantity of bromide.

Mr. ARCHER CLARKE would begin with a strong solution of bromide, which appeared to destroy part of the action of the light.

Another question was read without eliciting a reply:—"Is it possible to develop a plate with a plain pyro solution without other addition?"

A third question asked for a formula for polish that might be used on cameras and that could be more rapidly applied and finished than French polish.

A member had seen and used such a mixture many years since. He believed that wood naphtha was the solvent, and gum benzoin one of the ingredients, but could not remember what the others were.

Mr. PEMBERTON said that the addition of ether to ordinary French polish made it dry more quickly.

On the subject of black for camera work, Mr. Pask recommended asphaltum dissolved in turpentine, to which was added lampblack and a little gold size.

For metal diaphragms, the CHAIRMAN found nothing so good as nitrate of copper. The metal should be first cleaned with potash, and, after immersion in the nitrate of copper solution, held over a Bunsen flame. A second application was sometimes desirable, but the method should not be used for any article that was put together with soft solder, as the heat necessary to obtain the black colour would melt it.

Mr. T. E. Freshwater showed some photographs of the moon taken direct with the Lick telescope.

In reply to a question as to the length of focus of the instrument, Mr. A. HADDON said that with the photographic correction the focus was between fifty and sixty feet; without it the focal length was eighty feet.

This being the monthly lantern night, slides were shown by the Chairman, and Messrs. Pemberton, Freshwater (Indian subjects), Drage, Teape, and Wellington. The exhibits of the last-named gentleman were from negatives taken in Norway last summer, and included, amongst others, the sun at midnight from the North Cape, and a street scene taken with a detective camera at a quarter to twelve p.m.

CAMERA CLUB.

FEBRUARY 13,—Rev. A. B. W. Whatton in the chair.

Mr. GRAHAM BALFOUR read a paper on *Landscape*.

Previous to the lecture the HON. SECRETARY read an extract from an old book, entitled *Gifantia*, published in 1761. This extract, which had been sent up by a member (Mr. A. C. Lyster), gave an account of a vision produced by a supposed photographic agency, and experienced in Central Africa. A viscous substance received images which became fixed on removal to a dark chamber.

In his lecture Mr. Balfour took as his principal text, "Art for Art's sake." He maintained that art was in no way a question of figures or no figures. Pure landscape or landscape with figure might show equally good art in our representations. He pointed out the different conception taken of nature in modern as compared with earlier times, and slightly sketched the history of landscape art. He took the view that art had no concern with teaching conduct or with giving any scientific information.

A discussion followed the reading of the paper; in this Messrs. E. J. Humphery, W. A. Greene, Davison, Shipton, Dr. Patterson, and the Chairman took part.

The subject on Thursday, February 27, is *Photography as Applied to Medicine*, when a paper will be read by Dr. C. S. Patterson. Meeting at eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 14,—Dr. F. H. Low, M.B., in the chair.

The members were informed that Mr. Wilson intended presenting the Society with a selection of photographic works for the library.

After questions from the box had been put and answered, and the discussion thereon, and the election of new members, and other formal business gone through, Mr. RONALD WHITING read a paper on *Reducing and Intensifying Negatives*.

In the discussion which ensued, Mr. C. WHITING remarked that negatives dried quickly through immersing in spirit to drive the water off are generally much denser than those dried in the ordinary way; in fact, a negative that was dry in some parts and not in others on being put into the spirit and dried was found to be almost twice as dense in those parts that were not dry on immersing in the spirit. He also mentioned that if a very much under-exposed negative were simply bleached with mercury and then allowed to go, it would be decidedly improved, and although the contrasts before were too violent, the bleaching would remedy that to a large extent.

Mr. G. F. BLACKMORE said he did not approve of intensifying a badly under-exposed negative; it had its proper place, which was certainly not in the printing frame.

Mr. R. WHITING, in replying to questions, remarked that the different processes of intensification enumerated could be used with films, and he did not think there would be found to be any action on the celluloid backing.

The CHAIRMAN requested the members who had won medals at the late exhibition to send them to the Secretary, as they were to be engraved with names and dates; and announced that a special general meeting would be held on March 8 to consider the exhibition and generally discuss all matters relating thereto, except that the question of the awards must not be touched upon in the sense of questioning any of them.

Members will note that the meeting of March 8 is not to interfere with the holding of the next ordinary meeting on the 28th instant.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

FEBRUARY 10.—The members spent the evening in discussing the best light for use in the dark room, and submitting the several samples of glass to a practical test. For this purpose pieces of Ilford rapid bromide paper were used, and an exposure of ten minutes was given. The following were the results obtained:—That exposed to the light of one thickness of cathedral green, after being in the developer for about one minute, was quite black, while that with two thicknesses was of a dark grey; those exposed to the yellow and ruby were still quite white. In about two and a half minutes longer that exposed to the yellow began to show a grey, the ruby (the darkest procurable) following one minute later.

Mr. E. S. PAUL remarked that at previous meetings of the Club, when he had recommended cathedral green to be used, he had never advised that it be used alone, but in conjunction with a screen of canary medium, and expressed his belief that if forty thicknesses were used it would still be easy to fog a plate.

Mr. GOODHEW remarked that the safety, or otherwise, of a particular screen was largely influenced by the make of lamp, for with one in which the burner was six or eight inches from the glass would be found much safer than one with the burner only two inches from it; also that one with two screens placed a few inches apart would be found much safer than with the same screens placed close together, although they apparently gave the same light.

The SECRETARY said that in choosing a light to work by we had the choice of two evils, either it was necessary to have a light that was practically, if not absolutely, *no* light (if it was desired to have one that would have no effect upon the sensitive film, however long exposed), or a light which, while promoting ease of working, would cause fog if allowed to act for a comparatively short time; and therefore it was necessary under these conditions to choose one which hit the middle course, that is, a medium which would not show any trace of fog with the longest *necessary* exposure on the most sensitive plates; anything which cut off more light than this was not only needless, but was an actual disadvantage and detrimental to the best results, as nothing was more necessary than a good light to judge the negative by in developing, and for this reason he objected to such screens as had a mottled appearance (as cathedral green), as he opined that it made the judging of fine detail more difficult, and remarked that all knew the nuisance of emulsion on the back of a negative.

Messrs. Steuart, Cherry, Beckett, and others, spoke of the way in which the tests were applied.

The vote of the meeting was taken, when it was found that canary medium and yellow glass were the favourites.

Next Monday, February 24, Mr. George Davison (of the Camera Club) will give a lecture entitled *A Chat on Pictures by Photography*. Visitors are invited to attend.

HOLBORN CAMERA CLUB.

FEBRUARY 14.—The programme for this evening being Mr. J. Traill Taylor on *Lenses*, a large number of members assembled at the Club Rooms to hear him; but, owing to the annual general meeting of the Photographers' Benevolent Association, of which body Mr. Taylor is President, being called for the same evening, he was (greatly to the regret of the members of the Holborn Camera Club) unable to be present. However, Mr. F. W. Edwards, of Dulwich, who was luckily in the room, kindly stepped into the breach, and delivered a most instructive and interesting discourse on the subject of *Lenses, their Uses and Abuses*. We are sure all those who were present had considerably increased

their store of information on the subject at the conclusion of Mr. Edwards's remarks.

On Friday next, February 21, Mr. E. Clifton will deliver a lecture on *Carbon Printing*. Visitors, ladies especially, will be very welcome.

For the information of gentlemen contemplating joining this Club, we may say that subscriptions for the coming year will not fall due till March 30, so *now* is the time to join.

After a vote of thanks to the Chairman (Mr. D. R. Lowe) the meeting was brought to a conclusion.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

THE annual meeting of the above Association was held at 181, Aldersgate-street on February 14, Mr. J. Traill Taylor (President) in the chair.

The minutes of the last Annual Meeting having been read, and a few corrections being added, they were confirmed.

Mr. HUBERT having stated his intention of burying the sanguinary implement of warfare and dropping personalities, the meeting assumed quite a harmonious aspect.

The report was taken as read.

Mr. HUBERT then promised his help to forward the Society, and thought an Honorary Secretary a great improvement.

The questions of reducing the subscription of professional photographers and of amateurs being allowed to serve on the Committee were discussed, Messrs. Rolph, Bedford, Hubert, Cox, Mackie, O'Connor, and Spiller taking part.

The report was then adopted and carried unanimously. The balance-sheet was then read and carried unanimously.

Mr. BEDFORD then stated that as the election of officers depended on the proposed new rules, that they should form the next business to be placed before the meeting.

Mr. HUBERT seconded, and it was carried.

Mr. MACKIE then read the proposed new rules, and after considerable discussion, in which most of the members joined, Mr. BENHAM proposed and Mr. MACKIE seconded that the new rules should be accepted. Carried with only two dissentients.

Mr. John Spiller was elected Treasurer. Votes of thanks were passed to Mr. Stuart (the late Treasurer) to Mr. Harland, and to the President. It then being late, the election of officers was postponed till the new rules had been passed by the Registrar.

A Committee meeting was held on the same evening and in the same place, Mr. Bedford (Chairman of Committee) presiding.

Minutes of previous meeting read and confirmed.

Messrs. J. S. Langfield (Windsor) and A. (Thompson) Coventry were elected members of the Association.

The Committee then considered a member's application for assistance, and made a grant.

HACKNEY PHOTOGRAPHIC SOCIETY.

FEBRUARY 13.—At this meeting Mr. G. H. SLIGHT read a very instructive and entertaining paper on *Past Photography*, going back some fifty years or more, giving personal reminiscences, and showing prints, plates, &c., illustrating the various items alluded to incidentally. Although somewhat troublesome, he would not regret going back to the old wet plate process.

Dr. GERARD SMITH said he had worked the wet plate process, and the fact that the advertisements often used now said "Results like wet plates" prove that there must be something in it.

The SECRETARY announced that an exhibition of apparatus would be held on the 27th instant, and that one of the Vice-Presidents (Mr. J. Hubert) had secured a silver medal at Royton for his *Happiest Land*.

Mr. Burt Acres was then nominated for membership.

Mr. F. W. Hart showed a photograph of the group he had taken by his flash lamp at the preceding meeting.

Mr. Dean showed some enlargements from some micro-negatives.

The SECRETARY then communicated the result of his experiments with pyrocatechine. He had made up Dr. Carl Arnold's formula. The normal developer failed to act in an hour; being gradually strengthened, a weak image was obtained. On the whole, he could not see that any advantage whatever was gained by its use.

From the question box:—"What is the simplest way of removing emulsion off useless negatives?"

The SECRETARY advised very hot water.

Dr. GERARD SMITH thought salt and water the best.

IPSWICH PHOTOGRAPHIC SOCIETY.

FEBRUARY 12.—Mr. W. Vick in the chair.

Four new members were elected.

The SECRETARY then read the report of the Judge (Rev. E. Ledger, M.A.) on the lantern slide competition, for which fourteen sets of six each had been sent in. The silver medal was awarded to "Mont Thomas" (Mr. R. Cash), and the bronze medal to "Lantern plates" (Mr. Evan Edwards).

The slides were then thrown on the screen through Mr. W. H. Booth's biunial lantern, and the Judge's award was unanimously endorsed by the members present. Mr. Cash's slides were reductions from half-plate negatives, and Mr. Edwards's were mostly from "snap shots" taken with Watson's hand camera.

BRIGHTON PHOTOGRAPHIC SOCIETY.

FEBRUARY 11.—First Annual Meeting.—The President (Dr. Rean) in the chair.

The SECRETARY read the Committee's report, which stated that the Society now numbered sixty members. It also referred to the papers read during the year, which have been of a high class and evoked considerable discussion. The lantern evenings have also been a feature, and have proved most enjoyable. During the summer months excursions have taken place to the most picturesque spots in the vicinity; these have been thoroughly appreciated. Two interesting competitions have also taken place; one for the best set of lantern slides being keenly contested.

The officers for the current year were then elected as follows:—*President:* Mr. W. H. Rean.—*Vice-President:* Mr. W. Jago.—*Committee:* Messrs. Bedford, Cansh, Hardcastle, Graham, Perren, Mitchell, Tate, Webbing, and Wicks.—*Treasurer:* Mr. J. P. Slingsby Roberts.—*Hon. Secretary:* Mr. A. H. C. Cowler, 42, Montpelier-road, Brighton.

The prints sent in for competition were on view during the evening, the Judges—Messrs. Allen Fry, Hunter Graham, and Rean—awarding first bronze medal to Mr. W. Duddell. The silver medal was withheld, as in the opinion of the Judges there were no exhibits of sufficient merit to justify their awarding it.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

FEBRUARY 12.—Mr. J. T. Cook (Vice-President) in the chair.

One member was elected.

The exhibition of lantern slides for completion in Class A was then proceeded with. Eight members sent in six slides each, which, after being passed through the lantern, were voted for by ballot by the members present, with the result that the first prize, the silver medal, was awarded to Mr. Porritt; and the bronze medal, for second prize, to Mr. W. Joliffe.

WALLASEY PHOTOGRAPHIC ASSOCIATION.

THE general meeting, held on the 5th instant, was very largely attended,—Mr. E. Kite (Vice-President) in the chair.

Mr. W. Priestley was elected a member of the Association.

Mr. FRANK VAUGHAN gave a demonstration on *Photo-zincography*, giving examples of the processes used in transferring a photograph from the film to the block used in the printing press. The paper was much appreciated by the audience.

Various exhibits were shown:—The new Thornton-Pickard shutter, an improved roll holder, the Swinden & Earp box camera; and Messrs. Wilkin and Gregg exhibited specimens of work on the new flexible film and on bromide papers.

The next meeting will be held on the 5th proximo, when Mr. H. Wilkinson will give a paper on *Clouds and Cloud Negatives*. A discussion will also take place on detective cameras, when several sorts will be exhibited.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

FEBRUARY 13,—W. Jerome Harrison (Vice-President), F.G.S., in the chair About 200 were present.

The Birkenhead Society's photographic survey slides were advertised to be shown, but as these were not ready, a very good substitute was provided through the kindness of the following gentlemen and societies, who sent a number of slides for exhibition:—Messrs. H. Sturmey and C. W. Hastings, the Camera Club, and the Leicester, Coventry, and the Wolverhampton societies. Those from the Camera Club were the new animal studies, and were accompanied by very appropriate readings of particulars, which made the pictures much more interesting than would have been the case without them.

The new Club lantern was on view, and at the close some pictures were passed through.

It was announced that Professor Muybridge would give his lecture at the Birmingham Town Hall during March.

DERBY PHOTOGRAPHIC SOCIETY.

FEBRUARY 12,—Mr. R. Keene presiding.

After the business was transacted, the CHAIRMAN called upon Mr. Lancaster, of Nottingham, to deliver his lecture on *Optics as Applied to Photography*.

The lecturer, who showed considerable knowledge of his subject, arrested the attention of his audience as he travelled quickly from the earliest origin of substances used in the manufacture of glass, &c., for photographic and astronomical purposes. He showed by well-executed diagrams the action of light as it passes through the different combinations of lenses used, and also gave the formula for the manufacture of the best glass for photographic instruments. The time being limited, the lecturer was unable to finish his paper, but promised to do so at an early date.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

THE annual meeting was held on Tuesday evening, the 11th instant, in the Mosley street Cafe, Newcastle,—Mr. J. P. Gibson in the chair.

The election of officers was as follows:—*President:* Mr. A. S. Stevenson, J.P.—*Vice-Presidents:* Messrs. J. P. Gibson and H. R. Procter.—*Council:* Messrs. M. Auty, James Brown, T. Galloway, J. E. Goold, W. Parry, G. Proud, H. G. Ridgway, J. Hedley Robinson, H. Shaud, and L. Williamson.—*Hon. Treasurer:* Mr. J. W. Robson.—*Hon. Secretary:* Mr. Edgar G. Lee, 11, Beverley-terrace, Cullercoats.

The Treasurer's report showed a balance in hand of 2*l.* 13*s.* 3*d.*

The following were elected as members of the Association:—Miss Annie Philipson, Messrs. W. R. Ferguson, W. W. Fry, A. E. Harris, W. Milburn, and Lyddell Sawyer.

Mr. J. E. GOOLD read a paper on *Four Different Printing Processes suitable for Copying Tracings*.

Other printing processes were described by Messrs. M. Auty, James Brown, J. P. Gibson, W. Parry, and J. Pike.

Some very fine photographs by Mr. Robert S. Redfield, Philadelphia, were exhibited by Mr. Gibson.

Messrs. Auty, Brown, Gibson, Goold, and Parry exhibited a number of photographs, the work of the past season.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 6.—General meeting.—Dr. Tulloch (President) in the chair.

Mr. G. D. MACDOUGALD read a paper on *Stereoscopic Photography* [see page 119]. Mr. Macdougald then gave a description of the limelight jet used at the Society's lantern exhibition on the 29th ultimo.

Dr. Tulloch exhibited an apparatus for magnifying lantern slides he had made from a design published in the current *Year Book*. It consisted of a cardboard box with a plano-convex lens mounted at one end, the other end being made of ground glass. The lantern slide is placed in a groove sufficiently far into the box to throw the ground glass out of focus when the instrument is held up to the light to view the slide.

Beck's new camera, the "Pecrops," was on exhibition. Messrs. Beck had also two of their "Autograph" lenses on view; one mounted, as usual, in brass, the other in aluminium.

AMATEUR PHOTOGRAPHIC SOCIETY OF MADRAS.

JANUARY 10.—Annual meeting.—Mr. T. M. Horsfall (Vice-President) in the chair.

The SECRETARY read the Committee's annual report and the Treasurer's financial statement of receipts and disbursements for the year 1889. These were accepted and ordered to be recorded.

The following gentlemen were elected members:—Mr. A. G. Hudson, Bombay Revenue Survey; Lieutenant A. R. Knox, R.A., Mount; Mr. G. W. Fawcett, C.S., Trichinopoly; and Mr. F. H. Trevithick, Egmore.

The following were then elected as the Committee for the year 1890:—*President:* Mr. F. Dunsterville.—*Vice-President:* Dr. G. Oppert and Mr. C. V. Sundarum Sastri.—*Committee:* Dr. R. H. Cama, I.M.D., Messrs. T. M. Horsfall, C.S., F. H. Trevithick, The Zemindar of Challapally, Messrs. D. E. W. Leighton, and C. Michie Smith, B.Sc.—*Secretary and Treasurer:* Mr. T. Wake, Flower's-road, Egmore, Madras.

PHOTOGRAPHIC SOCIETY OF FRANCE.

FEBRUARY 7,—Mons. Bardy in the chair.

The SECRETARY read some correspondence relating to the development of the latent image by protecting the plate or film during development by a non-actinic colouration of the developer.

Mr. W. D. HOLMES then presented a small bottle of a similar dye which he had brought from America. The Chairman handed the bottle to the Committee to be experimented upon.

A correspondent sent a new formula for a mountant in which castor oil was mentioned. Many advantages were spoken of, no cockling of the cardboard to be feared, &c. The formula will be published shortly.

The Photographic Club of Lyons wrote to inform the Society that a laboratory had been fitted up in their premises in order that any of the members of photographic societies when travelling may make a free use of it for changing plates or developing the same.

Professor STEBBING inquired of the President if members of foreign societies would be welcomed? "No doubt," was the reply, "as the Photographic Society of Florence started the idea it would probably become international." Any one who has travelled knows the advantage of such an offer.

Mons. Ferrier, the celebrated photographer and slide maker, lately left, by will, a large sum to the Society. His son informed the Secretary that in memory of his deceased father he desires to make a donation of a title rent of 225 francs, 4½ per cent. (value about 200*l.*) This offer was accepted with due acknowledgments. A perpetual prize is to be given for progress made in stereoscopy.

Mons. Pector offered two medals in vermeil for the best lantern slides.

Mr. EDWARDS, of London, read a paper, in which he asserted his good faith in a former presentation which had been criticised by some of the members as well as by Professor Vidal. Mr. Edwards was listened to attentively, and the latter part of his speech (in which he thanked the Society for their urbanity, &c.) was applauded. He then exhibited a great number of proofs made from isochromatic plates as well as from ordinary plates.

Messrs. Attout Tailfer and Mante presented some very fine reproductions of stained glass windows obtained on isochromatic plates without the aid of a screen.

Mons. Berthiol presented a fine collection of proofs obtained by adding to the silver chloride a certain quantity of tridium chloride. Richer tones were claimed to be obtained than upon the ordinary albumenised paper.

Mons. Petit presented to the Society a number of proofs obtained by a new photo-engraving process. In the proofs exhibited the line engravings were good and the whites pure.

Messrs. Poulene presented a hand camera—a pretty little instrument.

Mons. Vallot exhibited some fine proofs obtained by the isochromatic collodion of Dr. Albert, of Munich.

The PRESIDENT, in speaking of film photography, made the remark that experiments were being made in order to obtain the "denitrification" of celluloid, and that success was certain. Coming from the lips of such an excellent chemist as Mons. Bardy, we may expect soon to see a new and valuable article in the market.

Mons. Molteni made a lantern exhibition of subjects taken on Ilford plates, as well as from a number of slides brought over by Mr. Edwards, representing bouquets, landscapes, &c., taken each one on an ordinary and on an isochromatic plate. A bouquet of "narcissus" on the latter was very much applauded.

SOCIETY OF AMATEUR PHOTOGRAPHERS OF NEW YORK.

JANUARY 14,—C. W. Canfield (President) in the chair.

Mr. F. C. BEACH read a paper on *Camera Shutters*, treating the subject very exhaustively, and exhibited a number of different models. He thought most all shutters were operated either by gravity, spring power, or pneumatic power.

Mr. CYRUS PROSCH exhibited a skeleton model of his present triplex shutter, and a model of the first one he invented. He spoke on the practical side of the question, and had tried to produce a commercial article that could be depended upon.

Professor L. H. LAUDY thought the word "instantaneous" should not be used, as there was not and could not be an instantaneous shutter. All required an interval of time to operate. He liked the Haddon shutter very much.

Mr. W. T. GREGG preferred a shutter operating between the lenses, and exhibited a model of his diamond shutter, called such because of the diamond-shaped diaphragm it made. Very few shutters worked quicker than the one-hundredth part of a second, and the average about the one-fiftieth of a second.

Mr. W. T. Winteringham exhibited his quick shutter, having two blades operating in opposite directions.

Mr. H. M. GRISDALE showed a combination drop and door-flap shutter having attached spring hinges, designed to prevent the jar of the doors as they fly open. He also explained a model of a shutter (sector shaped) in which a simple movement of one lever actuated by a spring operated two blades in opposite directions. He believed in having the apertures in the shutters considerably longer than the actual area of the lens, in order that a large amount of light may enter it.

Mr. F. C. Beach exhibited a prayer-book camera, invented by Mr. Krügner, of Germany, which had a self-setting shutter, simple device for changing plates, and was very easily operated. It carried twenty little plates about two inches square.

Mr. A. Peebles Smith made a flash-light exposure of the audience early in the evening, developed the negative, dried it, placed it in Dr. Just's automatic exposing and photo-printing machine, sent by the United States Photographic Supply Company, and exposed, by the aid of an incandescent electric lamp, thirty impressions on a continuous band of bromide paper. These were quickly developed with the eikonogen developer in large trays, fixed, cut off, and the prints presented to each member of the audience before the meeting broke up.

The SECRETARY read the Treasurer's quarterly report, showing a good balance in the treasury.

The resignation of Mr. David Williams as Vice-President and Director was read and accepted. Mr. Alfred L. Simpson was elected to fill the vacancy.

After passing a small appropriation from the special fund, the meeting adjourned.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

ONE-HUNDREDTH OF AN INCH.

To the EDITOR.

SIR,—With regard to your correspondent, "Free Lance," I confess that I did write my letter under a misapprehension. It appears that a certain portion of "Free Lance's" contribution on "Things in General," to which I took objection, was based on the report of the discussion that appeared in your JOURNAL on January 17. This report was furnished, I now infer, by Mr. Debenham himself, and the report of the remarks is so incomplete, that one might expect the comments made by "Free Lance," who was not himself present. My previous letter has explained the subject fully, and contained the kernel of what I said on the occasion of this meeting at the Society. I hope "Free Lance" will forgive the intended pleasantry of my remark in saying that he appeared to pose as "Mr. Debenham's looking glass," in that I now understand he had a very one-sided view of the case.

A more unwarrantable contortion, by the use of dialectics, made by Mr. Debenham of the gist of my letter I have never seen than occurs in the following remark in the second paragraph of his letter, where he says, unblushingly, "This argument is now recognised by Mr. Dallmeyer, who says that the original table may be taken as correct for the lens of seventeen inches focus, but that for another instrument the stop may require to be cut down to one-fifth of its calculated diameter." If Mr. Debenham wished to be fair, the least thing he could have done would have been to have quoted me fully, or by a single stroke of the pen italicised the word "*may*" in the above sentence quoted. The objects of discussion like the present one in your columns, Sir, are to arrive at truth in scientific matters; therefore, as tersely as possible, I will once again repeat the object of the chosen standard of angular measurement already referred to. The original tables, that have since been elaborated by Sir David Salomons, were constructed with an allowable out-of-focus circle of confusion of one-hundredth of an inch, *when viewed at the normal distance of vision.* To quote from the original paper by my late father, these words appear as the basis of the calculations necessary to form such a table:—"At the ordinary distance of vision of from twelve to fifteen inches, circles of confusion are seen as points if the angle subtended by them does not exceed one minute of arc, or, roughly, if it does not exceed one-hundredth of an inch in diameter."

It may be contended by a student of dialectics that by the use of the word "roughly" the statement is not sufficiently exact, but in my last letter I gave the exact distance at which one-hundredth of an inch would subtend an angle of two minutes of a degree, and varying proportions of an inch that would be subtended by two minutes of a degree at nearer distances *than that of ordinary vision*. Now the whole subject, as regards the value of such a table, depends on its intelligent use. A small picture may be, and often is, viewed at a normal distance of vision, as is often seen in illustrations in books, where the dimensions of the picture itself is that of column width, from three to four inches. Now, these tables, to be treated intelligently, are understood to give distances beyond which this circle of confusion (one-hundredth of an inch) is not exceeded; and also it is understood that they should be (if they are to be topographically sharp) viewed at *the normal distance of vision*. Now, I contend that such a table is of scientific value, in that, by its use, a photographer will know that if the ultimate employment of such photographs is such that they *are viewed at the normal distance of vision*, the amount of distinctness given by the diaphragm recommended will be sufficiently sharp; and if, on the other hand, they are to be used under different conditions, namely, for subsequent enlargement, or to be viewed at some nearer distance than that of the normal distance of vision, it follows that the lens would have to be stopped down proportionately, according to the number of times they would have to be enlarged, if finally viewed *at the normal distance of vision*. In other words, the circle of allowable confusion would, in such cases, be made originally smaller, but when enlarged to dimensions eventually to be viewed at the *normal distance of vision*, they would then subtend an angle of two minutes of a degree, or one-hundredth of an inch in measurement. The construction, then, of these tables to an intelligent mind is one of considerable value and importance.

Mr. Debenham objects to my question as to the measurable angle of the sun at different distances; I did not remember that he had himself put forward such a proposition on the occasion he refers to, and I think the reflected glory he would appropriate by mentioning this fact in conjunction with Captain Abney is rather weak. I wish, on the other hand, however, that he would study the latter gentleman's *Treatise on Photography* in the series, "Text-books of Science," pages 207 to 210, where Captain Abney acknowledges the importance of, and himself reproduces, the very table that Mr. Debenham endeavours to sit on as an absurdity! Mr. Debenham will find that Captain Abney treats the subject, not as one of absolute dimensions to be dealt with, but one involving angular measurement. It is the intelligent use, and not the abuse, of scientific work in such a direction that I wish to establish.

In conclusion, Mr. Debenham is pleased once again to meet arguments on *facts* by one of personality. On the last occasion that I had an argument with Mr. Debenham, it was concluded by him in the same way! If Mr. Debenham understands now the value of the work referred to, I am pleased; if he does not, I shall have failed to convince him, as I once before failed in trying to convince him in the subject of "depth of focus" by the introduction of spherical aberration, that there was an important difference, *scientifically* and *practically*, in longitudinal as well as transversal measurements of spherical aberration.—I am, yours, &c.,

25, *Newman-street, W.* THOS. R. DALLMEYER.

BRIN'S OXYGEN COMPANY, LIMITED.

To the EDITOR.

SIR,—Referring to the letter written by Mr. W. I. Chadwick, which appeared in your issue of the 14th instant, if we are the Company alluded to, I think it right to explain to you and your readers that Mr. Chadwick must have been misinformed by his friend, "the real gentleman." The workmen we employ at our compressors are all picked men, who too thoroughly appreciate the responsibility of their work to go beyond our fixed and perfectly safe limit, however much the one alluded to may have desired to give a "bit extra" in return for the "small piece of silver" presented to him.

If the result, however, of the "real gentleman's" misplaced generosity had been "a bit extra," and a good big bit extra, he would only have had himself to thank for any untoward consequences which might have ensued.—I am, yours, &c.,

T. N. HEXTER,
Secretary to Brin's Oxygen Company, Limited.

34, *Victoria-street, Westminster, February 19th.*

INLAND REVENUE DUTY ON VEHICLES.

To the EDITOR.

SIR,—Permit me to draw your attention to an error in your last issue, which, if not corrected, may be the means of causing trouble to some of your readers. I refer to your answer to R. Matthews, page 112, in which you say, "If you employ the vehicle exclusively for business purposes, and use it for no other, it is exempt from duty." This is a popular but erroneous view. A vehicle to be exempt from license duty must be used *for the conveyance of goods or burdens* in the course of trade or husbandry, and, in addition, have the name and address of the owner conspicuously painted thereon.

I enclose a cutting from an official form, from the marked passages of which you will see that the above statement is correct.—I am, yours, &c.,

HERBERT CLARK.

Inland Revenue Office, Heckmondwike, viâ Normanton, February 18th.

THE LATE DR. JOULE.

To the EDITOR.

SIR,—Referring to the report of the meeting of the London and Provincial Photographic Association, in which it is stated that Mr. Haddon and the President of the Physical Society were not aware of photographic inventions of the late Dr. Joule, it may interest Mr. Haddon to know that Dr. Joule took an active interest in photography, as reference to the proceedings of the Manchester Literary and Philosophical Society will show. The report of the meeting of the photographic section of that Society, held October 5, 1865, contains the following:—"Dr. Joule, F.R.S., exhibited and explained the construction of a camera which he had contrived for outdoor work without a tent. In this camera the operation was carried on by the successive introduction of the sensitising and developing baths, the mode of the application of the baths being similar to that already described by the author. By a special arrangement the holders of the plate are preserved from contact with the developing solution."

It will be noticed that the camera had been previously described, but I have not at hand the number of the *Proceedings* which contains the description. The above paragraph is sufficient to show that Dr. Joule was an "inventor," and references to other photographic matters in the Society's *Proceedings* show also that Dr. Joule was an enthusiastic amateur. I was present when the camera referred to was exhibited. It is, I think, a mistake to describe Dr. Joule as "Professor," his work was, I believe, conducted entirely in his own laboratory, and I never heard that he had any professional appointment.—I am, yours, &c.,

Manchester, February 15th, 1890. A. BROTHERS, F.R.A.S.

[Dr. Joule's camera was described, with illustrations, in our JOURNAL of that period.—ED.]

CELLULOID FOR LANTERN SLIDES.

To the EDITOR.

SIR,—We are told that celluloid "will not stand the heat" when used for lantern slides. I don't find this to be the case in my experience.

I would suggest to remove this difficulty. It can easily be placed between two pieces of "*nine-ounce glass*" (plenty of this in the market to be had cheap). This would have the advantage of keeping it perfectly flat, and the glass, which is largely a non-conductor of heat, would prevent it becoming ignited, at the same time keeping the substance the usual thickness of a lantern slide.—I am, yours &c., JAS. ALEX. FORREST.

Waverley Alexandra-road, Birkenhead, February 17th, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Six Tylar's quarter-plate slides; will exchange for unmounted single achromatic lenses.—Address, WRIGHT, Studio, Hanwell.

Will exchange cabinet lens for safety bicycle, ball bearings, in good condition.—Address, E. J. PITTUCK, 63, Union-street, Stonehouse, Devon.

Will exchange cyclostyle copying apparatus (foolscap size) for half-plate wide-angle lens or good tripod with sliding legs.—Address, BERNARD, 101, Goldhawk-road, London, W.

Rapid rectilinear lens for plates 15 × 12, with set of stops, as good as new, in exchange for whole-plate camera, three double backs, and lens.—Address, A. JONES, 31, Percy-street, Tottenham Court-road.

Will exchange Ross Nos. 5 0A doublet and Watson's whole-plate wide-angle rectilinear for Nos. 7 portable symmetrical or 10 × 8 actinic doublet.—Address, EDWIN T. SHELTON, 11, Woodstock-road, Oxford.

Will exchange posing chair (two backs), studio table, background (exterior), boat, oar, and waterpress, silver chronograph watch, and opera glass, for posing chair, exterior background, and cabinet portrait lens.—Address, F. C. D. HURD, Photographer, Shipton Mallet.

Wanted copying or enlarging camera in exchange for half-plate detective camera with rectilinear lens and instantaneous shutter.—Address, ECOLE DE PEINTURE, 125, London-road, Croydon.

Will exchange Stanley's magnesium enlarging lamp and Optimus perforated Russian iron magic lantern, both nearly new, for studio accessories.—Address, E. PENFOLD, 106, Union-street, Torquay.

Will exchange half-plate set by Wood, Cheapside, consisting of camera with three double backs, Trafalgar rapid rectilinear lens, and shutter, solid leather case with patent lock, to hold the above, and tripod, for safety bicycle of light and good make.—Address, H. W., 44, Bower-street, Maidstone.

THE author's edition of the *American Annual of Photography* is one of the finest efforts of the bookmaker's art which we have seen. It is printed on a special paper, and beautifully bound in blue and gold. The firm of Scovill-Adams is to be congratulated upon its taste and enterprise as displayed in connexion with this handsome annual.

WE also acknowledge receipt of the *Photographic Times Calendar* from the same firm. It is ornamented with pictures representing phases of life in Old Knickerbocker New York in 1630 to 1690, when, if we are correctly informed, New York had not received its present name, but was known as New Amsterdam.

Answers to Correspondents.

All matters for the text portion of this JOURNAL *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED :—
G. Taylor, Bishop Auckland.—*Photograph of the late Bishop of Durham.*

W. R. K. (Dublin).—Hint noted. Thanks.

F. H.—Simple meniscus lenses may be obtained from every dealer in spectacle sundries.

S. J.—The negative is irretrievably ruined; there is no remedy. It is returned as requested.

SURREY.—The Company collapsed some year or so ago. It was not the only company floated to take photographs in natural colours that has come to grief.

OPTIMUS.—The necessary materials for opaline pictures may be obtained from any of the large photographic warehouses. Consult the advertisement columns.

CHAS. ROOSE.—There is no book published on the subject. Nothing has appeared in connexion with it in the JOURNAL for many years. The process is seldom used nowadays.

NOVICE (Wilts).—The apparatus in question is good value for the money; but, of course, it will not compare with that of the best makers, nor, indeed, do the manufacturers profess that it will.

B. LEWIS.—The spots on the celluloid films are due to the manufacture, not the development. Spots on these films are not uncommon, but they occur far less frequently now than when celluloid photography was first introduced.

E. O. C.—In the negative sent the fogging does not proceed from the material of the shutter hinge, as surmised, but from light. Evidently light gets into the slide from the rabbets of the shutter. Examine the slide carefully before a strong light.

W. REID says: "Will you kindly inform me the best way to be rid of air bells in enamelled prints."—Bring the print and glass in contact while immersed in the gelatine solution, taking care that no air is imprisoned between them; then remove and squeegee.

H. W. B. (Ipswich).—1. There are numerous hand cameras which will serve your purpose of taking deck views on the passage out.—2. Glass plates will probably prove the handiest, as they will be of small dimensions.—3. Certainly; give us a call, and we can talk the matter over.

W. C. BOWEN.—In the collodion process the bath should only be faintly acid. The bath you have made is that used in the albumen process—the aceto-nitrate bath. For wet collodion the bath is a plain solution of nitrate of silver slightly acidified with nitric acid.

M. FREDERICKS.—Those who supply lithographic materials will also supply the necessary materials for photo-lithography. Double transfer paper may be had from Marion & Co., the Autotype Company, and at other photographic warehouses. Thirty square feet cost about half-a-crown.

H. CLARK.—We should advise you to postpone attempting to take instantaneous pictures of the denizens of the farmyard until the light improves, unless you obtain a more rapid lens than you have; *f*-16 is too slow for instantaneous work as the light is at present. With a lens working at, say, *f*-8 and quick plates, there would now be little difficulty in the undertaking.

CRYSTAL PALACE.—You may apply for permission to photograph in the grounds of the Crystal Palace to Messrs. Negretti & Zambra, but it is scarcely probable that you will obtain it. For particulars of Hardwich's *Photographic Chemistry*, apply to Churchill, New Burlington-street, and for Meldola's *Chemistry* to Macmillan & Co., Bedford-street. This latter is one of the *Nature* series, and sells at 6*s*.

D. W. C.—If the damage to the opal pictures was due to bad packing, it is clear that the railway company are not responsible. The consignors are the ones that must be looked to for compensation. The best plan would have been, as broken glass could be heard within, to refuse to receive the parcel at all. Then the consignors would have to settle the matter with the railway company.

G. H. A. wants help as follows: "I should be much obliged if any one could help me in burnishing photographs. I have a whole-plate optimus burnisher (new), and I have tried Castile soap, both in one grain to the ounce of alcohol and plain. I have also tried screwing the roller tight and had it slack. Would any one kindly say how hot the burnisher should be, and also if the print should go through often, and give me full particulars, as I cannot get a polish at all."

W. BAMFORD.—The formula will doubtless answer, but we have not used that particular one ourselves. Instead of making the ink it will be much better to procure a little photo-lithographic ink ready made. It is not expensive, and you may then depend upon having a suitable article. It, as purchased, will require diluting with turpentine. Any printers' material dealer will supply the right kind of thing. The formula you quote is very good, but the method of preparation is troublesome, and uncertain in the hands of a beginner.

'YOUNG COLLODION makes the following inquiries: "Will you be kind enough to tell me, through your 'Answers to Correspondents,' whether there is any permission required to work the wet collodion business on the sands at either Southend, Ramsgate, or Yarmouth, and who to apply to; and is there any charge made, and, if so, could you tell me the price usually paid?"—We are quite unable to answer the queries ourselves; but our correspondent can obtain all the information by writing to the local authorities in the different places—say, to the Town Council.

A. KEANE.—1. Instead of attempting to adapt your half-plate camera for taking "stamp portraits," it would be better to obtain a new one, for the following reasons: In all probability the camera would not close sufficiently to focus the images, as the lenses are only about an inch and a half focal length, and there would have to be a partition for each lens, which would render the apparatus useless for any other purpose.—2. Any number of lenses may be used; nine is the most general number.—3. The backs of the prints are coated with dextrine to make them adhesive.—4. Messrs. Marion & Co. or Messrs. Fallowfield will doubtless supply the necessary perforating appliances.

ENAMELLED writes: "You will much oblige by an answer to following questions on enamelling. 1. What is the proper way of cleaning glass previous to applying French chalk?—2. Must the collodion be allowed to dry, or only to set before the gelatine is applied?—3. Should the collodion film be washed to remove 'greasiness' before coating with gelatine?—4. Must the print have a coating of gelatine, and, if so, should it be applied at the time of mounting, or may it be dried and again damped when wanted?—5. Is the collodionised plate to be immersed in water when it is wanted to soften the gelatine, or should it be merely sponged over."—1. There are many ways of cleaning the glass. If it is not very dirty the following will answer:—Make a thin cream with whiting and methylated spirit; rub this well over the glass and let it dry, then polish off.—2. Allowed to well set.—3. Yes.—4. Gelatine applied at the time of mounting.—5. Immersed in water, or the print may be applied immediately the glass is gelatinised, that is, the plate after the solvents have been washed out of the collodion, the glass and print may be immersed in the gelatine and afterwards squeegeed together.

E. BEVERIDGE says: "I am anxious to make some daylight enlargements on a special paper, and to sensitise it myself. I see on page 473 of the 1888 ALMANAC a method of silver printing on plain paper, but do not know whether this would be applicable for development instead of printing right out. May I ask you kindly to let me know through the 'Answers to Correspondents,' in the JOURNAL, as to the following points?—1. Whether, instead of salting by the chloride of sodium or ammonium, a wash of bromide of potassium with the iodide would take the place of salting and give a more rapid print?—2. Whether the image should be exposed until slightly visible, and may then be developed by *either* protosulphate of iron, &c., as for wet plates, or by pyro and ammonia, as for gelatine plates?—3. Whether enlarging by daylight against a north sky will be slower or faster than by lamplight, using a coudenser? I hope you will not think me too troublesome. Perhaps you will be able to suggest a more rapid process to work. I want to enlarge to 24×24 and 32×32, and am told that I could not coat these sizes with gelatine emulsion, even if I could procure it."—In reply: 1. A mixture of the iodide and bromide may be substituted for the chloride; then the image will have to be developed. But the paper must be sensitised with a silver bath strongly acidified with either acetic or citric acid.—2. No image, or only a slight trace of one, should be visible. Neither developer would be of any use. Gallic acid or pyrogallic acid, strongly restrained with acetic, must be used.—3. This will depend upon the lamp and focus of the condenser as compared with the quality of the daylight at the time. Our correspondent will save both trouble and money by employing the bromide paper of commerce, which is much more rapid than the iodised paper would be. Bromide paper can be had in larger sizes than those mentioned.

ERRATUM.—In a letter from Mr. W. H. Walmsley, of 1022, Walnut-street, Philadelphia, he calls attention to a mistake in the spelling of a name in his letter on *Flash Light Photography in America*, page 47 in issue of January 17. Instead of "Hemfalg's" lamp the name should have been *Hemperley*.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, February 25, at eight p.m., at the Gallery, 5A, Pall Mall East.

CROYDON CAMERA CLUB.—A meeting of those in favour of forming the above photographic society will be held at eight p.m. on Tuesday, February 25, at Room 2, Public Hall, Croydon. All who approve the project are requested to attend, or, should they have previous engagements, write their approval to Mr. H. Maclean, 34, Birdhurst-road, Croydon.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—On Thursday, February 27, Mr. A. Haddon will give a lecturette and practical demonstration of *Glass Blowing as used in the Chemical and Physical Laboratories*. Visitors are invited.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, February 26, Monthly Lantern Meeting, *Ethozo versus The New Benzoline Light*; March 5 *Artificial Light as an Auxiliary to Daylight*.

ANIMAL SAGACITY.—Mr. Thomas Mason, 21, Parliament-street, Dublin writes: "I send you a lantern slide of the celebrated Lea Tail, or Stone of Destiny, which stands on the Hill of Tara. My son is standing by it. When I first showed this slide on the screen by limelight, my son coming out life-size, a terrier dog which we had reared from a pup was in the room. As soon as the picture came on she jumped up with delight on the screen, evidently recognising my son. I thought of showing the same delusion to a friend, but the dog could not be deceived a second time. This I may fairly say proves animal sagacity."

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1556. Vol. XXXVII.—FEBRUARY 28, 1890.

CELLULOID AND ELECTRICITY.

In the course of the discussion at a recent meeting of the Camera Club, on the subject of certain defects in the new rollable celluloid films, the fault was set down, and possibly with reason, to the effect of electricity. It may be useful to briefly study the question with a view of discovering, if possible, at what stage of the film's "life" the defects arise.

Electricity, in one way and another, has shown its influence in photography from very early days; we speak now from a purely mechanical or physical, rather than from an electro-chemical point of view. For instance, the troubles that formerly arose from dust attracted to the glass plate by the electricity induced in cleaning and polishing will be remembered by all the earlier workers; but the cause having been pointed out, it soon became an easy matter to overcome.

Possibly some of the spots that have been so much complained of in connexion with celluloid films may be, if traced to their source, found to be the result of foreign particles electrically attracted during some portion of the process of manufacture by the otherwise perfectly pure materials employed, for we cannot well believe that the materials themselves contain anything of an injurious nature. Pyroxyline, and more especially collodion, films are known to be highly electrical, and it follows as a matter of course that celluloid possesses the same characteristic, the degree of excitability varying, perhaps, in inverse ratio to its thickness when in the form of sheets.

But in addition to danger of dust attraction we have to deal with a more serious evil, namely, markings caused by the discharge of electricity in the form of sparks. This may to some seem a somewhat improbable occurrence, though it is far from being so, as we shall show. We remember some years ago a rather mysterious kind of local fogging in rapid dry plates was attributed to the same influence—electricity—and we well recollect the surprise aroused by Mr. Warnerke's demonstration of the ease with which a brilliant display of sparks might be produced from a sensitive plate.

If a dry and slightly warm glass plate be fixed lightly upon an ordinary pneumatic holder and, in a perfectly dark room, the indiarubber disc be moved rapidly over the surface, the result will be the production of a more or less brilliant train of light. In the early days of gelatine plates, when so many amateurs and others were making their own films, and hand-coating was the invariable rule, the conditions were all present for the production of this abnormal display of electric light. A warm glass plate is placed upon the pneumatic holder, coated with highly sensitive emulsion, and by the slight friction caused by the removal of the holder a faint electrical discharge takes place, invisible through the coating of emulsion, but acting, nevertheless, upon the under side of the sensitive layer, with the result that after forced development of an under-exposed plate there appears a slight fog in the centre of the plate, much resembling the well-known "flare spot" of days gone by.

This is open to easy demonstration, the only conditions necessary being perfect dryness of both glass plate and india-rubber disc, and the effect is enhanced by slightly warming both.

In the case of celluloid, which is more readily excitable than glass, it is not difficult to believe that greater danger from this cause exists, and it is very easy for any of our readers to satisfy themselves on the point.

Many of them are no doubt familiar with the parlour experiment in which electricity is developed from a sheet of ordinary brown paper by warming it until thoroughly dry and then submitting it to friction with the sleeve or with a soft clothes brush. Under these circumstances, if a finger or the blade of a knife be presented to it, a series of sharp "snaps" are distinctly audible, and in a dark room a vivid display of sparks will be obtained.

If for the brown paper a sheet of celluloid, such as at present employed for negative purposes, be substituted, precisely similar results accrue, though from the rapidity with which the celluloid discharges itself they are at first more difficult of detection. The first experiment we would suggest is to lay a sheet of celluloid upon a piece of glass, both being preferably warm and quite free from moisture. Pass a soft hat brush a few times rapidly over the surface, and the celluloid and glass will be found to cling tightly to one another. Upon separating them, a creaking or crackling sound is produced, as if some adhesive substance intervened, and if this operation be performed in a darkened room, the separation will be found to be accompanied by a faint luminosity resembling phosphorescence.

If the celluloid be warmed and laid against the body or a cloth surface and again brushed, no spark is seen until it is removed from contact with the non-conducting surface; but the instant the separation is complete, one *brilliant* spark discharges itself in the direction of the thumb and finger by which the celluloid is held. If between the thumb and finger and the celluloid a piece of thick woollen cloth be placed, this brilliant discharge may be avoided, and then, on approaching the finger to various parts of the sheet, several *feeble* discharges will be obtained, each consisting of a number of separate sparks flying in all directions, after the manner of some of the recently published flashes of lightning.

Now, it is clear that if in the process of coating celluloid with emulsion the support be rendered electrical, it is in a very favourable condition to give off luminous discharges to the

unmistakable detriment of the sensitive coating. This condition is, perhaps, more likely to arise in coating a stretched band by machinery, but the danger is not absent when the cut sheets are coated in contact with glass, as the discharge may easily take place in separating the film from its temporary support.

It is not only the vermicular markings, more specially alluded to at the meeting of which we have spoken, that may be attributed to electricity, but also the isolated black spots also complained of—these being possibly caused by single sparks of great brilliancy.

The question is, Can such provisions be made as to completely de-electrify the celluloid before coating, and also to guard against its excitement at any subsequent stage? We have little doubt the means will be found.

What, we wonder, is really the truth about turpentine and its effect upon sensitive films? It is twelve or fourteen years since Mr. R. Kennett uttered the first impeachment by warning the users of dry plates against storing them in pine plate boxes, especially when the latter were newly made, in consequence of the destructive action of the turpentine upon the sensitiveness of the films. About the same time, we remember, an American writer—Mr. Clemons, if we mistake not—recommended oil of lemon as a preservative for sensitised paper, a small quantity of the essential oil placed upon sponge or cotton wool being placed in the box or drawer with the paper. Now, as chemists are well aware, oil of turpentine and oil of lemon are very similar both in composition and in action, so that if the latter possess any efficacy in preventing change or decomposition in the case of silvered paper, the former may well be supposed to exercise some sort of action upon the far more delicate and sensitive bromide film.

Yet Mr. Dunmore has recently given the result of an experiment from which he deduces the innocence of turpentine in connexion with the charges laid against it. Two plates, the backs of which were smeared with a turpentine preparation, were left for a time in an ordinary dark slide, and upon development were not found to have suffered in the slightest degree. But we would point out that in this instance the vapour, though it might be expected to exercise some effect if the power existed, would be far from having free access to the films. At a recent meeting, too, a member recommended, as the best blacking for the insides of cameras and dark slides, a solution of asphaltum in turpentine with a little lampblack added. Surely, if there be any danger in turpentine this preparation should give it every opportunity of developing itself, to say nothing of the possibility of additional trouble arising from the bitumen itself. It would be well if some one with time on his hands would put an end to the doubt by a series of conclusive experiments.

The subject of the atomic weight of gold is, among chemists, engaging considerable attention of late, and some matter interesting to the photographer at times crops up in the published accounts of the investigations. The theoretical aspect of the matter, of course, has little or no practical bearing on photographic operations beyond indicating the actual amount of gold that might be expected in a given weight of pure "chloride." Since the use of the double salt of gold with an alkali even this point may be ignored, and all that concerns the user of double chloride of gold, and potassium or sodium, is to see that the label of the tube or bottle guarantees the usual proportion—seven grains of gold in fifteen of the salt—and to see, if possible, that the guarantee is fulfilled.

We have already pointed out that there are samples of "chloride of gold" now to be bought that cannot possibly—except at a loss to the seller—contain this proportion of metal, and that how much below this recognised standard the sample falls is purely a matter of the conscience of the seller. The acknowledged standard departed from, the material has no more right to be termed chloride of gold than has a mixture of margarine and butter to be termed butter. In the latter case, however, the law would intervene; in the former, the result of an appeal to the law would be doubtful.

In preparing solutions of this salt for making toning baths it is not wise to keep them ne- .ralised ready for use, as some photographers are in the habit of doing, for the salt is not stable in that condition; indeed, neutral chloride of gold is a different substance from the acid chloride. Not only is it different chemically, but its physical appearance is not the same, the solution of the neutral salt being a brownish yellow, while the acid chloride is a pure yellow, verging almost to greenness.

The best method of preparing the solution is to keep it not weaker than, say, a grain to the drachm, and only when wanted for use to add the chalk or other neutraliser to the required amount of strong solution, then to filter after shaking a few times, and, finally, to add the acetate or other alkaline salt. If the chalk be added to a weak solution, say a grain to the ounce, the acidity is less readily counteracted, and there is risk of over-haste, leading to the concoction of a defective toning bath.

It is not generally known that chloride of gold will dissolve a certain amount of chloride of silver, but such is the case, as can be easily demonstrated.

Stale albumen has the reputation of causing albumenised paper prepared from it to have an acid reaction; but this is opposed to the experiments of Mr. Mark Power, who, writing in the *Journal of Analytical Chemistry*, gives an account of a series of experiments extending over a period of six months upon the change gradually undergone by egg albumen during the process of decomposition. Not to make the matter tedious, we give the proportion (which gradually increased) at the beginning and at the end of the period. At first the quantity of free ammonia was very minute, being only about the fourteenth part of a milligramme in ten cubic centimetres, while at the end of the time it had increased thirty-fold.

Some persons ridicule the idea of the necessity for the elaborate care recommended to be taken to prevent vibration of the building where photo-micrographic work is being carried on; but they would be surprised to learn that in attempting to discover to what extent the Royal Observatory was affected by such causes, the Astronomer Royal found that the rumbling of a railway train 570 yards away rendered some observations impossible during the passing of the train, that even when a mile distant it caused great disturbances of the observing instruments. It may thus easily be seen how difficult very fine work, of the kind we speak of, must be to accomplish successfully in the middle of a populous district or large town.

HARDWICH ON SCOTT'S WARM-AIR SATURATOR.

Some short time since Mr. A. W. Scott, of Weston-super-Mare, sent me one of his "warm-air saturators," with a request that I would try it and report the result. The saturator was charged with "gasoline," and three pints of the same fluid were sent for renewal.

I have experimented carefully with this saturator, and am much pleased with its performance. It is equal to Broughton's vapour tank, which is saying a great deal, as this tank, in my opinion, is nearly perfect in working, and if it had been incapable of explosion could not have been superseded.

Ives's porous saturator does not charge the oxygen so highly with ether as Broughton's vapour tank, and is consequently more liable to "snaps" and "passing back;" but the experiments of the late Mr. Barber, conducted under my direction, prove that it is safe from fear of dangerous explosion. Mr. Sutton, of the firm of Cutts & Sutton, who was present, can testify that when it was purposely filled with explosive gas, and, by jumping on and off the pressure boards, the flame drawn through it so completely that it set fire to the bag on

the other side, the only effect was to produce a report about as loud as a small pistol. Nothing gave way, even when the experiment was several times repeated.

Whether Mr. Scott's saturator is as safe as Ives's, I am not able to say. He mentions, in a private letter to me, that there are three feet of air passages inside it, but he does not say of what diameter, consequently I do not know whether there would be any chance of what is called "short circuiting," from possible imperfection in the manufacture. This was where the Broughton tank broke down. There were seven feet of tortuous windings, but the solder leaked on a particular occasion, and the oxygen in consequence passed by an easy route, emerging from the H pipe in an imperfectly saturated and explosive state. Such a thing could not happen in an Ives's saturator because the barrels are full of flannel, and the air tubes go straight through from end to end.

I would suggest that until this point is settled beyond dispute, Scott's saturator should be used with pumice tubes. Mr. Pumphrey, of Birmingham, makes them of a substantial kind, and it must be a heavy shock indeed of explosive flame that would force its way through one of his tubes. Or, in lieu of pumice tubes, you might use Oakley & Beard's safety jet, made after a model given by me in THE BRITISH JOURNAL OF PHOTOGRAPHY. This jet has the additional merit of being very *silent* under high cylinder pressure, as the mixing chamber is oval in form without any corners, and, in conjunction with the pumice chamber above, tends (like the air chamber in a forcing pump) to destroy jerking movements and produce a continuous flow.

With Mr. Scott's nipple of one-fourteenth of an inch aperture attached to one of the afore-mentioned jets, and connected with a cylinder of compressed oxygen, I have obtained a stronger light with gasoline than I ever got before; but I should hesitate at present to make an exact comparison between it and coal gas, much less between gasoline and pure *hydrogen*, which gives the hottest flame known when burnt with oxygen, I am also of opinion that much may be done with apertures of a smaller size (such as one-twentieth of an inch), provided the pressure be sufficient to spread the flame over the whole face of the lime.

In Messrs. Griffith Morris's circular, which I receive every month from their address at Maneety-lane, Liverpool, I see gasoline spoken of as sold in original cases containing two cans of four and a half gallons each, at 1*s.* 5*d.* per gallon, cases included. The railway companies, however, refuse to carry it except at what they term their "ton rate," so that by the time it reaches Sunderland, which is the nearest large town to me, the price has risen to 2*s.* 6*d.* a gallon. Even then it is much cheaper than "White's anæsthetic methylated ether of '717," which is sold retail here at 2*s.* 3*d.* per pound.

In concluding this article, I must in the name of all who use the limelight thank Mr. Scott for this last and most important addition to our means of illustrating our lectures, and of teaching by the eye as well as by the ear. T. FREDERICK HARDWICH.

I would venture to suggest a caution in using Scott's saturator. The tap leading to the bag, or cylinder, should be kept close shut until the supply of oxygen gas is turned on, as I notice a tendency to condensation of vapour in the O tube, and a consequent spirting of a few drops of liquid gasoline the wrong way when this precaution is neglected.

ENAMELLED COLOURED PRINTS.

I BEG to submit the following as a suitable and successful method of enamelling coloured prints, and is specially applicable to the perfectly smooth surface of a print on albumenised paper, whereby the colours are prevented from running or spreading:—

I take the coloured print and float it upon a hot solution consisting of gelatine and water, to which has been added a small quantity of chrome alum; and I have found the following to be a convenient working formula, namely, thirty grains of gelatine to each ounce of water, with the addition of one grain of chrome alum to every six ounces of solution.

The coloured print to be treated is floated face downwards upon the surface of the above-mentioned solution for merely a second or two, that is, only for such time as suffices to ensure an even coating of gelatine solution on the coloured side, which may be done in the well-known way of holding the print in a curved shape, and allowing the centre to touch the solution first, and then dropping gently first one side and then the other, to prevent the formation of air bubbles; the print is then carefully lifted and allowed to dry face upwards.

It is absolutely essential that the print should be allowed to dry thoroughly after receiving this coating of gelatine. Any number of prints may be thus prepared and stored to be finished hereafter, as I have not found them to deteriorate by keeping.

To enamel a print I soak it in cold clean water until it becomes perfectly limp, and having previously coated a clean glass plate with plain enamel collodion, after the latter has set (it may become surface dry), I plunge the coated plate into cold water until the usual greasiness disappears, slip it under the print soaking in water, bring the plate and print into contact below the surface of the water, withdraw them, and after draining the plate for a few seconds, lay the plate on a pad of blotting paper, then a sheet or two of blotting paper on the back of the print, covering the whole with a piece of thin macintosh or American cloth, and squeegee the latter to remove excess of water. The plate and print are now reared up to become bone dry, and the print can then be stripped from the glass.

Provided the gelatinised coloured print is first of all allowed to thoroughly dry before soaking, and being placed down on the collodionised plate, any one acquainted with collodion enamelling could not fail to produce perfect results. I do not enter into any details as to the preparation of the collodionised plate, as these are so well known.

A. GIL DE TEJADA.

FILM PHOTOGRAPHY.

ALTHOUGH many different formulæ for making emulsion and preparing gelatine dry plates have from time to time appeared in this and the other photographic journals, I am not aware that hitherto any reliable method has been published for producing a good and serviceable stripping film.

In these days, however, when one sees in the market not only films that do *not* require stripping, but some, indeed, that actually can be used like paper in roller slides, it makes one feel that he is a little behind the times in attempting to describe a process that has anything to do with glass; and I very much fear that with such facilities before them of buying ready-made all that they require, I shall persuade but a very, *very* few of my brother photographers to think even of making a film, much less a stripping film, for themselves. And, indeed, when I come to consider the matter, I am half inclined to lay aside my pen and give up the task I had proposed to myself as useless under existing circumstances; but still, as possibly there are some who, like myself, are fond of experimenting, and that our worthy Editor, to whom I sent a negative taken on one of my films, has been kind enough to pronounce the result "good," and has requested me to write a description of the process, I will, without further apology, give my *modus operandi*.

Now, as by a very little variation in the course of procedure I can make two different sorts of film—one to be stripped before exposure and the other not until all operations are over—I will take each in their order.

I first coat for myself, or procure, some glass plates, half an inch wider on either side than is required for the finished negative; for instance, for a whole-plate negative I use glasses 9×7. Having carefully cleaned one side, I sprinkle on it a little French chalk, and lightly rub, by a circular movement, the surface with a tuft of clean cotton wool, and finally dust both face and edges with a soft camel-hair brush. The next step is to coat with some plain uniodized collodion, and when well set, to cover the edges and sides to the depth of one-eighth of an inch with varnish and place in a rack to dry.

Meanwhile, I prepare a solution of gelatine (any clear gelatine will answer, such as the ordinary French, or Nelson's), thirty-five grains to each ounce of water, to which, when melted, is added for each ounce twenty minims of a ten-grain chrome-alum solution, and two drachms of spirits of wine. The whole is then filtered through two thicknesses of muslin into the pouring vessel, and kept warm at about 100° Fahr. till I am ready to use it. After *slightly* warming the plates (not too much, or the collodion will crack and peel off) against

the sides of a V inverted can, made out of thick galvanised iron so that it will not buckle, full of hot water, they are coated as thickly as possible with the above gelatine solution; and here, perhaps, as there may be some difficulty in getting the gelatine to flow kindly over the collodion-surfaced plate, I had better state my plan of working this way (as described in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1882, page 213) is simply this:—Take a broad camel-hair brush, dip it in the same gelatine that you are using, only in *another* vessel, and quickly smear all over the plate and then coat. The gelatine (or emulsion, as the case may be) will now flow quite easily. The plate is then gently rocked for a moment on the pneumatic holder, removed, and carefully slid on to a perfectly levelled marble or slate slab to set, and, lastly, placed in the drying box to dry; in fact, treated just the same as when performing the last operation of sensitising with gelatine emulsion—a subject I need not here speak of, as it has already been described in this JOURNAL dozens of times.

Before, however, I pass on to No. 2, I must explain my reason for using plates larger than is required for the finished negative: first, because the edges when stripping may possibly tear, and next by placing gently a proper-sized clean plate on the sensitised one, and with a sharp pointed knife cutting all round the edges, you will have your film the exact size you want for the carrier, and, moreover, the film will, most probably, on removing the glass spontaneously, release itself, and, if not, it certainly will directly the knife is inserted under the corners. I have mentioned a carrier, but if this be wanting, the film can very well be exposed without any appreciable loss of definition through a clear thin plate of glass, supported at the back by some thin black cardboard, simply allowing (if necessary) for the thickness of the glass by giving the focussing screw a quarter or half a turn to make the film register correctly with the screen. As to development and fixing, there is nothing peculiar. I do just the same as with a glass plate; but with *drying* flat there is some difficulty. I have, however, much lessened it by using its original support, sliding this under the film when in the water, and after draining let it dry there of its own accord. There will be no difficulty in releasing it after, and when placed under pressure between the leaves of a book, the film will lie flat enough for all practical purposes.

And now for No. 2, and I must be brief, for I see I have already taken up too much of your valuable space. This already has, necessarily, been in a great measure anticipated; for, as I said before, the difference in the preparation between the two films is very slight—in fact nothing, except that the common-sized ordinary plate is used, and a thinner substratum of gelatine, and only just the edges touched round with varnish before development. Without this precaution the film is very apt to leave the plate, and being so delicate is awkward to manage. I much prefer to let it remain on till the end, when every operation is finished and it is perfectly dry, and *then* strip. There need be no fear, it will come off easily enough directly the edges are loosened. As these negatives are so thin they can well be printed from either side, and obviously are useful on this account for many purposes.

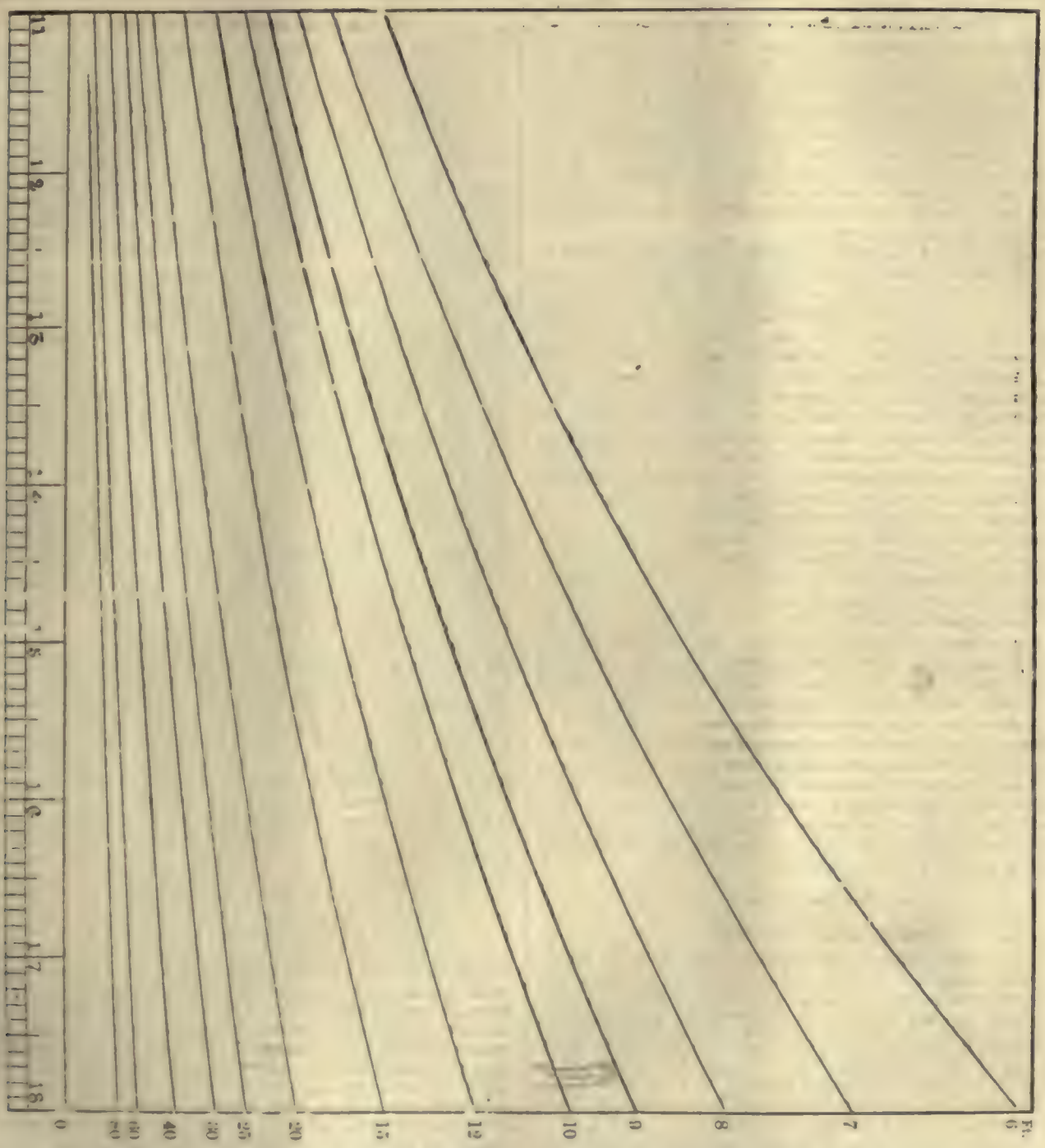
H. B. HARE.

SCALE FOR FOCUSSING HAND CAMERAS.

GRAPHIC methods of determining the focussing of lenses in hand cameras and marking the camera for future use, without necessitating the user to have recourse to calculations or inspection on the ground glass, are always useful and appreciated. On the present and following page we give a focussing scale, carefully drawn to accurate size from measurements prepared by Mr. William Ackland, whose skill in the mathematical department of photographic optics is well recognised. While we know that one of a similar class has been given in a contemporary American annual, yet is this scale the first that has been drawn to accurate full measurement, necessitating nothing but the application of a pair of compasses to prick off the distances to suit lenses of any focus from three inches to eighteen inches, with increments of a tenth of an inch.

The method of using the scale is as follows:—

Having noted on the scale of inches the figure corresponding with



the focus of the lens that is to be adapted to the camera, and having focussed the camera on a distant object, make a well-defined mark, to which the camera can be expanded with certainty in the future, in the certainty of the distance being always in good focus. This is represented by the zero line 0 on the scale. Now, to know where to continue the markings on the camera, so as to ensure sharpness of objects which are situate at a distance of, say, 40, 30, 10, or 5 feet, it is only necessary to place one limb of a pair of compasses on the zero line directly opposite to the figure that indicates the focus of the lens, and the other on the curved line opposite, and set it off on the focussing line of the camera. When the camera is expanded to this mark, all objects situated at the distance shown in feet at the end of the curved lines will be in sharp focus when the lens is worked with full aperture. Of course, when a small stop is used, the range of sharp definition is increased. Assuming the lens to be 3 inches focus, it will be seen that the distance to which the camera has to be expanded from its infinite distance mark to enable an object 4 feet away to be sharp, will be ·2 inch, this being approximately the distance between the zero line at 3, and the curved line represented by 4 feet, whereas with a lens having a focus of 10 inches the extension of camera necessary for an object 4 feet away would be 2·6 inches. Were the focus of the lens 11 instead of 10 inches, the extension necessary would have to be 3·2 inches. If the lens were one of 18 inches focus, the camera would have to be extended from its zero point of extreme distance ·7 inch to define sharply an object 40 feet away, or 6 inches were the object only 6 feet away.

The use and advantage of this scale for copying cameras are too apparent to require comment.

EXPLOSIVE FLASHING COMPOUNDS.

The valuable report presented by Messrs. J. G. Bullock and C. L. Mitchell, M.D., to the Photographic Society of Philadelphia on the dangers of flash-light compounds should be carefully read by all who are in the habit of practising photography by artificial light. Though in this country such compounds find very little favour, comparatively speaking—magnesium powder, pure and simple, satisfying most requirements—in America they are largely used in consequence of the greater rapidity of ignition and superior value of the light secured, but this gain is surely more than compensated for by the dangerous character of the mixtures employed.

Perhaps the most important paragraph in the report is that in which the authors speak of the preparations obtainable commercially, the formulæ of which are, as a rule, secret. The proprietors of these, the reporters point out, may label them "safe," but the manufacturer's *ipse dixit* in a case of that sort is scarcely any guarantee to the purchaser and user, and probably when an accident does occur these self-styled "safe" compounds are found to be as inherently dangerous as any others. With regard to the statements that have been made to the effect that while there are, undoubtedly, dangerous compounds there are others that are quite harmless, the authors wish it to be understood that "they consider all forms of flash powder"—*i.e.*, compounds—"dangerous, the difference between them being only in the degree of danger involved." This explicit delivery, we think, contains the gist of the question, and is worthy of careful attention.

The appended note by the editor of the *American Journal of Photography* partakes rather of the character of special pleading on behalf of the condemned preparations. It is true, as already stated, that the compounds "flash off" more rapidly, and give a light of greater actinic force, than magnesium powder alone, but we deny *in toto* that the latter is so incapable, as stated, of producing good results in the very quickest class of work. This depends as much upon the method of use as upon the material. The argument that because the photographer only "handles" a few grains at once, and the dealer only sells one ounce packages subdivided into smaller ones, they are not exposed to any danger is not characterised by the usual wisdom of our contemporary. It is not at the moment that the "few grains" are being used, or the "one ounce packet" being sold, that the serious accidents occur, but rather when the whole stock goes off at once from some "unexplained" cause, the "unexplainedness" of the cause arising from the unwillingness of some of the public to recognise the instability and consequent danger of these compounds.

STEREOSCOPIC EFFECTS.

Dr. G. D. Macdougald can scarcely have been really in earnest when, in his semi-jocular defence of the stereoscope, he alleges that two dissimilar pictures are not necessary to produce the true stereoscopic effect. In point of fact, he states that if two prints from the same negative be mounted side by side and viewed either in the stereoscope, "or by the unaided eye," they will give the appearance of "solidity." And further on he says distinctly that "to enjoy stereoscopic impression it is necessary that each eye have a picture for itself, but not necessarily from a different standpoint."

So frequently has this fallacy been upset that we cannot but think Mr. Macdougald has some hidden meaning in what he says that he does not clearly express. That an impression of quasi solidity may be obtained by *some* persons—for the power varies with individuals—by closing one eye when looking at a picture, or by viewing two similar pictures in the stereoscope, or without the stereoscope by the "squinting" process, is quite true, but that it is not real stereoscopic effect, but rather an effort of imagination, is easily shown. In the case of the two similar pictures, whether looked at in the stereoscope or by squinting, the effect of solidity, if any, will not be great, and will not be affected by a reversal of the pictures. But in the case of a pair of truly stereoscopic pictures, the relief will be bold and startling; and if the position of the pictures be reversed, it will be just as great but of an opposite character, foreground objects being apparently carved into the distance. If Mr. Macdougald's statement were accurate, the solution of the difficult problem of exhibiting stereoscopic pictures in the lantern would be rendered of the easiest.

ROUND ABOUT HAMPSTEAD.

In these days of rapid changes and alterations, it may be acceptable to photographers to hear of any place that retains even a small portion of its picturesque and natural beauty, and is all but independent of the encroachments of the jerry-builder, and the useful but not ornamental railway track, in which they can exercise their skill. Fortunately, at the present time, and in all probability for many years to come, rural Hampstead will enjoy immunity from any sweeping changes, and remain unspoilt by the so-called improvements usually meted out to any picturesque district within easy reach of the metropolis. I may be perhaps thought an enthusiast if I say there is not a more suitable spot for photographic work, within many miles of town in any direction, than at Hampstead.

A place, from time immemorial, favoured of artists, naturalists, and lovers of sylvan scenery, Cox, Crome, Constable, De Wint, and a score of others have laid the Heath under contribution for their wonderful effects of form and colour. The rich red glow of the broken sandy soil contrasted with the bright cool greens and russets of the varied foliage, the picturesque and irregular masses of broom and furze, interspersed with the trailing briar, form a splendid foil and foreground to the purples and blues of the distant landscape. A panorama broken and diversified with gleaming bits of colour in the reds and whites of scattered cottages and hamlets, almost buried in the surrounding greenery, and the smooth rolling outline of woods and pastures, broken here and there by the grey tower or spire of some village church. Standing here, on the higher part of Hampstead Heath, we have an extensive and uninterrupted view for many miles spread out before us. If we happen to look westward we see the church of Harrow-on-the-Hill, a landmark for miles, and the glittering water of Hendon Reservoir flashing in the sun. The pretty River Colne, winding through the valley, is of insufficient volume to have much effect on the view from where we stand; the only indication of its course is the lighter colour of the willow trees that fringe its banks.

Unfortunately, distance is, to the photographer, but of partial value, the nearness of a densely populated town frequently causes a smoky haze sufficient to obliterate much of the photographic detail except on rare occasions. We must, however, accept things as they are, and by judicious selection and exposure make the best of them. A west or north-west wind provides the most suitable conditions, often absolute clearness to the horizon, and an east or south-east wind the worst. It may be that an intimate knowledge of this district, under all aspects, in all weathers, and at all times of the year, has raised it in my estimation to be considered an exceptionally suitable one for photography, not only in summer, but all the year round, winter and summer alike, the only necessary condition being clear sunshine. I can scarcely imagine any one of artistic perceptions who, on a bright day, could fail to see pictures right and left as he strolled through the quaint streets or over the springy turf of the Heath. Those who have not visited the place under favourable conditions, or perhaps only know it by name as "'Appy 'Ampstead," associated with Bank Holiday crowds of 'Arrys and 'Arrietts, would soon be disabused of their adverse impressions by a couple of hours stroll on a bright spring morning, the air redolent with the perfume of the furze, whose flowers, like waves of gold, shimmer in the sunlight. The purple of the heather, mixed with varied greens and browns of grasses, plants, and bracken form a veritable garden. Here and there clumps of larger trees, with groups of ancient firs, whose ruddy stems and sombre foliage add to the variety and beauty of the scene. Happy children in bright clothing flit about like so many butterflies among the greenery, or running along the sandy paths that intersect the Heath in all directions mingle their joyous laughter with the carolling of the numerous feathered songsters that pass their days secure, in a great degree, from molestation. On many a quiet summer's evening the nightingale may be heard trilling forth its charming music to delighted listeners. Close to London, indeed! It might be a hundred miles away. Not even the faintest hum of the traffic of the largest city in the world, so close at hand, is noticeable. The quiet and restful country is on all sides, and as the soft west wind fans our faces we can scarcely believe that the fraction of an hour suffices once again to land us amid the crash and clatter of a densely populated town. The fraction of an hour? Yes, in about twenty minutes we can make the change, and at the expenditure of a few coppers.

The photographer naturally asks, "What there is to do? singing birds and blue distances do not offer much temptation." Now I will tell you, and if you will follow me, we will go over the ground in imagination, and you will do well to select a day and go over it afterwards in reality. There are three points almost equally convenient that you may come to from town:—First is Hampstead-heath Station; the second, Finchley-road Station; and thirdly, by omnibus to the High-street. Whichever

route may be selected, the first spot to seek must be one from which a photograph can be taken of the old Church, with its ivy-covered porch and copper spire, its position necessitating a morning light, say between ten and eleven o'clock; owing to the number of trees, this is the best time of the year for this special subject, as when in full foliage they intercept the view from the best points. Having exposed one or two plates, as may be thought desirable, we proceed along Heath-street, or rather to the beginning of it, and make an exposure on the street itself, and on the handsome buildings that line each side of the way. Still continuing our walk before turning out of Heath-street, a view looking towards the route we have just traversed, a little above the Fire-engine Station, will form an excellent picture, as also will one looking up the High-street from the gateway a little below the omnibus station. The traffic is the only drawback to these street views, as all the other subjects to which we shall be introduced are quite free from this objectionable condition. Having made our exposures, we retrace our steps and turn up Holly-hill; this leads to Mount Vernon and the Grove. The up-and-down character of this part of Hampstead offers several chances for exposures. In summer time a double avenue of trees, called the Judges'-walk, on the very summit of the Heath makes a good picture; but now it may be passed by. The next place at which we arrive is the Flagstaff, the highest part of Hampstead Heath, and near to a pool of water on which the juveniles of the neighbourhood sail their toy ships, and which is also used as a ford and watering place for horses and cattle. This affords a capital opportunity for groups with a rapid shutter, and is easily got at from all sides, so that you can have your choice of light. Here also is one of the most favourable spots imaginable, not being a seascape, for photographing clouds—a low horizon with an uninterrupted view looking westward. The most splendid sunsets are often witnessed from this point, more effective in point of colour than those observed at the seaside. In suitable weather it might be quite worth while to make a purpose journey with the sole object of photographing clouds.

Leaving this we come to "Jack Straw's Castle Hotel," the entrance to the stable-yard from the road forming a first-rate setting for a horse being groomed at the stable-door, the old fashioned buildings lending themselves to picture-making in a most happy fashion. Passing by the hotel towards North-end, we have on both sides of the road attractive features. On the right we get a patch of rough ground and fir-trees, with a very fine elm-tree avenue; in summer three or four plates might be exposed with advantage. When the trees are leafless, as at the present time, the left side of this sunk road will be found most worth attention. The photographer will scarcely require telling what to do here, as many suitable combinations are directly in front of him: he must use his own judgment as to how he will deal with them; in fact, all throughout this trip I merely suggest those points that, to my taste, make excellent pictures—almost all of them admit of considerable variation.

On arriving at the "Bull and Bush" photographers are generally ready to refresh, and proceed to do so. Afterwards we pass up the road by the end of the hotel, by Grove Cottages—old wooden buildings that have been photographed times without number, but now doomed to destruction. Several notice boards announce the fact that the land is to be let for building purposes. Passing through a short lane on the left, we emerge on the extreme edge of the Heath, and climbing up a somewhat steep bank, get an admirable view of the surrounding country, with a quaint farmhouse in the foreground. Taken from the bank side, these farm buildings make an excellent picture—several plates may be here exposed with advantage, the foreground making up well with the broken sandy ground and furze bushes. Here and there the trailing bramble lends its aid to the composition, and if two or three children can be subsidised for the occasion, we have the opportunity of getting pictures satisfactory and pleasing, and such that no other place within a reasonable distance of town can supply.

We now make our way across the Heath eastwards towards a group of fir-trees, close to which passes the main road to Highgate from Hampstead, and near to the "Spaniards," a well-known and ancient hostelry, where we may do worse than finish up our tramp with a substantial meal. These fir-trees, owing to their situation and age, are well worth a few plates, and make excellent pictures, but before making any exposures it will be advisable to stroll about and examine them from various points of view, for, unlike many clusters of trees, they are free from the charge of being monotonous—every different point of sight giving an entirely new combination. Several pathways intersect them, and our pictures may partake of the character of an avenue or open view, according to the standpoint we select. At any rate, we have by this time used up our stock of plates, and performed a good day's work, and this by only laying under contribution a small portion of Hampstead Heath.

Towards London, still on the Heath, we have many more views of a distinctly different character, but beautiful and suitable for camera work, and which extend up to and merge into the Highgate district on the left, where we may find abundance of delightful subjects in Millfield-lane, Fitzroy Farm, and in the winding and embowered lane that leads up to the high road. In the summer time those ponds fenced off from the public road supply excellent subjects. I can but recommend a visit, and the different suitable points noted down, and I think he will be a very exacting or inappreciative photographer who will return from such a visit unsatisfied.

EDWARD DUNMORE.

EIKONOGEN AS A DEVELOPER IN PRACTICE.

[A Communication to the Photographic Society of Great Britain.]

It may seem presumptuous in me to write from the other end of the world on a subject that the members of the Photographic Society of Great Britain have a much better opportunity of forming an opinion on than I have, and on a subject that will perhaps have been thoroughly threshed out before this paper can be read; but when I consider for how long new developers have often been in use before any actual comparative experiments with them and old developers have been made, or at least before the results of such experiments have been made public, I am encouraged to think that what I have to tell may not be so very much behind time after all; moreover, the changes that may be rung on a developer by varying the proportions of the ingredients are so endless that every experimenter, working on lines laid down by himself, is likely to cover some new ground, however much may have been covered already.

There have been numerous expressions of opinion as to the value of the new developer. It has been declared "as good as" and "better than" pyro, and so on. Now I quite appreciate the value of such opinions when they come from men of experience, but, after all, they are of less value than an actual detailed account of experiments undertaken for the sake of making a comparison.

There fell into my hands what I believe to have been the very first box of eikonogen that came to Japan, and I set about to compare its working with that of pyro at once, and with the most practical object that I could have, namely, to determine whether or not I should adopt it instead of my old friend in actual practice. It may take a little time to detail the principle of the experiments that I have made, but I think that if this paper is to have any value it will be by detailing what I have done before I give the conclusions that I have drawn.

The eikonogen came into my hands carefully done up in one of the original tin boxes, on the outside of which were instructions not to open it in the presence of ammonia fumes, but in a dry, pure atmosphere. These instructions were duly attended to. There were no instructions as to the method of using it, but I had read enough in the English photographic press to know at least pretty fairly what to do with it. Briefly, this is what I understood to be claimed for it: it was intended to be used as a substitute for pyro, and was said to be quicker and more energetic in its action. The alkali recommended was carbonate of soda, and some had stated that either only very little of this should be used, or that some restraining bromide should accompany it, otherwise there was a danger of fog on account of the excessive energy of the developing action.

The eikonogen was found to be a somewhat heavy, coarse powder, of a rather dirtyish pinkish colour, readily soluble in about thirty times its weight of cold water, and giving a yellow or light brown solution, which rapidly darkened in the air from the absorption of oxygen. It was neutral to test papers.

Here, at the very beginning, a series of experiments were made to test, as well as it could be done without waiting a long time, the keeping qualities of the solution. The following were the results:—In aqueous solution, without any preservative, eikonogen darkens much more quickly than pyro. If the eikonogen be dissolved in a solution of sulphite of sodium instead of water, the colour is light green instead of yellow; if sulphite of soda be added to an aqueous solution before it has darkened much, the colour will be changed immediately from yellow to green. This "sulpho-eikonogen" solution seems to be very permanent, and does not stain the hands. It is not necessary to neutralise the sulphite of soda with acid to get a permanent solution. The sulphite of soda that I used was a fairly good commercial sample, and was distinctly alkaline to test papers. The addition of alkali to the aqueous solution accelerates the discoloration, but not to nearly so marked a degree as in the case of pyro solution. Even when made strongly alkaline the "sulpho-eikonogen" solution discolours very slowly. A solution that had been used for development, and that was put on one side in a measuring glass, was of a very light brown colour only at the end of several days. Even the alkaline solution does not stain the hands. If an aqueous solution has turned deep brown by exposure to the atmosphere, it will

change to a comparatively light brown by the addition of sulphite of soda.

The first set of experiments with pyro and eikonogen were intended merely as "feelers," so that I might get some idea of the action of the substance I was working with. I made up a one per cent. aqueous solution of eikonogen in water, and a ten per cent. solution of each of sulphite of soda and common carbonate of soda in crystals. The first developer that I tried was made up as follows:—

Pyro	2 grains.
Sulphite of soda	10 ,,
Carbonate of soda	10 ,,

to each ounce of water.

Another developer was made up with exactly the same proportions, but replacing the pyro with eikonogen.

Exposures were made two at a time in the camera, the subject being chosen to show great contrast and full gradation. A table covered with ornaments was selected, and over two vases standing side by side were thrown a black velvet cloth and a white table napkin. The first two plates were purposely much under-exposed, the second two received a little shorter than the best exposure, the third pair a full exposure.

A pair of plates were placed in dishes side by side, and at the same moment the two developers were poured over the two plates. The results were as follows:—In each case the image under pyro began to show considerably before the other, and development was complete, or had gone as far as it would go, when the plate under eikonogen was not half developed. The development under eikonogen went on steadily, however, and eventually there came out, in the first case, apparently the same amount of detail as with pyro; in the second, little more; in the third case, the eikonogen plate had the appearance of being somewhat over-exposed, the other of being just rightly exposed.

Experiments were tried with the carbonate increased by twice, and eventually by three times, but the results were exactly the same as in the first cases, except that, both with pyro and with eikonogen, the development was a little quicker. In every case the eikonogen proved much the slower developer, but on the whole there was in the finished eikonogen-developed plates a very little more detail than in the case of the others. There was no appearance of fogging with eikonogen (or with the pyro either) even when the largest amount of carbonate was used, and the colour of the image was excellent whether the alum bath was used or not.

Further experiments were tried to see the effect of developing several plates in succession with the eikonogen—in all the experiments already described a fresh solution had been mixed up for each plate. The development became slower and slower, but on the whole the eikonogen compared favourably with the pyro, inasmuch as it appeared to become exhausted more slowly, and certainly became discoloured much more slowly. In fact, by the time that a pyro developer had become of the colour of stout, the eikonogen developer showed little or no discoloration at all.

The net result of these experiments was to show that eikonogen had at least as powerful a developing action as pyro, but that it was a great deal slower. Now I am myself in favour of slow development, and would not consider the tardy action of the eikonogen to be a drawback, but I know hat no developer that is much slower than pyro with carbonate of soda will find general acceptance. My next series of experiments were therefore to determine what was the quickest modification of the eikonogen developer that I could find. I mixed a stock solution containing two per cent. of eikonogen and ten per cent. of sulphite of soda. All the following developers had the same amount of eikonogen and of sulphite—namely, two grains of the former and ten grains of the latter to each ounce, the alkali and restrainer only being varied. The subject chosen was a landscape, including dark green foliage and a gate painted a glaring white—a great range of contrast again being got. A number of plates were exposed n quick succession, an exposure of little less than what I should consider 'normal" being given.

The first plate was developed with the following developer:—

Pyro	2 grains.
Sulphite of soda	10 ,,
Carbonate of soda (crystallised)	20 ,,

My idea in taking this as a standard with which to compare eikonogen was that, although it is a slower developer than any common ammonia developer, it is pretty quick as developers with alkaline carbonates go. I consider that a developer is not likely to become generally popular unless it will work as quickly as does this one.

The plate was watched in this developer, and it was found that the image made its appearance in twenty seconds, and that development was finished in three minutes. I set myself then to find, if possible, an eikonogen developer that would work as quickly as this one. I tabulate the results, it being understood that the eikonogen and sulphite of soda were, as stated above, constant:—

	Developer.	Image Showed.	Development Finished.	Remarks.
	Eikonogen and sulphite without alkali.	Mins. Secs. 1 30	Mins. 20	Full detail, but thin image.
1	Carbonate of soda, 5 grains ...	0 30	6	Very good quality.
2	,, ,, 10 ,, ...	0 30	5	
3	,, ,, 20 ,, ...	0 30	4	Image rather thin and foggy.
4	Carbonate of soda, 20 grains; bromide of potassium, 2 grains.	1 30	15	Very good quality.
5	Carbonate of potassium, 5 grains	0 30	6	Very good quality.
6	,, ,, 10 ,,	0 30	4	
7	,, ,, 15 ,,	0 25	3	Image rather thin and foggy.
8	Carbonate of potassium, 20 grains; bromide of potassium, 1 grain.	0 40	4	Very good quality.
9	Liquid ammonia, 2 minims; bromide of potassium, 1 grain.	2 0	10	Thin image, with both chemical and colour fog.

All quantities are in grains to the ounce.

The only conclusion deducible from these experiments is that eikonogen will not work as quickly as pyro. It will be seen that in every case but No. 8—where the rapidity of development came up to, or even nearly up to, that of the pyro developer—the image was thin and foggy. Farther than that, with the above exceptions, the best negatives were distinctly those that took a considerable time to develop. It will be seen that of the developers tried the quickest contained twenty grains of carbonate of potassium and one grain of bromide of potassium to each ounce, and that this did not come very much short of the pyro developer in the rapidity of its action. On the whole, as in the first set of experiments, the eikonogen appeared to bring out a little more detail than the pyro.

The colour was in all cases—except that of the ammonia developer—good, but I do not think that it was any better than that given either by hydroquinone, or pyro with sulphite and a carbonate, using the alum bath. The gradation of density—or "tonality," to use the slang of artists—was certainly somewhat different from that given by pyro, but I do not think I am able to judge whether it was better or worse. There certainly is a certain softness about the eikonogen-developed negatives that must be an advantage in the case of some subjects.

It will be seen that one plate was developed without any alkali, except that due to the slight alkalinity of the sulphite of soda. The fact that this was possible induced me to try the following experiment:—Three solutions were made; they were as follows—(1) Eikonogen, two grains to the ounce of water; (2) Sulphite of soda, ten grains to the ounce of water; (3) Eikonogen two grains, sulphite of soda ten grains, to the ounce of water. Three plates were flooded with these three solutions at the same moment. The results were as follows:—

In the case of (3) the image appeared in two minutes, and development was finished in twenty minutes.

In the case of (1) the image appeared in two minutes, but at the end of two hours little more than the high lights had appeared, and the solution was much discoloured.

In the case of (2) no trace of an image had appeared at the end of two hours.

A rather curious thing came out of this last set of experiments. I mixed (1) and (2), and with the result that a great part of the colour was at once discharged, and flowed the solution over the plate that had been under the sulphite of soda solution for two hours without being affected. I intended to see what would be the result in the way of development, but forgot all about the plate for two days, when I suddenly remembered it. I expected to find nothing but a mass of fog, but, to my no small surprise, I found in the dish a fully developed and fixed negative. I suppose the fixing was effected by the sulphite of soda.

I ought to observe here that all the plates used so far were of about average rapidity—as so-called rapid plates of the present day go—giving something about twenty on the sensitometer, and that they were of a very "robust" kind. That is to say, they gave, with any ordinary pyro developer, very clear shadows, and would stand "any amount of forcing." I wished to try the new developer on an entirely different kind of plate, and I had by me a kind that is very common amongst commercial plates, and that is excellent for many kinds of work—I mean a very rapid plate, giving density easily with pyro, and giving a full, round image with good

gradation under a moderately strong, or fairly restrained, developer, but fogging more or less with a developer strong in alkali unless duly restrained.

I found that with such plates, using two grains of eikonogen and ten grains of carbonate of soda to the ounce, but no restrainer, I could get nothing but thin images, or, if I prolonged development, foggy plates. A corresponding pyro developer gave excellent results. It was evident that with such plates and eikonogen a restrainer must be used, and I tried bromide accordingly. I, however, thoughtlessly used bromide of ammonium, forgetting for the moment that in the presence of sulphite of soda free ammonia would be produced, and that ammonia does not agree with eikonogen at all. The images come up finely, and in the developer apparently boldly and strongly, but on fixing I had the most beautiful sample of almost ruby-red fog that I have seen. I do not think that it would have been possible to get red fog with these plates, using pyro. With pyro they would have given grey fog (if any), and it is my experience that grey fog, whether due to over-exposure or to forcing, and colour fog, do not appear at the same time under pyro. The substitution of bromide of potassium for bromide of ammonium gave quite satisfactory negatives, but the development was very tedious. The restraining action of bromide appears to be greater with eikonogen than with pyro, so that only a little need be used. In this case I found one grain to the ounce sufficient.

W. K. Burton.

(*To be concluded.*)

PHOTOGRAPHIC CONVENTION.

The next meeting will take place at Chester, from June 23 to 28 inclusive. The programme will be as follows:—The proceedings will be opened on the evening of June 23 with a *conversazione*, President's address, and lantern exhibition. Excursions have been arranged for each day during the week; the evenings being devoted to the reading of papers and discussions. An exhibition will be held of novelties, apparatus, &c.; no charge will be made for space.

The Convention dinner will take place on the evening of June 27. Arrangements are being made for excursions to the following places: Moreton Old Hall, Conway, Bettws-y-Coed, Carnarvon, Harwarden, Llangollen, &c.; also a trip on the Mersey to witness the regatta of the Mersey Yacht Club. Cheap railway tickets to these places will be issued by the Railway Company upon production of membership ticket.

CAMERA CLUB CONFERENCE.

The Conference, as already announced, will take place at the Society of Arts, on Thursday and Friday, March 20 and 21, under the presidency of Captain Abney.

Amongst the papers to be read and discussed will be the following:—

"The Art of Drawing and Photography," by Mr. A. M. Rossi.

"Photography by the Light of the Electric Spark," by Lord Rayleigh.

"The Latent Image," by Mr. C. H. Bothamley.

"Limitations in the Treatment of Subjects by Focus," by Mr. T. R. Dallmeyer.

"Collotype and Photo-etching," with practical illustrations, by Mr. W. T. Wilkinson; and other papers by the President, Mr. Lionel Clark, and others.

It is further proposed to bring forward, in as complete a manner as possible, the subject of photographic exhibitions and their regulations.

The exhibition of apparatus will be, as usual, in the Library of the Society of Arts.

All photographers or others interested in the subjects under discussion are invited to be present.

Foreign Notes and News.

Among the ravages wrought by death during the present month in the ranks of the professional photographers of the Continent, we have to chronicle the decease, on February 11, of Herr Theodor Prümm, the well-known portrait photographer of "Unter den Linden." His name has already occasionally appeared in our columns as one of the successful contributors to various German exhibitions, and he was one of the most active and indefatigable members of several Berlin photographic societies.

A technical night school has recently been founded in Berlin by the Club for the Promotion of Photography. The first lecture was delivered by Professor Vogel, and dealt mainly with the artistic principles involved in photography. The students already number twenty-four, and as the excellent laboratory of the polytechnic is set apart for their accommodation on two evenings during the week, their numbers will, doubtless, rapidly increase.

The constantly recurring grievance of photographers—the interference of the Customs authorities with packets of dry plates—formed the subject of some amusing confessions at the last meeting of the Berlin Friends of Photography. The question was asked, What is the best method of getting dry plates over the frontier? To this Herr E. Vogel replied that his custom was to hide the packets among the dirty linen in his portmanteau. Professor Vogel showed himself, as was to be expected, more ingenious; his plan is to make up his plates in a number of exactly similar packages, one package, however, containing injured plates. This plate he presents to the officials, who, satisfied apparently with injuring, as they suppose, one packet, let the others go free. But it was Herr Wight who certainly carried off the palm for inventiveness, as he gets his plates made up in packets exactly resembling books, and Custom-house officers have, as every one knows, such a wholesome horror of anything pertaining to literature, that this plan is certain to succeed. It must be admitted that this conclave of respected *savants* publicly deliberating on the best method of circumventing the Customs authorities of their own and other countries has its humorous side. It comes perilously near open advocacy of smuggling. Is Professor Vogel about to develop into another Beaumarchais?

Herr A. Lainer has been carrying out some experiments with a view of ascertaining how far it is worth while to collect and precipitate the silver contained in old fixing solutions. He finds that a bath in which 1200 plates of cabinet size have been fixed contains 181 grammes of silver, equal in value to about 30*s*. Dr. Miethe, in reviewing these results, remarks that in a bath in which he had fixed 80 plates, size 12 × 16 and 13 × 18, he found 12 grammes of silver, which amount corresponds pretty nearly with the results obtained by Lainer. It would appear that the amount of silver contained in the old fixing solution depends entirely on whether or not the acid fixing bath be employed. The ordinary fixing bath can be used for so few plates in comparison with the acid bath that to attempt to extract the small amount of silver it contains is not worth the trouble involved.

An anonymous correspondent of the *Wochenblatt* inquires if adding *sulphur* to a developer is generally to be recommended. The gentleman is wise in preserving his *incognito*. True merit is always (?) distinguished by modesty!

For what purpose do patent agents exist? This is a question that cannot be answered without consideration. It evidently cannot be to ensure to inventors the validity or patentability of their inventions. The last week's issue of the Journal commented on Johnson's recent patent for altering the focus of an objective by the insertion of an additional lens, and it was pointed out that the method is something over thirty years old. In Germany patent agents seem to supply guarantees very little better. Thus it appears from the last number of the *Photographische Nachrichten* that Schirm's specification for a magnesium lamp (April 3, 1888) corresponds exactly with James's, which was published in England exactly two months previously.

A communication recently made by Herr Voigt to the Photographic Society of Frankfort contains a good deal of interesting information in regard to eikonogen. Herr Voigt finds that this developer gives the best results at a temperature of from 8° to 10° C. The development at higher temperatures takes place with more rapidity, but there is then a danger of getting negatives deficient in depth. He recommends the following solution:—

Water	500	grammes.
Sulphite of soda	25	,,
Carbonate of soda	15	,,
Carbonate of potash	5	,,
Eikonogen	5	,,

Our Editorial Table.

Hard Battles for Life and Usefulness.

(By Rev. James Inches Hillocks. London: Houlston & Sons.

This work, which is illustrated, is a record of the life and labours of of one who, born of parents in an humble sphere of life, and whose lot in early life was of a more than usual up-hill nature, has yet, after "hard battles," achieved that honour which arises from a life of usefulness. *Hard Battles* is an autobiography, in which Mr. Hillocks tells his story with modest simplicity, and we trace with great interest his career from his early life as a weaver boy in Dundee to

his position as a clergyman in London, where he spends a life of usefulness, encouraged by the fact that the Queen has been pleased to confer on him a civil list pension. The illustrations in the work are mainly, though not exclusively, Edinburgh scenery of an historical or archæological character, and the frontispiece is a good Woodburytype portrait of the author.

Fallowfield's Photographic Remembrancer.

This catalogue, for the quarter ending March, consists of a dozen pages of various specialities, of which Mr. Fallowfield is either the manufacturer, the seller, the importer, or for which he is agent. Among these are the Facilé hand camera, which both in its construction and achievements is well illustrated; flash lamps, cameras of several kinds, celluloid films, and other necessaries and luxuries. As Mr. Fallowfield gives Cramer's American plates the high character of being "the fastest plate yet made," English makers should look to their laurels in this respect.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2628.—"Improvements in or relating to Apparatus for the Production of Magnesium Flash Light." Communicated by C. Lansiaux and C. Merville. A. J. Boult.—*Dated February* 18, 1890.

No. 2776.—"Improvements in Photographic Lens Shutters." Communicated by Voigtländer & Son. Complete specification. F. Bishop.—*Dated February* 20, 1890.

No. 2812.—"Improvements in Photographic Cameras." O. Freeworth.—*Dated February* 21, 1890.

SPECIFICATION PUBLISHED.

1889.

No. 4649.—"Cameras." Greenall and Bishop.—Price 8*d*.

PATENT COMPLETED.

Improvements in Shutters for Photographic Cameras.

No. 4649.—Thomas Wright Greenall, The Grammar School, Hartlebury, near Kidderminster, and Frank Bishop, of the firm of Marion & Co., of 22 and 23, Soho-square, Middlesex.—February 1, 1890.

This invention relates to an improved so-called "instantaneous" shutter for photographic lenses. The shutter is of that kind which opens and closes upon a diametrical line by the motion in opposite directions from the centre to the sides of a pair of plates or wings pivoted upon a common centre and overlapping when closed.

The invention relates essentially to the mechanism whereby the plates or wings are operated, and the object of the invention is to simplify this mechanism and reduce the cost of manufacture. The plates or wings are operated by a pin moving in a curved angular or biangular slot in each of them, the slots lying in a direction such that the two extremities of each slot are in a line about radial to the centre of motion of the plate or wing, and the slots being oppositely bent or curved so that motion of the pin from one end to the other of the two slots will cause simultaneous motion of the two plates or wings in opposite directions, the motion of the pin through the first half of the slots causing an outward separating or opening motion of the plates, and the motion of the pin through the second half of the slots causing an inward or closing motion of the plates. This actuating pin is carried or actuated by a lever pivoted to the frame and acted on by a spring provided with means of varying its tension for the purpose of regulating the velocity of motion of the plates according to the length of exposure required, a spring trigger being also provided, having notches or shoulders adapted to engage with the lever and hold the plates either in the closed or open position as required, said trigger being released either directly by hand or by pneumatic agency, as well understood. The pin through which the plates are actuated projects through a slot in the frame, and serves as the medium through which the shutter may be brought to the open position for focussing for a prolonged exposure or "set" for a short or "instantaneous" exposure.

Camera Club Notices for March, 1890.—Monday, March 3, half-past seven p.m., Smoking concert. Thursday, March 6, eight p.m., Mr. Andrew Pringle on *The Optical Lantern*. Thursday, March 13, eight p.m., Lantern evening. Monday, March 17, half-past eight p.m., Lantern in operation; evening for testing slides. Wednesday, March 19, half-past eight p.m., Special smoking concert and opening of members' annual exhibition of photographs. Thursday, March 20, two p.m., Opening of Conference and exhibition of apparatus at the Society of Arts by the President (Captain W. de W. Abney, C.B., R.E., F.R.S.); papers from two p.m. to half-past five p.m. Friday, March 21, ten a.m., Exhibition of apparatus in Library of Society of Arts; two p.m., Renewal of Conference papers from two p.m. to half-past five p.m.; half-past seven p.m., Annual dinner at Frascati Restaurant, Oxford-street (near Tottenham Court-road). Thursday, March 27, eight p.m., Mr. W. Willis on *Platinotype Possibilities*. Thursday, April 3, eight p.m., Lantern evening. Monday, April 7, half-past eight p.m., Smoking concert.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 4	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle.
,, 4	North London	Myddelton Hall, Islington, N.
,, 4	Holmfirth	
,, 4	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 4	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 4	Paisley	Paisley Museum.
,, 4	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 5	Coventry and Midland	The Dispensary, Coventry.
,, 5	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 5	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 6	Bolton Photographic Society	The Baths, Bridgman-street.
,, 6	Leeds	Leeds Mechanics' Institute.
,, 6	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 6	Glasgow Photo. Association	Religious Institn.,177, Buchanan-st
,, 6	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 7	Sheffield Camera Club	Whiteley's Institute, NewSurrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

February 25.—Technical meeting.—Mr. W. E. Debenham in the chair.

An announcement received from the Royal Geographical Society was read to the effect that the set of views taken by Signor Sella in the Caucasus was on view at the Society's rooms until the end of this month.

The Chairman referred to the special interest which these views had in relation to the fate of the late Hon. Secretary.

An exposure shutter was exhibited, the features of which were that it did not require resetting, but worked in either direction, the spring being set by the pressure of the ball used to release it. By pulling a pin the exposure could be made to last any desired time, as in this case it required one pressure of the ball to open the shutter and another to close it.

Mr. Cowan remarked that the shutter appeared to be identical in principle with one that had been shown at another meeting.

A dark-room lamp for benzoline was shown that had the form of a candlestick. It was furnished with a ruby chimney.

A letter was read, sent by Mr. T. Pegles, of Retford, and asking for the opinion of the members as to the cause of some markings that appeared on some photographs accompanying the letter. These markings were in the form of a series of bright lines descending from the top of the photographs. The photographs had been taken in a building at night, and the illumination had been a magnesium flash ignited behind the camera. There was scarcely any image on the plate except the lines referred to. The writer himself thought that the marks were due to illuminated currents of heated air.

Mr. W. Bedford thought that they were due to a row of gas jets, a representation of which appeared in one of the photographs.

The Chairman thought there was no doubt that this was the case. The markings were parallel, and although they took a form varied in direction, yet they were all alike, curving and moving together like the marks made by a graining comb. The camera had been moved, probably, by opening or closing the dark slide whilst the cap was off the lens, and the gas jets had left the trail of their presence on the plate, as various portions of it had been directed to them.

Mr. H. Chapman Jones showed a camera of the detective kind, which he called a Memorandum camera, the object being to take notes which would prove useful, whether the photographs were intended to be shown or not. The lens was of the rapidity *f*-4, so as not to be restricted as to time or degree of light, as was the case with a slower instrument. It was made by Swift, and fitted with an Iris diaphragm, so arranged as not to cause any projection from the tube. The focus was just under three and a half inches equivalent, and there was a sliding adjustment of the tube that permitted it to be fixed at distances answering to the requirements of photographing an object from two feet away up to any distance. At the shortest distance quite a readable negative could be obtained from the page of an ordinary book. The shutter was of the roller-blind character, working directly behind the lens, and leaving an opening three and a quarter inches in length, more than three times the diameter of the lens. The spring roller was a cylinder of an inch in diameter, so that it was not necessary for it to revolve with extreme rapidity in order to get a rapid exposure. It was difficult to get a material for the blind that would stand the strain of the rapid pull. He had succeeded best by using black tape at the sides and stitching the blind to that. The arrangement of plates was a simple one—that of Mr. T. Samuel. The size of plate was $3\frac{1}{4} \times 2\frac{1}{2}$, and it was, in fact, the half of a quarter-plate. With twelve plates complete, the camera weighed thirty-five ounces. In order to facilitate matters, he used a finder and view meter, which could be laid on either top or side of the camera, and which had a square focussing glass with markings in both directions answering to the plate used horizontally and vertically, so that the choice of direction could be made from actual inspection of both positions at once. The camera could easily be used for taking a photograph of a page of a book by standing the book upright on a table, setting the lens at the focus mark for two feet, and then putting the camera at that distance from the page. By using a fine slit of the one-five-hundredth of an inch, as mentioned by Anschütz, and placing the shutter close to the plate, an exposure of the one-ninety-thousandth of a second could be obtained. If even one contented oneself with the one-fiftieth of an inch, the speed would be one-nine-hundredth of a second. He did not propose to use it as a secret camera, but from its thinness it could be so used more readily than most detective cameras. Photographs taken by the camera of street scenes in London on December 21, which was a dull day, and at various hours of the day, were produced. They were taken to show that one need scarcely ever fail to secure a photographic memorandum, whatever the weather or the time of day. The plates had all been developed with eikonogen in a dish together. Any that appeared over-exposed were transferred to a

weak solution of bromide, and then after a time returned, if necessary, to the eikonogen to gain intensity.

The CHAIRMAN asked Mr. Chapman Jones whether, with a lens of *f*-4, when stopped down to *f*-8 or *f*-12, he could get as much flatness of field as with a lens possessing only *f*-8 aperture to start with.

Mr. JONES thought not, but he had considered it desirable to be able to use the rapidity indicated by *f*-4 when needed. The curvature of field of the lens was not great; it was equal to one-ninetieth of an inch at the margin of the size he had mentioned.

Mr. BERNARD thought that the most useful point in the apparatus was the spiral movement of the lens in focussing; that movement was very smooth, and allowed exactness in registering position.

Mr. W. ENGLAND suggested placing the roller-blind shutter next to the plate.

Mr. JONES thought that that was the worst position for a shutter, although for such work as the photographing of a bullet in flight it might be necessary.

Mr. COWAN showed three exhibit-size paper prints developed with eikonogen. The first had been developed in a fresh solution, four ounces in quantity; it had appeared to be flat and over-exposed. A second print had then been developed after receiving only half the exposure. This print was bright; but a third print, that had received the same exposure as the first one, was next developed in the same solution. This was perhaps the best of the three, and was very different from the first one. This difference he attributed to the small quantity of bromide liberated in the solution by the development of the two first prints.

Mr. Atkinson showed a print made thirty-two years ago on ordinary dull paper. There was no sign of fading.

The CHAIRMAN remarked that the print was unmounted, and many instances showed the greater safety of those compared with mounted prints. He also thought that the print looked as if it had been toned with *sel d'or*.

Mr. ATKINSON said that it had been so toned.

The CHAIRMAN said that that process tended greatly to permanency of result. Albumen prints did not readily yield to the *sel d'or* bath, otherwise they might not have heard so much of the fading of photographs.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 20.—Mr. A. Haddon in the chair.

Mr. J. B. B. Wellington showed two unopened bottles of eikonogen, one of which showed the contents to be of the original nearly white colour, whilst in the other bottle there was a decided discoloration. It was observed, however, that this discoloration appeared to exist only on the surfaces and in the interstices of the crystals, and it was thought that it would not be sufficient to affect its action as a developer, although the Chairman and Mr. A. Cowan, in answer to a question as to whether a decided change of colour in eikonogen is prejudicial, replied in the affirmative.

The CHAIRMAN had repeated Mr. Cowan's experiments with eikonogen mixed with sulphite of soda, both in the powdered state. Some of this mixture he had enclosed in a sealed tube and found it retain its whiteness. He had also mixed eikonogen with sulphite and carbonate of soda, and in this case the powder darkened rapidly. From this he inferred that the sulphite used by Mr. Cowan was decidedly alkaline, and that would account for the ready way in which Mr. Cowan's sulphite developed with pyro without further addition of alkali.

Mr. R. P. DRAGE was still using some of the eikonogen as originally supplied in powder; it was dark in colour, but he did not find it any the worse in its action.

Mr. COWAN then showed the results of some experiments in developing bromide paper. A number of examples printed from the same negative were handed round and the opinion of members requested as to which was best. The prints selected proved to have been developed with eikonogen, four grains; sulphite of soda, thirty-two grains; and carbonate of potash, two grains to the ounce. Hydroquinone he had found to possess the power of giving extreme density, and it might be advantageously employed for thin negatives. The formula he had used was hydroquinone, two grains; and carbonate of potash, ten grains to the ounce.

Mr. T. E. FRESHWATER had also found eikonogen very satisfactory for developing bromide prints. He had used the same solution for developing four or five lantern slides in succession and had then used it for four pieces of bromide paper.

Mr. DRAGE showed a plate covered with fine lines like cracks, which, on examination, showed as rows of transparent spots. The general opinion was that this was due to air bubbles during development.

CAMERA CLUB.

ON Thursday, February 20, a paper communicated by Mr. W. K. Burton was the subject for discussion at the Club. The title of the paper was *One or two of the Tenets of the Naturalists*. Mr. A. Pringle read the paper. Mr. W. A. Greene occupied the chair.

Mr. BURTON in his paper took the view that any want of sharpness in the principal objects or plane, and any falling off away from the centre of interest in the different planes could not be depended upon optical principles, but that, on the other hand, those principles would appear to demand that planes, other than the plane of chief interest, should be less perfectly defined. He further referred to the subject of imagination in the pictorial arts, and to the possibility of introducing it in photographic work.

The discussion was opened by a paper read by Mr. G. DAVISON, in which he observed that the variation in focus of different planes admitted and argued by Mr. Burton was one of the chief contentions of those called naturalistics. He thought it was more a matter of the mental attitude whether representations should be sharp or not. A definite detailed examination of nature was the scientific, not the artistic, attitude. He thought imagination could not be expected to supply the truth of representation—an analytical, not a realistic representation—in which lay the thrilling charm experienced by an artistic perception of a beautiful scene in nature.

An animated discussion was carried on by Messrs. Shipton, Humphery, Sturmey, Pringle, Clift, Davison, Maskell, Jerome Harrison, and the Chairman. A letter from Mr. Graham Balfour upon the subject was also read.

On Thursday, March 6, Mr. Pringle will treat of the subject, *The Optical Lantern*. Meeting at eight p.m.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 18.—Mr. A. Mackie in the chair.

The SECRETARY reported that all the arrangements for the *conversazione* at Northampton House on March 4 were now complete. There would be a good exhibition of pictures, both of members' work and also from outside. An excellent concert had been arranged, and this would be followed by an excellent exhibition of selected slides by the members. As the tickets were strictly limited, members present were requested, if they had not already sent in their application for tickets, to give their names to the Secretary after the meeting. It was announced that Mr. Bishop was having his lantern specially prepared for the occasion, and had kindly undertaken the entire management of that part of the evening's proceedings.

This being a technical night, the CHAIRMAN asked if any members had brought any specimens of work or were prepared with any questions upon difficulties, &c.

Mr. L. MEDLAND having been asked respecting the manner in which he had secured the opening slide in his lecture on *A Day at the Zoological Gardens*, which consisted of himself and of a lion couchant by the side of a lake in Epping Forest, said he had brought the original half-plate picture with him. It was a composition picture, in which the figure of himself and that of the lion had been cut out from other pictures and pasted in position on a scene in Epping Forest. The edges of each picture having been nicely thinned down with a sharp knife, the picture when copied showed no signs, even in the lantern, of being a composition picture.

Mr. A. E. Smith showed a Tylar's window shutter which he had had specially made for him.

Mr. J. OAKLEY asked if the working of such a shutter did not shake the camera.

Mr. SMITH produced a print taken with it, and in this there was certainly evidence of a move, but he thought this was not due to the shutter, but to movement in the figure itself.

Mr. W. T. COVENTON then showed a jug which he had procured in which to mix hot solutions. It was an enamelled white earthenware jug with a handle which he had procured, not from a photographic dealer's, but from Maw & Sons, and was marked in black figures inside with the ordinary ounce, half, and quarter marks.

Mr. MACKIE suggested that an ordinary glass jug, costing 7*d.*, to hold about a quart, answered every purpose, and could be marked outside. Of course, in using it for hot solutions the jug should be warmed first.

Mr. MEDLAND asked as to the best way to reduce a half-plate or other large negative to magic lantern size by night.

One member had occasionally done this by placing a sheet of white paper at an angle behind the negative, and throwing the light of a short length of magnesium ribbon upon it found the reflected light from the paper sufficient to copy the picture. Another member had tried this method and found the illumination very equal. A third member had used an arrangement which, although now called Griffith's patent, he thought was very old. It consisted of a long box with negative at one end and the lantern slide at the other; the lens was between the two. Ground glass was placed behind the negative to diffuse the light, and with eighteen inches of magnesium wire and stop *f*-32 he found the exposure was right with an ordinary negative. With this arrangement no focussing was required if the respective distances between the lens and plates were marked upon the box.

Mr. J. TRAILL TAYLOR said that a good arrangement was that of placing a sheet of ground glass at a little distance behind the negative. Two sheets were better than one. Then arrange three or four gas burners towards the margin of the plates, and if it was not possible to have gas or magnesium ribbon, then common candles or paraffin lamps would do as well.

Mr. F. G. READER had found parchment paper a good diffuser of light. He had tried large lenses to condense the light upon the negative, but found the exposure very much too long.

The SECRETARY said he did a great deal of copying at night by letting the light from his Triplexicon lantern condenser fall on the picture at an angle on one side and the light from a large gas burner at an angle on the other, then, by arranging a sheet of waterproofing in front, so that no direct light from these sources fell upon the lens, he found that all reflection was destroyed, the grain of the paper was not shown, and he had practically such an arrangement as Mr. Armstrong had described in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY.

Mr. TAYLOR said he had been trying the night before a new arrangement which had been sent to him; this was Hume's Cantilever enlarging apparatus. The light was simply a paraffin lamp. The condenser was five inches, and the lens a 1*n* portrait. Copying a quarter-plate its own size with stop *f*-4, he found that with an almost instantaneous exposure the plate was over-done. He did not, however, throw it away, but placed it in a reducer consisting of bichromate of potash and sulphuric acid—about two or three drops of the latter. Leaving it for a short time, he found upon his return that the figure had well-nigh disappeared.

Mr. MEDLAND: Could you make the picture reappear?

Mr. TAYLOR: Yes; the surface had become so disintegrated by the action of the reducer that you could, by inking it, almost take a print of it. The influence of bichromate of potash mixed with certain acids was something wonderful. In the old collodion days this was taken advantage of for producing a certain class of picture. He had been enlarging certain fleas and bugs up to lantern size, and the figures were densely black. The plate was reduced and whitened by this method, and being subsequently treated with Schlippe's salt, they were of natural colour, and were fearful and wonderful to behold. The solution must be employed very weak.

Mr. MEDLAND: Has any member used peroxide of hydrogen for taking out stains? If so, what strength has been used? I have tried to remove a stain from an intensified negative by its means, but have not been successful.

Mr. MACKIE had not tried it, but said it was a most wonderful bleaching agent. It is not sold at various strengths, but as of so many volumes.

Mr. COVENTON: What is the best means of copying an old glass positive?

Mr. MACKIE: Nothing is easier to copy than a glass positive. By placing the camera and illuminating agent so that no reflection is seen a copy can be made quite equal to the original. It is best to place the picture by the side of a window.

One member had removed the backing and, placing it in a frame, had printed it out.

Mr. OAKLEY had removed the backing and printed from it equal to any negative.

The SECRETARY said that by illuminating the positive in the manner he had described before, a perfect copy could be made by artificial light; the grain was so very fine in glass positives, if there could be said to be any grain at all, that the resulting copy could be made equal, if not better, than the original.

A member asked if in using the mixture of bichromate and potash as a reducer was the acid of any use.

Mr. MACKIE: The bichromate has no action without the acid. You get practically clear glass with bichromate.

Mr. TAYLOR: Bichromate has a very useful function, and upon this use I am now experimenting. It will remove the effects of light upon a plate. Supposing a plate to have been what we may call light-struck, *i.e.*, by leaving a box of plates open in the dark room, or by exposure to daylight, &c., then by immersing the plate in a weak solution of bichromate, and afterwards washing it thoroughly and drying it, it will be found that the plate can be exposed in the usual manner; it may be a little slower, perhaps no slower at all. Even if a plate has just come from the makers and been exposed upon a subject, if there is cause to think it has been wrongly exposed or the subject has moved, the plate may be taken into the dark room and, treated in this manner, will be found to be restored to its pristine state.

Mr. MEDLAND: Is there no limit to the time it may have been exposed?

Mr. TAYLOR: I do not think so; but I am experimenting in this direction, and have a plate ready for trial at home which has been exposed for some hours to weak daylight.

A member: Has any one tried to tone Obernetter's paper with the borax bath?

One member had tried it, but could get no result; another had tried it very successfully by using three grains of gold to ten ounces of solution and more borax.

Mr. MACKIE: There is nothing equal to sulphocyanide of ammonium for toning gelatine papers.

Mr. TAYLOR said he would give a hint *re* the use of alkaline and of silver developers. He had been taking a shot at some workmen in front of his office; they moved, so he gave the plate eight or ten times the exposure upon another subject. Upon development with an acid and silver pyro solution he found no trace of the first exposure. In the old collodion days the developer used consisted of pyrogallic acid, citric acid, and silver. The plate had been exposed in the first case for an alkaline development, and this goes for nothing when using the silver developer. Another advantage he might point out in using the bichromate restorer was that two or three exposures might be made upon the same plate and the effects of all of them might be undone.

Mr. MACKIE: Be very careful to wash well after each immersion in the bichromate and use about a five per cent. solution. Three per cent. was used for carbon printing.

Mr. READER: When a plate has been intensified with bichloride of mercury and ammonia and thoroughly washed, is the surface still poisonous?

Mr. TAYLOR: Certainly not.

Mr. PARFITT: Was not bichromate of potash recommended in an American formula for developing?

Mr. MACKIE: Perhaps it was not known that the most poisonous acid in use by photographers was pyrogallic; it acts the same as phosphorus.

Mr. COVENTON had seen it stated that this acid was used as medicine.

Mr. MACKIE: A great many things are used as medicines that yet in their composition are most poisonous.

Mr. TAYLOR: In the days of the Photographic Society of Scotland he had used tannin as a developer with success. From developers to flash-light compounds was, perhaps, a long fetch, but he wished to draw the members' attention to the fact that picric acid had been used in America to make a flash compound, and that, in pouring it away, one to one and a half pounds had exploded and killed several persons.

Mr. PARFITT: Has the late explosion of a gas cylinder in Scotland been satisfactorily explained?

Mr. TAYLOR: It is said to have been so, but he was not entirely satisfied with the explanation. The hydrogen had been practically let out and the oxygen pumped in. The proportion of hydrogen to oxygen in a six-foot cylinder must now have been exceedingly small. The oxygen being pumped in under a great pressure, the cylinder was necessarily very hot. The manager says that when the end was let down upon the ground the cylinder exploded. Was it the heat which caused some metallic or other dust inside the cylinder to become red hot, assuming the presence of such metallic dust in the cylinder? The proportion of hydrogen appeared so small that the mixture might have been thought to have become practically non-explosive? It seemed to him that there must have been more hydrogen in the bottle than had been imagined.

Mr. READER said that the bottle could not have been very hot or the man could not have carried it.

Mr. TAYLOR said there was one consolation to consumers, viz., that if the explosion was caused by the heat of the cylinder no explosion from this cause could take place after the cylinder left the works. One of their own Society's bottles had burst whilst being tested at Brin's, but this was, no doubt, caused by the bottle having been tested far beyond what it would have ever been called upon to bear in ordinary use.

Mr. MACKIE said that the bottle belonging to this Society which had been burst was very large and cumbersome, but the Society never put more than twenty feet of gas into it, its capacity being from sixty to eighty feet. Brin's Company had tested it up to one ton, and it consequently burst. He had never heard of an explosion from the pressure of gas inside, but always from applied light.

Mr. GROVER thought that an explosion might occur from a jar to the cylinder; he thought he had heard of such cases.

Mr. MACKIE had read that the army used such cylinders in Egypt, and that they had been rolled down hills and over precipices, and never burst.

Mr. PARFITT: What are modern bottles made of?

Mr. MACKIE: Of the best steel.

Mr. MEDLAND: Has any one seen the new benzoline saturator, and what kind of light does it give? Is it preferable to the ether saturator? He had used the latter at a lecture in Norfolk, and found the light almost too powerful for the slides which he had prepared for the limelight. It would have done for much denser pictures.

Mr. TAYLOR: There is a new oil about to be placed in the market which comes from Paris. The firm's traveller placed statistics before me this week. The oil is similar to paraffin but a little thicker. It does not spread over the lamp like petroleum or make an offensive smell. The light is from three to five times the intensity of ordinary paraffin oil.

Mr. GROVER had tried an oil from the Vaseline Oil Stores which gave no smell.

Mr. COVENTON: This is Luxor oil, and keeps the lamp clean and does not smell.

Mr. MACKIE: The secret of keeping down offensive smells from any oil is to keep the outside of the lamp clean.

Mr. MEDLAND: Camphor purifies the oil.

Mr. MACKIE: Camphor gives a carbon light, and probably alko-carbon dissolved in paraffin would give a pure and powerful light.

A long discussion then took place on various lights and the arrangement of wicks.

Mr. GROVER described the powerful light used by builders &c., for night work. He said the material used was the common refuse from the gasworks It was improved by the admixture of a certain amount of water, and produced flames up to three or four feet long. The old Lucigen greases everything around it.

The next meeting of the Society at Myddelton Hall will be on Tuesday, March 18, the President (Mr. J. Traill Taylor) in the chair, when a demonstration will be given by the Britannia Works Company on *Printing on Alpha and Bromide Papers*. Members are requested to notice that this demonstration is on March 18, and not April 18, as has been announced in error.

THE LANTERN SOCIETY.

A LARGELY attended meeting of those interested in the formation of a lantern society was held at St. James's Hall (Upper Regent Saloon) on Thursday, February 20.

After a brief discussion, it was decided to form such a society; and it was resolved that it should be known as "The Lantern Society."

The Hon. Slingsby Bethell, of Chelsea Lodge, Chelsea Embankment, was elected Provisional Chairman; and Mr. T. H. Holding, 46, Chesilton-road, Munster Park, S.W., as Secretary, *pro. tem.*, together with a Committee of seven to frame rules, the latter body consisting of Messrs. E. R. Shipton, A. Mackie, G. B. Creswell, Lieut. C. E. Gladstone, R.N., A. R. Sheppe, together with the Chairman and Secretary.

Any of the above will be pleased to receive applicants for membership.

HOLBORN CAMERA CLUB.

FEBRUARY 21.—Mr. Chang (who presided) presented two framed prints and two lantern slides of the recent flash-light exposures made by him.

Two new members were then enrolled.

Mr. E. CLIFTON then gave a lecture on *Carbon Printing*, and produced some very successful results on opal, especially considering the fact that, owing to the fog, all the prints had to be made by electric light.

Friday next, monthly lantern night, *Illustrated Boston* slides will be shown. Visitors will be welcome.

It is specially requested that all pictures and slides for the Club exhibition will be sent in as early as possible, Thursday for preference, when members of the Committee will be present to receive them.

Club exhibition and Cinderella dance, Saturday, March 1, at Anderton's Hotel, at eight o'clock, when all members, with "their sisters, their cousins, and their aunts," are expected to be present.

MANCHESTER PHOTOGRAPHIC SOCIETY.

FEBRUARY 13,—Mr. T. R. Cobley in the chair.

Minutes passed, the following were elected members:—Messrs. Heman Woolley, Broadbent, and Mounsey. It was announced that the President (Sir Henry E. Roscoe, M.P.) and the Hon. Secretary (Mr. W. I. Chadwick) had been elected hon. members of the Manchester Amateur Photographic Society.

A communication was read from the Hon. Local Secretary of the Convention to be held in Chester during the present year.

It was decided that the Society as a body be not associated with the Convention, leaving members who felt so disposed to join on their own account, and several of those present promised to do so.

The principal business of the evening was an exhibition of lantern slides, the work of members, sent in competition for a prize to take the form of a good autotype, or something similar ("medals" not being appreciated).

Sixteen lots of six slides each had been sent in on the previous Monday. The whole of them were forwarded to the President of the Liverpool Amateur Photographic Society (Mr. Paul Lange) for adjudication. Mr. Lange, with two other members, after seeing the slides on the screen, made their award, and, in accordance with instructions, addressed it to the Chairman of this meeting.

The slides (ninety-six) were now placed upon the screen, after which the

award was opened and read as follows in the order of merit:—1st. W. G. Crote: 2nd. H. M. Whitefield; 3rd. W. Schofield (Oldham); 4th. F. W. Burt. The award gave the utmost satisfaction, and a cordial vote of thanks was passed to the adjudicators.

Mr. H. M. WHITEFIELD suggested that additional interest in Society competitions would be taken by members if a system of classification could be adopted, which, without specially selecting individuals, would separate competitors into two or more grades, whereby less experienced members should not be placed in competition with well-known skilful gentlemen, who would, naturally, take first rank; but with gentlemen possessing similar ability to their own, or at least the *average competitor*, whatever number may have entered for competition. Thus, if there were twenty-five entries, the Judges should be requested to place the first thirteen in order of merit, and name the first and thirteenth; the latter would be the average competitor and first in the second grade or class. If only ten gentlemen entered, then the sixth would be the first in the second class. Of course, in both examples number one would be first in the first class.

The result would be that although every one would have to do his best to obtain first place in one or the other class, yet the less skilful would not be forced into close competition with those who had great experience, and who would certainly excel them; at the same time no invidious selection of individuals would be made. On the other hand, experienced but weak-minded members who feared they might not obtain the first position would be prevented from aiming at the second award by lowering the quality of their work to a supposed average merit by the absolute uncertainty of the number of competitors, which could only be known when the exhibits were actually sent in.

A considerably extended discussion followed, and many objections were raised to the method suggested by Mr. Whitefield, but no conclusion was arrived at.

PHOTOGRAPHIC SOCIETY OF JAPAN.

A MEETING of the Photographic Society of Japan was held at the Chamber of Commerce rooms, Tokyo, on December 12, at half-past four.

The following gentlemen were unanimously elected as members of the Society:—Dr. G. Wagener, Messrs. Tamamura, Katzuro Takenouchi, E. H. R. Mosley, and J. P. Cockburn.

Objection had been taken to a certain proposed member on account of his having copied without permission, and sold, the pictures of a member of the Society. An explanation which was satisfactory both to the objecting member and to the Society was given, but the following resolution, proposed by Mr. E. R. Holtzapffel, and seconded by Mr. Pantazzi, was unanimously passed:—"That this Society discountenance, by all means in its power, the practice of copying the photographs of other artists for sale, and that, if the practice be continued, the Society take into consideration the desirability of making a bye-law whereby such practice shall, *ipso facto*, exclude from membership of the Society."

Mr. K. Ogawa exhibited the enlarged camera with which he made photographs direct, measuring thirty-eight by thirty inches, for the forthcoming exhibition, and an enormous tripod intended to be used with it in photographing interiors. The top of the tripod reached the roof of the hall. A monster printing frame for making the pictures on paper, measuring four feet six inches by three feet six inches, was also shown.

Mr. Kinsuke showed the Kodak, the smallest of the numerous hand cameras now so popular, and Mr. Kajima some very beautiful opalotypes done on opal glass that had been coated with emulsion in Japan.

Mr. W. K. BURTON read a paper on *Eikonogen*, the new developer. The results of his experiments had certainly been to make him conclude that the developer had good qualities, but he considered the claims made by the makers to be quite extravagant. On the whole, Mr. Burton doubted if it would oust our old friend pyrogallic acid.

After the ordinary meeting was concluded, a special meeting was held, and Messrs. J. Johnston and F. Walkinshaw were elected members of Committee. Mr. A. J. Hill was elected Foreign Treasurer.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

ONE-HUNDREDTH OF AN INCH.

To the EDITOR.

SIR,—Mr. T. R. Dallmeyer's charge against me of contortion of meaning will, I should say, only rebound upon himself in the estimation of those who follow the discussion. I believe that I have used only arguments that are perfectly fair, and as to his complaint that I ought, in quoting from him, to have italicised a word which he did not italicise himself, I can only say that had I done as he suggests, I should have laid myself really open to some charge of contortion of meaning such as at present cannot truly be made.

The initial weakness in such tables as those under discussion, is that of assuming as a constant that which is essentially a variable. Thus the question of any particular size of circle of confusion as undistinguishable from the sharpness of a point, is dependent upon many variables, such as the distance from the eye, the sharpness of sight of the observer, and the nature of the subject itself. Taking the first of these only, Captain Abney, in referring to Dallmeyer's table, mentions a distance of from forty to fifty centimetres—about sixteen to twenty inches. Mr. T. R. Dallmeyer, in his former letter, speaks of the original table as exact for a distance of seventeen inches. In his last letter he quotes the ordinary distance of vision as being from twelve to fifteen inches. I have always seen the distance of distinct vision put decidedly less than this. Ganot, edition 1883 (Atkinson), says: "For small objects, such as print, it is from ten to twelve inches in normal cases."

Considering, then, that the distance of observation may vary according to the different authorities from ten inches to twenty, each gradation of distance calling for a different size as that of permissible circle of confusion; considering, too, that in consequence of curvature of field, or other failings inherent in most, if not all, photographic lenses, the figures given in any table would again have to be altered for all but the centre of the field, and considering other things, not necessary to recapitulate here, such tables as those under discussion appear to me to be for general purposes useless. When, as in the case of the particular one to which I referred, the one-hundredth of an inch is given as applicable to all lenses, and there is no suggestion in the table or paper accompanying it that the one-hundredth of an inch and the other figures must be taken subject to such continual variations as those suggested by Mr. Dallmeyer in his former letter and others as I have pointed out, it seems to be not only useless but misleading and absurd.

Mr. Dallmeyer is, I think, very injudicious to introduce the subject of the controversy on depth of focus into the present discussion. In that controversy I have always maintained that the claim made for increase of definition in the out-of-focus planes, when the real focus is sacrificed to spherical aberration, is a claim without foundation and contrary to the fact. Mr. Dallmeyer, I consider, in reality yielded the point when he said that the definition was made worse on one side of the focal plane and better on the other. Even if this latter claim were proved or admitted, the countervailing loss of sharpness in the other direction reminds one of the man who, finding his blanket short and his feet cold, cut off a piece from the top and sewed it on at the bottom.—I am, yours, &c.,

W. E. DEBENHAM.

P.S.—Mr. Dallmeyer tells me to study Abney's *Instruction in Photography*. It is just possible that I may be as well acquainted with that work as Mr. Dallmeyer himself. If I find it desirable to refer to an authority, as Ganot, for instance, I am content to do so without assuming ignorance on Mr. Dallmeyer's part and directing him to study it.

COMPOUND GAS IN CYLINDERS.

To the EDITOR.

SIR,—In reply to the letter of Mr. Hester published in your issue of the 21st instant, I do not make such statements as those contained in my letter published in these columns of the 14th instant unless I know them to be authentic.

I may say, that three days after my letter referred to was posted, I was informed that the Brin Oxygen Company, and the other Companies working the process, had just decided to make "some alteration" in the thread of the hydrogen cylinders, but what that alteration was to be was not stated.

Of course, the *left*-hand thread for hydrogen cylinders practically comes under my suggestion, and this alteration, if properly carried out, will prevent the accidental mixing of the gases; but it may lead to trouble, mistakes, and disappointments by the users, who, in hundreds of cases, will be unable to distinguish the difference between *right* and *left*-hand threads of the same diameter, especially when they are internal threads.

If, then, the wrong fittings are taken by mistake, they wont fit, and there can be no accidents, but cases may arise where there can be *no exhibition*. If the screws were of a different diameter, they might be made as easily distinguished as a sixpenny piece is from a shilling.

I should also state that the Manchester Oxygen Company (the Company from whom I obtain my gas supply) have recently adopted the relief valve (safety valve), and there is now no fear of any cylinders being over-charged.

W. I. CHADWICK.

CARBONATE OF SODA AS A DESICCATING AGENT.

To the EDITOR.

SIR,—I think I can show that the objections made in your article last week to my suggestion for the employment of *dried* carbonate of soda are a little imaginary. The name or description employed is that by which the substance is most commonly known to ordinary chemists, and is official in the *British Pharmacopœia*.

I did not contemplate a chemical analysis, and fail to see the slightest necessity for "ignition" in the case of carbonate of soda any more than for chloride of calcium. As a matter of fact, instead of the formidable crucible, any pie-dish and kitchen-oven will answer admirably, and the material being always at hand, I certainly think, even if only second best, it may be useful. Although common washing soda, well baked, will answer the purpose, it is easier and preferable to start with the bicarbonate. This, if roasted with your dinner, will give off carbonic acid and a little water, leaving carbonate of soda practically anhydrous. I may mention that I have previously recommended this method as an easy and economical way of obtaining pure carbonate of soda for use with the developer, using about one-third the quantity in place of the usual. crystals. Fairly pure bicarbonate of soda is now manufactured very cheaply, and as it can be obtained from any chemist or grocer, is readily available.

Some months ago I roasted one pound of bicarbonate in the oven, and found it lost the theoretical amount, the result weighing a little over ten

ounces. I placed this in a very damp cellar, where it has remained in the dish until now. On again weighing, I find that, although apparently dry, it weighs twenty-five and a quarter ounces, having absorbed and solidified fifteen ounces of water. This is perhaps an extreme illustration, but it answers my purpose. I may further state that on replacing in the oven, it first melted, and ultimately dried up to its original weight of ten and a quarter ounces.

I entirely fail to understand the logic of your correspondents who point out the fact that *crystals* of carbonate of soda effloresce. I am not advocating the employment of such; and it must be remembered that the effloresced carbonate still retains much water of crystallisation, which, if driven off by heat, will certainly be reabsorbed at the first opportunity.

I still adhere to my theory of the preservative action of the carbonate with blotting paper, and believe this will only be found effective as the heat employed to dry the paper has partially dehydrated the carbonate. If I am correct, paper soaked in solution of sulphate of soda and dried by heat would be similarly useful, and in both cases experiment will prove the accuracy or otherwise of my notion. I imagine if carbonate paper be dried spontaneously, and without heat, it will be found the reverse of preservative.

I apologise for troubling you at such length, but felt called upon to supply the "stronger arguments" in favour of my suggestion, and thank you for the opportunity of doing so.—I am, yours, &c.,

Scarborough. JOHN WHITFIELD, F.C.S.

[Starting from the "dried" carbonate of soda, the question is, which is the cheaper and more convenient—efficiency taken into consideration, of course—carbonate of soda or chloride of calcium? A simple experiment will prove, we think, that the latter, which can be obtained at about the same price as, or little more than, the bicarbonate, will do vastly more work. So why change?—ED.]

MR. G. D. MACDOUGALD ON STEREOSCOPIC VISION.

To the EDITOR.

SIR,—Mr. G. D. Macdougald, in his communication to the Dundee and East of Scotland Photographic Association has, while trying to combat some statements alleged to have been made by me, so completely overlooked my real position in the matter, and has made so many statements, the absurdity of which he might have seen had he consulted the most elementary class-books, that I might well pass his remarks unheeded. Still it may be well to point out some matters, not of opinion at all, but perfectly well known to every beginner in optical science, and perfectly clearly laid down by every writer who within many years has treated the subject of stereoscopic vision.

In the first place, I suppose I must once more point out that the origin of the discussion was a remark by "F. M. S." in *Photography*, May 9, 1889, touching stereoscopic photography *in its relation to art*. I have never denied the scientific uses of the stereoscope, on the contrary, I did them full justice. My point all along has been that stereoscopicity is no attribute, much less essential, of art. But to turn to Mr. Macdougald's optical utterances.

He begins with the old story of stereoscopic vision by squinting. That is right enough for those who can do it—probably not one in 1000 without being educated up to it. Mr. Macdougald's alternative method is to "look at the right picture with the right eye, and the left in like manner with the left." He admits that personally he cannot do it; well, so far as stereoscopicity goes, in which his soul delights, his inability is no loss, for there is no stereoscopic vision in such a case. (Text-books *passim*.)

"It is surely more natural to look at a double pictorial representation than at a single." (Macdougald.) "When a body of moderate size, ascertained by touch to be solid, is viewed with both eyes, the images of it formed by the two eyes are necessarily different. . . . Nevertheless, they coalesce into a common image which gives the impression of solidity." (Huxley, *Elementary Physiology*.) "We have two eyes, most of us, but we do not, under normal conditions of diet, *see double*." (Pringle.)

Mr. Macdougald writes, that it appears that "Mr. Pringle labours under the impression that binocular vision—that is, vision giving the appearance of solidity—requires that each eye looks at the object from a different standpoint." I confess I am under that impression, but find no "labour" in comprehending the truth, nor in agreeing with every text-book on the subject that I can find. Without the sense of touch, and without two eyes, we cannot have the impression of solidity, nor of relative distances. I should like Mr. Macdougald to explain how two eyes can look at an object simultaneously from the *same* standpoint. "One may mount two prints from the same negative," says Mr. Macdougald, "and such prints will give the appearance of solidity when viewed either by the unaided eye in the manner above mentioned, or through the stereoscope." Here is news indeed! but if there were the slightest foundation for such an assertion, who so foolish as to carry a stereo-camera and make stereo-negatives when single ones will do? If Mr. Macdougald will consult "Hardwich and Taylor," or indeed any class-book on optics, he may derive some benefit.

On the binocular microscope, as proof of his theory, Mr. Macdougald surpasses himself. "The binocular microscope," he says, makes it "at once apparent that the appearance of solidity or stereoscopic impression does not rest on the fact of each eye having a picture for itself." Well, I always thought it did exactly rest on that fact. If Mr. Macdougald ever used a binocular microscope it is very strange that he did not notice that not only does each eye see the image projected by *one-half* of the objective, but by means of a prism the image projected by the right half of the objective is projected to the left eye, while the right eye views the image projected by the left portion of the objective; and, further, when the instrument is so arranged that the right eye looks through the right half of the objective, and *vice versâ*, the image is not seen stereoscopically but pseudoscopically. (Another death blow to the second alternative method of seeing stereoscopically with the unaided eye mentioned above.) The binocular microscope, in fact, furnishes a complete refutation of nearly every sentence on stereoscopic vision in Mr. Macdougald's paper with which he regaled the Dundee Society. (See "Carpenter," and any other text-book on the microscope.)

Mr. Macdougald says I "dislike" the "small hole trick." This is proof that he has not carefully read what I wrote. I expressed neither liking nor dislike of it. He refers the impression of solidity obtained by the "small hole trick" to suppression of surface on the picture. I do not believe in this theory of his at all; I attribute the illusion to brain-action chiefly. But till the elements are mastered there is not much use discussing more difficult matters. Mr. Macdougald says, "In what, then, does stereoscopic vision consist? That is a very difficult question to answer." Possibly, but it is answered for us, even if we are incompetent to work it out for ourselves, in every treatise on elementary optics with any pretension to completeness.

I omit notice of the bantering tone of Mr. Macdougald's paper. No doubt it may have amused such of his hearers as were unaware of the extraordinary weakness of his arguments, and his entire misapprehension of stereoscopic optics.

I also reserve further comment on the fact that in my original article (*Photography*, June 13, 1889) I dealt with stereoscopicity as related to art. I said, and I say, solidity is not art, nor is art illusion.—I am, yours, &c.,

ANDREW PRINGLE.

OXYGEN GAS MAKING.

To the EDITOR.

SIR,—Now that the question of "Gas Bags *versus* Cylinders" is being ventilated, as a result of the recent disastrous explosion of a gas cylinder, it may be well to devote attention to the entire question of oxygen gas for lantern purposes, with a view to removing the suspicion existing in many minds as to the danger of the various processes and the conditions under which perfect safety may be attained.

While my impression is that, from their great convenience and other advantages, the system of compressed gases will eventually command entire possession of the field, it must not be forgotten that there are still those living in isolated districts, and not easily served by the cylinder system, who adhere to the usual method hitherto adopted for producing their bag of oxygen.

A friend of mine has recently met with a serious accident by the explosion of his retort, which shattered his right hand and has, probably, partially disabled him for life. He draws my attention to a paragraph, which I enclose (and which you may, perhaps, introduce), in which it is argued that the danger is not apparently confined to novices, but that presumably the professor, who was the chief sufferer, was perfectly aware of the nature of the ingredients he was handling. Possibly some amongst your numerous correspondents may, with your permission, give the result of their experience, with a view to restoring confidence in the process. I have my own theory with regard to the matter, but prefer at present waiting the result of this inquiry.—I am, yours, &c., E. BAKER.

86, *Fisherton-street, Salisbury.*

[The paragraph referred to is as follows:—

"A serious accident is reported from Bloomington, Illinois, U.S.A. A lecture on chemistry was being given at the high school there, when a retort in which oxygen gas was being made for a certain experiment exploded. The professor was terribly burned, especially about the face, and it is feared that he may lose his sight. Furthermore, twenty of the boys and girls who were scholars of the school and were gathered round the platform were injured, three of them seriously."

On this subject we shall have something to say on an early occasion.—ED.]

POLISHING PHOTOGRAPHS.

To the EDITOR.

SIR,—I have received many valuable hints and have been much benefited by reading your esteemed JOURNAL. I have often thought how very unselfish many of your correspondents are in giving to the public, through the "Correspondence Column" and elsewhere in the JOURNAL, useful hints which have cost them very likely a good amount of hard cash as well as anxious hours, and with your kind permission I should like to add my mite by helping "G. H. A." out of his burnishing difficulties. I have passed through the same disappointing and vexing hardships as he mentions, but have arrived at the stage when I can finish to any amount with pleasure, so am able to speak with confidence

Buy a quarter of a pound of best pure white curd soap (not Castile), then take a piece of soft flannel, rub it over the soap a few times, and then rub the print before it gets bone dry, at the same time let the burnisher be getting hot, and sometimes wipe the moist off the roller to prevent it wetting the bar; heat the bar until the roller is quite dry and the bar so hot that it cannot be touched with the thumb; by this time all the prints will have been lubricated with the dry soap, and will be ready for rolling. Take the bar out when hot enough and clean it with a piece of fine emery cloth, of course rubbing it lengthwise; put it in its place and take an old print to test its tightness; screw as tight as possible to admit of the print pulling nicely through. Sometimes the roller gets slippery and does not draw the prints through; when so, take a file and draw it lengthwise over the roller, turning it the while.

Attention to these points, and all difficulties will be at an end.

Alston, February 25, 1890. T. BRAMWELL.

To the EDITOR.

SIR,—In your last issue one of your correspondents stated that he had a difficulty in obtaining a polish on his photographs, and wished for advice. If he follows out the subjoined instructions he ought to have no difficulty in securing a most brilliant surface.—I am, yours, &c.,

The Promenade Studio, Graham-street, Penrith, Cum., Feb. 24, 1890. HERBERT WELFORD.

Into a ten or twelve-ounce bottle pour eight or ten ounces of methylated spirit (pure), take a piece of *white curd soap* (not Castile) and pare it very fine, add about an ounce and a half of it to the spirit, shake well for some time, and then allow the soap to settle down. In about an hour or so it will be ready for use. Decant off sufficient for the prints to be burnished, and apply with a soft sponge. The prints ought not to be quite dry, but slightly damp from the mounting. (Be careful about this: if the prints are too dry they will not polish well; if too damp the paper will peel off the card, or else wrinkle). When the spirit has dried off, rub the cards gently with a silk handkerchief. Each one must be done separately. They are then ready for the burnisher, which ought to be heating for ten or fifteen minutes before it is wanted. Polish the steel bar with fine emery cloth, thoroughly clean it from particles of grit, and then adjust it to the thickness of the cards. There must be a distinct pressure, so as to carry the card through easily and without slipping; experience will soon teach the right amount of pressure required. Pass the cards backwards and forwards several times, and the polish will be enhanced if a slight convex curve is given to the photograph by pressing it to the roller in the last two turns. The card will slowly regain its straight surface, and will retain the extra polish acquired by curving it. When carried out properly this method never fails.

SCIENCE AT "SEA."—A NOVEL MEETING.

To the EDITOR.

SIR,—I was attracted by a notice at the top of the companion-stairs on board the R. M. S. P. Co.'s ship *Orinoco* asking all the ladies and gentlemen passengers interested in photography to meet in the dining saloon the following afternoon to discuss photographic matters. At the appointed time I made my way to the saloon, when, to my surprise, I found the tables all over the cabin with cameras to the right and cameras to the left, stands and shutters of all makes, examples of photography of all kinds and in all stages of progress; in fact, a veritable exhibition. The chair was taken by Mr. Charles Levy, of Jamaica, a gentleman who has just joined the ranks of amateurs. He opened the meeting as follows:—

"LADIES AND GENTLEMEN,—It is fortunate for myself, and perhaps still more fortunate for you, that the duties of a Chairman are simple and limited in the extreme, and you need, therefore, feel no apprehension of being inflicted with a long speech from me; but even did I feel any tendency in this direction, I have been requested in photographic language, by a young lady whose mandate is irresistible, to adopt the 'rapid process,' and quickly apply 'the shutter.' Little, however, as I may have to say, I feel it incumbent on me in the first place to express my great appreciation of the compliment for which you have selected me in calling on me to fill the chair at this scientific meeting, where looking around me there are so many more capable and worthy of this distinction.

"You are all no doubt aware that this meeting has been convened at the instance of Messrs. Henderson and York, two gentlemen who have devoted many years of labour to the study and advancement of the art of photography, and who are desirous of exchanging ideas with any amateurs present, and from whom in return we will no doubt gain much useful information and addition to our stock."

The Chairman then called on Mr. York to explain the peculiar features of the various cameras, shutters, &c. He described the very portable and ingenious detective supplied by Mr. Abrahams, carrying eighteen plates in shields, with all the automatic safeguards to prevent mistakes. Results taken on board were exhibited. Watson's Acme whole plate camera was explained, which elicited much approval for its simplicity and extreme portability.* Mr. York concluded by giving his experience of the working of hydroquinone, which he strongly recommended. Negatives taken on board and developed by this process were exhibited, and gave much satisfaction. He strongly recommended saving the old solution, for commencing the development of doubtful exposures by feeling one's way, and finishing off with a dash of newly mixed developer to secure the desired quality.

The Rev. William Lowndes, of Codrington College, Barbadoes, showed some fine and interesting photographs, landscape and figure, taken in Ireland, Brittany, Ely, and Dorsetshire. He spoke of the pleasure it gave him to bring home, after a holiday, some reminiscences. Then Professor William Skinner, of Coke College, Antigua, followed in the same strain. He also exhibited some fine work, including some gelatino-bromide prints, which he considered more permanent than the usual silver prints. This statement Mr. A. L. Henderson took exception to. He doubted the more permanent character of gelatino-bromide prints. He stated that he had silver prints in his possession, taken thirty years ago, that were quite good. At the same time, he admitted that he had some showing decided indications of fading, although only produced a few months. The reason he could not explain. Some examples of ceramic enamels were shown, also one of Stirn's button-hole cameras. Mr. Henderson stated that he had taken some queer photographs while on board by this camera. Many of the ladies seemed rather put out by this statement. Mr. Henderson remarked not to be alarmed, as the camera was not then charged. It was further remarked that photographic plates could be made so sensitive that in a perfectly dark room all that was necessary was to strike a lucifer match, when the continuing action would go on in the plate.

Mr. W. Fitzherbert, of St. Kitt's, W.I., showed some splendid apparatus.

Mr. J. J. Bowrey, F.C.S., F.I.C., Government Analytical Chemist of Jamaica, stated that his professional duties as public analyst prevented his following up photography, for which he had a great liking, and in answer to a query about the purity of water, he stated that perfectly pure ice was obtainable in Jamaica at 4d. a-lb., or 3s. per cwt., offering at the same time to supply the wants of any one present with chemically pure distilled water.

Mr. Henderson proposed the following resolution:—

"That a photographic society be formed, entitled the Orinoco Society, the main object to be the mere view of taking landscapes from on board the R. M. S. P. Co.'s *Orinoco*, while steaming between Southampton and Barbadoes. I propose Captain Jellicoe as President, Dr. Williams as Vice-President, Mr. Mc-servey (chief) Member of Council, Mr. Baily (purser), Treasurer and Secretary. Should this meet with your approval, I will suggest that for the convenience and comfort of the members a piece of non-actinic red glass be placed inside the port of the bath room, and the marble bath be boarded over so as to form a stainless bench. A *rocking bath* will be unnecessary, and finally, if not taxing the resources of the Company too much, a photographic depôt be added to the already numerous conveniences, also a photographic chemist, not necessarily a resident officer, but to be within call. Should these aforesaid suggestions be faithfully carried out there could be little doubt that the revenue of the Company would be largely increased."

Mr. Lowndes proposed, and Mr. Fitzherbert seconded, a vote of thanks to the Chairman, which was carried by acclamation. The Chairman replied,—

"LADIES AND GENTLEMEN,—I beg to express my grateful acknowledgments for your kind expressions, but think your thanks are more due to Messrs. Henderson and York than to myself. We have just left the fogs and cold of England and are now luxuriating in delightful weather and a tropical climate, a condition that may fairly be described in the language Shakespeare puts in the mouth of one of his heroes when he says,—

'Now is the winter of our discontent
Made glorious summer by this son of York.'

I beg to move a vote of thanks to those gentlemen—which was unanimously carried—of knowledge; unfortunately, I can add little to your entertainment in that respect, for I am only a raw recruit in the ranks of that large army of amateurs whose numbers are daily augmenting, and although I am fairly equipped with the necessary implements for taking the field, I have never yet fired a shot, and I will now, with your permission, introduce to you the gentlemen to whom I have referred."

The meeting then broke up, too late for afternoon tea.—I am, yours, &c.,

A GLOBE TROTTER.

* A very nice whole-plate camera, manufactured by Parken, Son, & Rayment, the property of the Chairman, was admired for its simplicity. It was very quickly taken and repacked. The shutters were of the ordinary character, Shew's, Kershaw's, drop, &c.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, whole-plate outdoor bellows camera and three double dry slides; will exchange banjo.—Address, H. E. WATKIN, Pontymoile, Pontypool, Monmouthshire.

Wanted, a detective camera and Ganot's *Physics* in exchange for electric (sixteen c.p. Edison-Swan) lamp and battery.—Address, J. R. RIGBY, Howick House, Burscough, near Ormskirk.

Will exchange a lot of numbers of *Photographic News*, *Amateur Photographer*, and THE BRITISH JOURNAL OF PHOTOGRAPHY, for a small printing press with type or a detective camera.—Address, H. FLETCHER, 289, Friern-road, East Dulwich, London, S.E.

Wanted to exchange, negative cupboard with grooves (size 37 × 24 inches), also thirty pieces of old English-pattern plate (make, Nash), and a centre-seconds Moy's silver chronograph; wanted, half-plate or larger outdoor outfit (latest make) or enlarging lantern.—Address, W. A. BROOKE, Van Dyck Studio, Tiverton.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

HENRY KNOWLES.—Argand fountain lamps for the lantern may be obtained from, or ordered through, every dealer.

W. S. G. has not complied with our rule by enclosing his name and address, therefore no notice is taken of his query.

W. HOOPER.—The formula, as given on page 469 of our volume for 1875, stands thus:—Alcohol, one ounce; bromide of cadmium, thirty-two grains; hydrochloric acid, eight drops.

ONE PERPLEXED (Sheffield).—The dates given of "Patents Completed" are copied from the official document. This date is, of course, different from that on which the patent is applied for.

J. T.—Do not put yourself to the trouble of making hypochlorite of lime, but buy it at the oilshops or drysalters', who sell it under the name of chloride of lime or bleaching powder. You will get as much for a penny as will serve your purpose.

ALGIN.—So far as we are aware, sodium alginate is not an article of commerce. Some years ago a patent was taken out for its manufacture, but we do not think it was ever put in the market. For the moment we do not remember the number or date of the patent.

S. BALLARD.—The fault in the negative sent is over-exposure. Evidently you have not taken into consideration the improvement that has taken place in the light during the past two or three weeks. The negative has received four or five times the right exposure.

A. T. C. WATMOUGH.—Neither hydrochloric nor sulphuric acid ought to be used in cleaning a Daguerreotype. We have *very* often published directions for doing so. We are not aware of any means by which one that has been nearly obliterated by sulphuric or other acid can be restored.

T. H. BILLINGHURST.—We are always willing to oblige, but we must draw the line at analysing mounts to see "whether hypo or some other chemical" is present. We have published so much relative to the testing of mounts that our readers ought really to be their own analysts so far as these are concerned.

AMATEUR (Leeds).—Alizarine lakes cannot be considered as permanent colours when exposed to light. They are more so than cochineal lakes, and are therefore preferable for the work. If the pictures are kept in portfolios or in albums, they will not change to any appreciable extent even after the lapse of many years.

R. R. W.—A four-inch condenser, by all means. Three-inch condensers are never used now in anything but toy lanterns. The condensers are not so expensive as you evidently appear to imagine. The *carte* lens will make an excellent objective. As you can do all the metal work yourself, the lantern will not be nearly so costly as you fear.

C. P. HEATH.—The only hand camera on your list with which we have practical acquaintance is "A," and we like it very much. Of the lenses named for such cameras, while all of them may be excellent, we make use of No. 2, which we would not willingly like to be without. While we have it arranged so as to focus, we usually employ it at fixed focus.

1, 2, 3.—The fog in the centre of the picture is what is known as a flare spot. It may be obviated by slightly altering the position of the stop in front of the lens either a little forwards or backwards. This must be determined by experiment. Simply moving the stop slightly while the image is watched on the ground glass will enable the proper position to be arrived at.

A. W. BELL.—The yellow spots appear to be due to sulphuretting while they are in the fixing bath; probably from minute air bells adhering to the prints when they are in the solution. If this be the cause, the evil, no doubt, originates in the early stage of the operation. When thus caused, the spots rarely show until the prints are washed, or sometimes till they are dry.

E. B. inquires: "Is a saturated solution of oxalate of potash or sulphate of iron which has been made with hot water stronger after it has been allowed to cool than a saturated solution made with cold water?"—No, supposing the cold solution be carefully made. But by far the best plan is to make the solution with hot water, then complete saturation when cold can be ensured.

AMATEUR (Hertford).—Seeing that the room occupied as a studio is only fifteen feet long and that you are constrained to use a very short-focus lens for full-length portraits, therefore the perspective will always be the same as in the enclosed examples. It is not a defect in the lens, but simply because it has to be used so close to the sitter. For its focal length it appears to be a very good lens indeed.

BROMIDE writes: "Will you kindly inform me in your next issue the exposure required for enlargements on bromide paper?"—The exposure, of course, depends upon the density of the negative, the aperture of the lens, the light, the degree of enlargement, and the sensitiveness of the paper. Without knowing any particulars whatever as to these, it is impossible to give the faintest idea as to the exposure necessary. Formulæ for the developer are sent out with the paper.

G. L. S.—Gallic acid is very sparingly soluble in cold water, although readily so in hot water. To make a saturated aqueous solution, dissolve in hot water any quantity above five or six grains per ounce, and allow it to cool. When cold the superfluous acid will have precipitated, leaving between three and four grains per ounce in solution. But by dissolving the acid in glycerine a very strong solution may be obtained, and this may be diluted with water without causing any precipitation. In this way you can make a cold solution of the acid of twenty or thirty grains to the ounce.

P. S. T.—Nitrate of iron was at one time somewhat extensively employed in the development of positive collodion photographs, on account of the whiteness of the image produced by its agency. It is obtained by mixing a solution of protosulphate of iron with that of nitrate of barytes, by which the sulphate of the latter is thrown down as a precipitate, leaving nitrate of iron in solution. But the same effect is more easily obtained by the addition of two or three drops of nitric acid to each ounce of the protosulphate developing solution. Should this give a too pronounced metallic lustre to the image, it may be corrected by the addition of a few drops of glacial acetic acid.

W. RAY says: "I want to photograph the interior of some vaults, which can only be done, if done at all, by artificial light. Two or three have already attempted them a few years back, using, I believe, magnesium ribbon and wet collodion; but the thing was a failure. The vaults are about one hundred and twenty feet long, with bays off them. Do you think the flash light, fired at different parts, in the bays, would prove successful?"—Yes; we think that a successful result may be obtained in this way. But the whole of the lights should be fired simultaneously, otherwise the smoke from those fired first would show in the picture. After one negative has been exposed another should not be attempted until the smoke has condensed or been otherwise got rid of, as it would make the picture hazy.

REMBRANDT says: "An answer through your 'Correspondence Column' will oblige as to what you would advise for me to apply to the *top* and *side lights* of my studio to prevent the sun from coming in, and to take away the least possible light. There are several things advised. What would you recommend as the best? Some liquid applied to the glass that would not turn colour with the sun, I think, would be best; something that will keep out sun and yet give good light—a nice, soft light, I mean, without increasing exposure."—Starch paste, mixed with a little whiting, stippled over the glass, is an admirable thing for obstructing the sun's rays, and it is not in itself liable to become yellow. An excellent method of stopping out the sun is to have some light wooden frames covered with white tissue paper, to fix up when necessary and to be taken down when not required. When the paper becomes discoloured or dirty it is an easy matter to take it off and apply fresh.

MR. M. AUTY, of Tynemouth, informs us that, having taken into partnership Mr. R. E. Ruddock, the business will hereafter be carried on under the style of Auty & Ruddock.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, March 5, *Artificial Light as an Auxiliary to Daylight*, followed by a selection of lantern slides of Norway by Mr. J. B. B. Wellington; March 12, *Stereoscopic Photography*.

THE ALBEMARLE AMATEUR PHOTOGRAPHIC SOCIETY.—A society under this name has been formed for the social discussion of technicalities of photography. Its Secretary is Mr. Walter Pilkington, St. Margaret's, Newlands Park, Sydenham, S.E.

ON Monday evening there was a numerously attended meeting of the Chester Archæological Society to hear Mr. J. Hargreaves' paper on the *Hundred of Wirral*, which was illustrated by about two hundred transparencies specially taken by members of the Birkenhead Photographic Society. These were exhibited by Mr. Paul Lange, President of the Liverpool Society.

A PHOTOGRAPHIC SOCIETY FOR EXETER.—A meeting to inaugurate the above will be held at the New London Hotel, Exeter (by kind permission of Mr. Pople), on Thursday evening, February 27, 1890. The attendance of all interested in the "black art" is particularly requested by eight o'clock, p.m. Any information respecting the proposed Society may be obtained of the Rev. John Sparshott, Fairfield House, Alphington-road, or Mr. Ernest F. C. Damant, 32, Longbrook-street, Exeter.

MR. ROBINSON'S PICTURES IN *Sun Artists*, No. 2.—Mr. W. A. Boord, Hon. Editor and Secretary of the Sun Artists' Association, sends us a copy of some correspondence resulting from a statement made by a contemporary that Mr. Robinson would not be at all gratified to find the much-vaunted photogravure has only yielded prints which are but a shade better than those to be pulled from any type block. But, as will be seen from the following letter, Mr. Robinson expresses his entire approval of the photogravures:—"Dear Mr. Boord,—I have received the proofs of *Sun Artists*, No. 2, to sign, and cannot refrain from writing at once to say how much I approve of the way in which my pictures have been reproduced. I expected much, and am not disappointed. —Yours very truly, H. P. ROBINSON."

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1557. Vol. XXXVII.—MARCH 7, 1890.

OXYGEN AND CHLORATE OF POTASH.

At the last meeting of the Chemical Society, a valuable paper upon the decomposition of chlorate of potash under various circumstances was read, and was followed by a practical discussion. The actual steps which the materials pass through in their conversion from a solid to a gaseous state are still matter of uncertainty to chemists, though, perhaps, the explanation given last year by Professor McLeod is as probable as any, the more that it was propounded as the result of the indications of a large number of experiments. When the mixture of oxide of manganese and chlorate is heated, the first stage is explained to be that the peroxide acts on the chlorate, forming permanganate, chlorine, and oxygen, chlorine certainly being evolved as soon as the action commences. Then the permanganate undergoes decomposition by the heat, producing manganate—an oxide of manganese and oxygen. The third stage he considered not so clear, though "it is more likely that the manganate is acted on by more chlorine, produced by the action of the peroxide on fresh chlorate."

In this paper (by Messrs. G. J. Fowler, M.Sc., and J. Grant) recently read, the effects of the influence of different other oxides were tried. Vanadium, wolfram, and uranium would be too costly for photographic use; we merely refer to them, and say that they caused the oxygen to be evolved at a much lower temperature than the pure chlorate needed; but there was waste, as the whole was not removed. Alumina, which is cheap enough, acted similarly, but less energetically.

Chromium also gave the gas off at a lower temperature, but still the whole of the oxygen was not evolved.

Iron, cobalt, nickel, copper, and manganese oxides gave off the oxygen at a comparatively low temperature, accompanied by only a little chlorine, the oxide being left but little altered at the end of the experiment.

Looking at the results of these varied trials, it would seem that, though iron sesquioxide might be substituted for the familiar manganese, we yet practically have at command, and in ordinary use, the most suitable material known for assisting in obtaining the oxygen from its most readily available source—chlorate of potash. The chief questions, then, arising are, Can the chlorine be prevented from coming over along with the oxygen, to the detriment of gas bags, unless removed by the wash bottles? and, What is the best proportion of the ingredients to show the advantage of the manganese? Professor McLeod, using the vapour of mercury as the constant source of heat, found the powdered chlorate to cake together, but no further action ensued. In another trial, when manganese was added, the gas was given off so suddenly that the apparatus was disordered, and even at a temperature of thirteen degrees lower the evolution was rapid.

To get rid of the chlorine several experiments were tried; half per cent. of carbonate of soda was added: it almost arrested any evolution of gas. Permanganate of potash added caused the retention of all the chlorine when added in quantities of less than one half per cent.; even about one-seventh of one per cent. reduced the quantity of that gas; but in all cases the rate of evolution was lowered.

As to the proportion of "black oxide" used, it varied from eleven to one-tenth per cent. Six per cent. gave off gas as rapidly as any; one per cent. caused a very slow delivery; six minutes were required to fuse even the small quantity of mixture employed.

As the question of economy, where home-made gas is still resorted to in any quantity, is of great importance, we may hear what Professor McLeod has to say on the subject of using the manganese a second time. "It has been stated that the manganic peroxide loses its power of decomposing potassic chlorate, and therefore cannot be used over and over again." (E. O. Brown, quoted by Baudriment, in the *Journal of the Chemical Society*.) "To test this, a quantity of granular peroxide, rather finer than that used in the previous experiments, was heated with potassic chlorate over a gas flame, the mass washed with water, and the insoluble residue dried. This operation was repeated nine times, and the washed and dried oxide was heated with potassic chlorate in the vapour of mercury. In this case the quantity of peroxide was only 6·8 per cent. of the amount of chlorate, yet the action was very violent, and complete in two minutes. . . . . The peroxide was entirely changed in appearance, and was brown instead of black. This shows that the peroxide cannot be exhausted by use, and the change of character seems to indicate that the peroxide had entered into chemical action, and had been reproduced."

In the five experiments with permanganate of potash added, when in the proportion of only one-seventh per cent. of the weight of chlorate used, the chlorine fell off half; when ·449 per cent. was used, there was only ·0041, as against an average of ·035 without permanganate, and the oxygen came off quickly. The proportion that prevented any chlorine whatever coming off was only ·049 per cent.

Now we do not hesitate to say that when using only one wash bottle, containing carbonate of soda, in preparing oxygen gas, the chlorine will not be reduced ninety per cent., which would be required to bring it to the level of the gas issuing from the mixture containing ·44 per cent. of permanganate, and we are by no means sure that two wash bottles would bring the issuing gas to this level of purity; hence it would seem to be a legitimate inference that a mixture compounded in the proportions thus indicated might be used to prepare oxygen gas, which, without any wash bottle being employed, would be

equal to that made in the ordinary way with the usual arrangements for washing. The extra time required for evolving the gas would be an element of safety.

We conclude by giving the proportions for a pound weight of chlorate indicated by the above remarks:—

Chlorate of potash	1 pound.
Black oxide of manganese	1 ounce.
Permanganate of potash	31 grains.

The manganese can be used again by washing the salts away from the mass left, after gas making, and collecting and drying the residue.

FURTHER REMARKS ON LARGE DIRECT PORTRAITURE.

In a leader in our issue for February 14, it will be remembered, we suggested for taking large portraits direct in the camera that lenses of a much longer focus than those generally employed for the purpose should be adopted; also, that the microscopic sharpness yielded by good compound lenses was of no actual advantage when the negative was printed—as most large portraits now are—on a paper with a rough surface. We furthermore suggested a trial of the front lens only of large combinations (which would necessitate the camera being at a much greater distance from the sitter) by those professionals who, up to the present time, have not found large direct portraiture a profitable branch of business; and, at the same time, suggested that no smaller diaphragm should be used with the single lens than was really necessary to obtain *pictorial* definition all over the plate.

As might have been anticipated, this article has produced many comments in professional circles. Some photographers, we are told, quite ridicule the idea of producing large photographs which are not quite as sharp as small ones; others make the objection that the ordinary camera would not be long enough to take a picture when only one lens of the combination was used, or that the studio would not be sufficiently long; and even if it were, the space intervening between the camera and the subject, if there were any haze or fog in the room, would materially mar the brilliancy of the picture. However, these objections are more imaginary than real in practice. Let us consider them.

Few studio cameras are now made which do not permit of sufficient extension to copy, with the lenses they are intended to carry, a picture the same as the original, and such would be quite long enough for the present purpose; if not, a lengthening cone is easily adapted. With regard to the length of studio. Taking a large portrait lens, by way of example—such as that referred to a fortnight ago—the focus of which was twenty-two inches, and catalogued to cover a plate twenty inches by sixteen. Now, by utilising the front lens alone, which we will assume to be something like double the back focus of the complete combination, say forty inches (we merely assume this to be the case, for the only data to go upon is the *back* focus as mentioned in the catalogue), such a lens, working upon a twenty by sixteen-inch plate, would be about equivalent to using a cabinet lens which requires twenty feet between model and camera for a full-length cabinet picture; that is to say, that at the same distance from the sitter, approximately, the same amount of subject would be included on the two plates. Hence, no longer studio would be required for one lens than for the other, and, of course, the question of haze would be the same in each case. The best artists, when the length of studio will permit, generally employ for cabinet pictures lenses of the foci indicated, and find no inconvenience therefrom on account of haze, except perhaps occasionally, under exceptional conditions of the atmosphere.

Acting on our suggestions, a professional gentleman of our acquaintance made the following experiment with a large six-inch portrait combination in his possession:—A portrait of a lady was taken on the full-size plate the lens was catalogued to cover—twenty inches by fifteen. It was a three-quarter-length picture, and to obtain it the camera had to be placed very close to the sitter. The lens, as every practical photographer is aware, had to be stopped down considerably in order to obtain even fairly good definition in the different planes, notwithstanding that full advantage was taken of the double swing-back arrangement of the camera. Next, another negative was taken of the same size, with the model in the same position, and including exactly the same amount of subject, but with the front lens by itself, and this stopped down sufficient only to give a moderate definition over the plate.

When the two negatives were finished, there was, as a matter of course, a marked difference between them. That with the complete combination was microscopically sharp in places; the texture of the skin, and other parts focussed upon, were rendered with painful sharpness, while the more forward portions, and those slightly behind—the carved back of the chair for example—were conspicuously out of focus. The other negative was not really, in the true sense of the term, sharp anywhere; that is, there was no crisp definition.

A print from each negative was then made on rough surface bromide paper and mounted. Now, the difference between the two pictures was not so great from a photographer's standpoint, and the balance, on the whole, was in favour of the second negative. The print from the first one did not at any part reproduce the exceeding definition existing in the negative, while certain portions still looked much out of focus. The print from the second negative appeared equally sharp all over. There was no conspicuous—or, one might say, appreciable—difference between the face, hands, and the back of the chair which was so marked in the other picture; indeed, in this the nearest and most distant objects really looked sharper than they did in the other. Therefore, taken as a whole, on the rough paper, when examined at a distance, as all framed pictures are, the second picture appeared to the best advantage as to general sharpness.

The contrast between the two finished pictures was greatest in the artistic sense, or, it might be assumed, from the customer's point of view, in the picture taken with the lens intact, the perspective of the figure and accessories was violent, which gave the portrait a very unpleasant aspect, without in any way conveying the idea of inferior photography; indeed, this, in both portraits, was excellent in a technical sense. In the portrait taken with the single lens the picture appeared harmonious, for, being taken from a much greater distance, the perspective was natural; and in every way this picture was the most pleasing and satisfactory likeness, as well as being the best picture. And this was the undivided opinion of every one whose criticisms were invoked, as well as the sitter's friends.

It must not for a moment be imagined that in this or in the previous article we deprecate the use of combination lenses for large portraiture, for we do not. Our object has been to protest against the employment of lenses of short focus for taking large direct portraits. It stands to reason that if a lens

of certain focus is necessary to take a pleasing, say, cabinet portrait, a comparatively much shorter one must not be expected to yield large ones which are satisfactory. More especially does this obtain when it is considered that large lenses are not and never can be made so perfect as small ones; and, added to this, the unavoidable inferiority increases with the size of the instrument.

At a recent meeting of the Royal Society, a paper by Sir John Conroy, Bart., was read, detailing some experiments that he had made with radiations from luminous flames. He found that three millimetres of glass and ten centimetres of water transmit a small portion of the non-luminous radiation of an Argand gas burner, but that when the thickness of water was increased to fifteen centimetres, the transmitted radiation consisted exclusively, or almost exclusively, of those kinds of radiation that affect the eye as light. 2. That with the form of apparatus he employed there was no measurable difference between the diathermancy of glass and pure water. 3. That the radiation from an Argand gas burner consists of about 1·75 per cent. luminous, and 98·25 per cent. non-luminous radiation.

One of the greatest drawbacks to the use of shellac for the manufacture of negative varnish is the great waste of solution which takes place, owing to a large amount of insoluble matter remaining in a partially suspended state in the solution refusing to subside, even after months of standing. Numerous methods of getting rid of this snare have been proposed, but none of them are quite satisfactory. We have shown that the plan by mixture with benzole or petroleum ether is fallacious, owing to the mutual solubilities of the liquids, and the method of mixing with one or other heavy powder often recommended does not seem to answer. The insoluble matter does not even filter out satisfactorily; but it is quite possible that one of the expedients described in a paper by Mr. H. N. Warren, previously referred to might be efficacious. He speaks of the power of rendering clear a solution persistently muddy, even after filtrations, which paper pulp possesses. It is mixed up with the liquid, and then the latter passed through filter paper. He also refers to the usefulness of albumen added to a spirituous solution for the same purpose.

The House of Commons has appointed a Select Committee, under the chairmanship of Baron H. De Worms, to inquire and report as to whether any alteration is required in the provisions, or in its administration, of the Merchandise Marks Act of 1887, in order to prevent fraud by the use of indirect indications of the place of origin on imported goods, or their false marking after importation. Also to ascertain if any fresh legislation is needed for prosecuting offences against the Act. From this it is evident the law is not at present working satisfactorily in the eyes of the Government.

In connexion with certain classes of goods the law is stringently enforced, while with others it is practically a dead letter. Notably is this the case with printed matter, with which the law appears to be fully complied, and with optical instruments where it is not. Large numbers of photographic lenses, for example, are daily imported into this country which bear no indication that they are made abroad. This is an open invasion of the law, and no notice appears to be taken of the fact. Sometimes when articles are marked, it is done in such a way that it is really a colourable evasion of the Act. A short time back we saw a foreign lens of the "rapid" type which, it was said, complied with the law. The words "Made in France" were stamped in the smallest possible letters upon the flange which is screwed upon the camera: there was nothing upon the tube of the lens. Chemicals, in bulk, are largely imported from the Continent, and the bottles or the cases containing them are duly marked according to the Act. But here they are put into smaller bottles, or packages, and simply labelled with the name of the retailer, without any reference whatever as to whether they are of home or foreign production. With many things it would be difficult, if not impossible, to carry out the law strictly. For example, large quantities of unmounted lenses for different purposes are imported into this country to be mounted here. How can such things be permanently marked without injury to them?

Photography, generally, is considered to be of a cosmopolitan character, and it is supposed that a confraternity exists amongst its votaries, regardless of politics. Evidently this does not apply to Portuguese photographers, who appear to be boycotting even English apparatus just now. An amusing incident has just been related to us. Some little time back a quantity of goods was ordered from a large London house by a dealer in Portugal. The goods were duly despatched and invoiced. Shortly afterwards a letter was received by the firm advising their return. In this the dealer, in polite language, disclaimed any political feeling himself, and regretted having to return the goods, as he would lose his profit thereon, but said if he kept them, it would be quite impossible to dispose of them, so strong was the anti-English feeling in Portugal at the present time. One might have supposed such narrow-mindedness did not exist, at least among photographers, whatever their nationality.

The brilliant light, unusual so early in the year, has caused activity in the studio. Already several letters have been received asking the best means of stopping out the direct rays of the sun, the best materials for blinds, with other similar queries usual at the advent of bright weather after the dulness of the winter months. "Spring cleaning" has already been commenced in many photographic establishments, in some certainly not before it was wanted. We have often commented upon the general untidy and slovenly condition of many photographers' studios, and the unpleasant effect it must have upon the sitters. A bright and cheerful condition of things conduces to a far more pleasant expression than dilapidated and woebegone surroundings. Our experience is that studios in the provinces are, as a rule, far better cared for than those in the metropolis. Why it should be so it is difficult to conceive.

It must be confessed that it is not an easy matter to keep a studio in such a neat and cleanly condition as one could wish. Glass roofs are seldom water or dust tight, hence the blinds or curtains often get wet and stained—this in itself is very objectionable. The water from a leaky roof also frequently drops on the backgrounds or the accessories, giving them a very unsightly appearance. Some artists appear to consider that if the dilapidations do not show in the finished picture they are of no importance. This, however, is a mistake. Many studios are cumbered up with stained, dilapidated, and out-of-date accessories which are never used. Naturally, these give the place a seedy and mournful look, which has its effect on the customer. Although the studio can rarely be kept so neat and clean as a drawing room, yet much may be accomplished in this direction now that dry plates have superseded wet collodion.

It is, as all know, a very difficult thing to make a glass roof even fairly free from leakage. Here is a method which was adopted by a photographer of our acquaintance, and it answered exceedingly well. Instead of repainting the outside of the sash bars with oil paint, he gave them a couple of coats of tar, to which was added, if we remember rightly, a little tallow. Those who have failed to make the roof of the studio impervious to water should give this method a trial.

One thing in connexion with spring light should be borne in mind. The light is not only brighter than it was, but it is infinitely more actinic in quality. Hence those who employ natural light in the dark room will do well to carefully test the windows while the light is at its best, particularly if they are covered with paper or other fabric. Most samples of these materials change colour with long exposure to light, and so gradually lose their efficacy. A window which will be perfectly safe in a winter light may be just the reverse in a spring one. The often unsuspected change in the colour of the

fabric has, we know, more than once led to the condemnation of plates which were perfectly good. Trouble in the dark room might frequently be avoided if the source of illumination were periodically examined.

At a recent meeting of one of the Metropolitan Societies the subject of copying glass positives was under discussion. It is a very simple matter to copy a glass picture in the camera if it be free from stains or tarnish, or to print from it as a negative if it be dense enough. This, however, is seldom the case if the positive be a really good one. Now it is frequently necessary to reproduce, or to make an enlargement from very inferior and stained glass pictures. The stains, it is true, may sometimes be removed by treatment with cyanide of potassium, but it is always a risky operation, owing to the frequently tender condition of the collodion film itself. The best plan under these circumstances is generally to clean off the black backing, and then use the picture as a negative from which to print a transparency on a dry plate —exaggerating the contrasts in the development, and from this transparency to make a negative. It sometimes happens that the tarnish may be such as to quite prevent anything like a presentable copy being made by reflected light, yet scarcely to show at all when viewed by transmitted light. We recently saw some excellent copies of a much stained or tarnished glass positive which were produced in this way. The tarnish in this case was such as to make copying in the camera quite out of the question.

ON THINGS IN GENERAL.

I suppose that in an ordinary way the annual meeting of any society or company would not be complete unless its harmony were disturbed by some jarring elements. As a little discord is necessary in music, or the mind would be rapidly clogged with the one unbroken succession of sweet sounds, this course has a sort of musical authority on its side, and was pursued at the Parent Society's meeting the other day. It was made to appear that the *fons et origo malis* was some action of the Council with regard to a paper submitted to it. Now, without entering into the merits of the particular subject of dispute, it may safely be observed that the question of examining papers intended to be read at the meetings of learned, or indeed any societies is a most important one. This reading is often shirked or done in such a perfunctory manner as to be worse than useless. I ask, Is any one prepared to say that no paper has been read before the Photographic Society of Great Britain which should have been put in the waste-paper basket rather than have been read in the form it was? This is, perhaps, treading on some one's toes; but the discussion causes such a remark to be opportune. To speak in another strain, every one will join with Mr. Mackie in his congratulations upon the present state of the journal of the Society; no one but he who has tried it knows the amount of time and labour involved in compiling such a set of abstracts as now are appearing. The editor is heartily to be thanked.

Speaking of editorial management, the editor of The British Journal of Photography has a very valuable scale for focussing hand cameras on pp. 132–3 last week. It is almost a pity it was not issued as a loose supplement, though, indeed, that might lead to loss of the piece of consequent mutilation of the volume. I recommend him to print it on a loose sheet for separate sale.

What is the reason, I wonder, why, when people write upon optical matters, they so frequently manage to make some altogether incorrect statement? Whether they know or do not know their subject (and there is a great deal written by the latter class) this queer result often comes out.

It is not necessary to define the class to which belongs the writer of a paper read before the Dundee Society (we may safely conclude this paper was not read by an official before it went to the meeting), in which are some very singular observations. The editor has shown the absurdity of the remark that a stereoscopic view, compounded of two prints from the same negative mounted side by side, will, when in the stereoscope, give the appearance of solidity, but they suggest there may be a hidden joke. Perhaps; for a little higher up on the same page occupied by this writer there is another such joke. Speaking of two artistic pictures mounted on one card viewed through a stereoscope, or "a box of lenses," he says, in effect, that if you coalesce the pictures by squinting, or if you get a united picture of the two by looking at them with the right picture seen by the right eye, and the left by the left eye, you get stereoscopic impression. Need I add that this is all a mistake? If one is clever enough to perform the latter feat there would be true, if indistinct, stereoscopic appearance. In the former case there would be reversed vision—pseudoscopic, as it has been called. But now comes the drollest part. Mr. Pringle, in his haste to demolish his critic, has tumbled into one of those errors I just alluded to, and has in the cleverest manner said precisely what, I expect, he intended not to say; for he states that the squinting mode of looking at the stereoscopic picture is "right enough for those who can do it," but that there is no stereoscopic vision when the right picture is viewed with the right eye, and the left with the left eye. He has just transposed the elements of his criticism, and no doubt is aware of the fact already, but he has lost the opportunity of making a telling point.

A little polemic of this kind on what is really a very slightly understood subject is a distinct gain in teaching, by the attention that is drawn to the subject when a spice of individuality is given to it; but I utterly fail to discover any benefit to be gained by letters of the type of those devoted to the defence of the carbonate of soda theory. Here we have a writer who, on a subject that admits of the plainest proof that any office-boy could be set to work at and finish in a few minutes, writes enough to cover several pages of foolscap paper upon certain theories and vaticinations respecting these simple matters. Mr. Whitfield could "easily enlarge in various directions," but he wishes his "remarks to be mainly suggestive." One is inclined to apostrophise his suggestions in the same way that Charles Surface at the end of the play usually speaks of his brother's *sentiments*. "Blotting paper soaked with a soda solution and dried has commonly been recommended as a preservative, and I am convinced that its action depends on its power to reabsorb water of crystallisation that has been driven off in the drying," &c. Again (p. 142), "I still adhere to my theory of the preservative action of the carbonate with blotting paper, and believe this will only be found effective as the heat employed to dry the paper has partially dehydrated the carbonate. If I am correct, paper soaked in solution of sulphate of soda and dried by heat would be similarly useful, and in both cases experiment will prove the accuracy or otherwise of my notion." Then why does he not experiment? What is the use of such armchair laboratory work? I will save him the trouble of making the first experiment by telling him that the carbonate of soda paper will answer perfectly if it is dried in the air, and so shatter one theory.

At the meeting of the London and Provincial Photographic Association on the twentieth of last month, Mr. Haddon pointed out a possible cause of irregularity in the experience of experimenters with sulphite of soda which no doubt frequently happens, the presence of carbonate of soda. It is very difficult indeed to free the sulphite from the last traces of this salt, and there can be no doubt that the published results of many experiments are marred by variations in the samples of sulphite employed in making them.

The subject of the oxygen explosion at Brin's Works is a very painful one, but I cannot help referring to it, because of what I consider the eminently unsatisfactory state of either our knowledge of the subject or the explanation tendered. The point to be elucidated is, What is the ignition point of the mixed gases under pressure, even when mixed in the best proportions for combining? Every one is familiar with the old experiment of setting fire to tinder by the sudden compression of air in a cylinder provided with a piston, so that we know the great heat that can be so produced. What I should like to know, and what Brin's could easily try by inserting a pyrometer, is, What is the maximum heat produced in the operation of charging a cylinder. This information, coupled with the length of time occupied, would be a valuable addition to science. I trust they may make it.

Free Lance.

CELLULOID AND ELECTRICITY.

The article in last week's Journal upon *Celluloid and Electricity* will probably be read with interest by all classes of photographers, for every one is now upon the look-out for information and interesting details of all that appertains to film work; and this is more especially

the case in regard to celluloid, as there are at the moment, or at any rate there were a short time since, several defects which are the sole right and property of the celluloid film.

The writer had the pleasure of being present at the discussion at the Camera Club, to which reference has been made in the leading article now under review, and he was half inclined to add the substance of these jottings to the general expression of opinion then given; but the discussion closed, and he now offers it as a contribution to the general knowledge.

Dealing with the statements in that article, it is worthy of note that many efforts have been made to connect photography, and emulsion work more particularly, with electrical phenomena. Doubtless there is a connexion of some kind, or, to be more exact, there may be under certain circumstances; but it appears to the writer to be exceedingly probable that such circumstances are just those which should not obtain in photographic work.

Some years since, one of our best writers upon experimental work (was it not Mr. W. K. Burton, Mr. Editor?) described how he had noticed flashes of light—presumably of electrical origin—which were emitted from a jar containing warm gelatine emulsion during the act of stirring up the contents with a glass rod, and the circumstances were very clearly described by him. Now the writer has been engaged for some years in making considerable quantities of emulsion by several methods and under varying circumstances, and has been a close observer of its vagaries; but he has never been able to detect any phenomena of the kind described.

And again, it has been stated (by Mr. Warnerke?) that certain photographic sensitive films, which were prepared by spreading the sensitive material and its support upon sheets of glass, which were then placed in a drying room and the films stripped from the glass, (which had acted as a rigid temporary support), were rendered useless, and their commercial manufacture made impossible owing to the sparkling and other electrical disturbances which took place when the dried films were being stripped from the glass plate; but the writer has not met with these phenomena when preparing films by this method.

These reminiscences have not only been given, however, to indicate the varying difficulties that arise, and to attempt to show that different workers meet with differing obstacles in their endeavours to attain the same ends, for neither of these troubles has been met with by the writer, but he has been crossed by many of which he has never seen mention in print.

Dealing with the question of the electrical condition of celluloid, if an original package containing one hundred sheets, measuring 50 × 20 inches, be opened, and the sheets lifted quickly up, a distinct and crackling sound is easily heard, and feeble discharges of light may be seen in a darkened room. There is, too, a very strong attraction between the sheets of celluloid and the separating sheets of fine close-textured tissue paper with which they are interleaved, and there is very little room to doubt but that these phenomena are electrical, and further, to conclude, that the sheets of celluloid as they come from the manufacturer are in a distinctly electrical state.

But from this point the conditions change. Celluloid cannot be successfully coated with emulsion without preparation or cleansing by some or other method which involves the use of water, and this is inimical to the continuation of the electrical condition. It is, therefore, probable that after being rendered fit to receive its coating of sensitive emulsion, that the celluloid will not exhibit those characteristic phenomena which indicate an electrical condition.

Whatever the argument may be worth, experimentally this is so, and in the writer's hands uncoated celluloid films, when cleansed and ready for flowing with emulsion, are not in the electrical condition they originally were, though very likely, if thoroughly dried, that condition could soon be restored.

Having thus dealt with the celluloid sheet itself, it only remains to be said that if, for purposes of flowing with emulsion, the films be temporarily attached to glass, it must be by some means involving the use of moisture or some hygroscopic substance.

And here, again, the conditions are not favourable to an electrical discharge or disturbance of any sort when the celluloid film is removed from its temporary glass support, for it must be noted that not only is there moisture between the glass and the celluloid, but that the latter is itself moist with water absorbed from the adhesive medium and the emulsion with which the film has been coated. As before stated, whatever the argument may be worth, the fact which it is desired to emphasise is that no such disturbance or electrical discharge has taken place within the writer's observation of several thousands of celluloid films, and he ventures to think that upon the above facts the question with which the article under discussion closes, viz. "Can such provision be made as to completely de-electrify the celluloid before coating, and also to guard against its excitement at any subsequent stage?" may be answered thus: That in practice such conditions obtain as completely exclude the probability of any electrical action.

The question of the cause of the defects peculiar to celluloid has not been dealt with here, except to attempt to traverse the suggestion that they are electrical in their origin. The evidence of practice seems to indicate that the trouble is a chemical one arising in the manufacture of the material, and which can only be overcome by chemical means.

S. Herbert Fry.

THE AMERICAN ECLIPSE EXPEDITION AT CAPE TOWN.

"Hail, Columbia!" was the burden of the deeds, if not of the song, that greeted the United States steamship *Pensacola* when she entered Table Bay a few days ago. The good people of Cape Town would have been equally ready if "*Vive la France!*" had been the watchword; nay, I venture to affirm that at the present time even a Portuguese man-o'-war (not, if you please, the jelly-fish of that ilk) would have little to complain of in the way of welcome unless war had actually been declared, and even then the welcome would be *warm*. Hospitality is one of the chief virtues of South Africans, English, and Dutch—a virtue soon acquired by newcomers in this genial clime. The arrival of a foreign war vessel in the bay is the signal for the residents to vie with one another in making the strangers welcome, and if in a commercial capacity also the strangers are taken in, the corresponding private function makes ample amends.

Now, the Observatory being an Admiralty station, it follows as a matter of course that courtesies shall be exchanged on the arrival of a new ship, and if the whole truth must be told, these courtesies, being a matter of course, a formal duty, are not quite so spontaneous and enthusiastic as those of the non-official denizens of the Cape. But the arrival of the *Pensacola* was another matter altogether. She had come from America with a party of astronomers, bent on witnessing and investigating the phenomenon of a solar eclipse, visible in South America and West Africa. She had come to make, also, a few investigations in terrestrial physics at Cape Town, as she had done at other ports on the coast of the Dark Continent. The Cape Observatory had an interest, a prominent interest, in the new visitors; the Observatory felt a sort of proprietary right in them; since they were to be entertained, who had so much right to entertain them as the Cape astronomical staff? And the Observatory staff, headed by Dr. Gill, pounced down on their American brethren accordingly, and tugged, might and main, to get a full share of their time and company.

Perhaps I am trying to make too much of South African hospitality. I have been a member of two eclipse expeditions myself, and I have invariably found, wherever I have been, that a cordial welcome is always extended to the scientific man. I have been indebted to Americans for many an hour of pleasant sight-seeing, as well as many a day of sympathetic help. On this occasion I regarded the visit of the eclipse observers as I would regard the visit of personal friends from my own old home country, although I had only met one of the members previously. But it is time I curtailed this lengthy introduction and came to business, for now I have taken up my pen to say something about the eclipse observers, the reader will naturally be impatient to hear what I may have to tell him about new developments in solar physical research.

The American expedition is under the leadership of Professor D. P. Todd, of Amhurst College University, but, as usual in expeditions of this character, it practically consists of several parties, sent out by various State departments for special branches of scientific study. First and foremost, to my mind, as being an entirely new departure in photo-eclipse work, I must mention the work of Professor H. F. Bigelow, who received his credentials from the Washington Nautical Almanac office, to which he belongs.

The photo-astronomical reader will recollect that during the transit of Venus observations in 1874, an instrument called the photo-heliograph was made use of. This consisted of a four-inch lens, of about six feet focus, giving an image of nearly three-quarters of an inch diameter; this image, instead of being received direct on the sensitive plate, was further

enlarged to a diameter of about four inches, by means of a secondary magnifier. It was found, however, that this image was not sufficiently good to give a reliable measurement of the contact of Venus with the sun, and when the expedition of 1882 was sent out, the photographic method was abandoned by the English Government. But not so by the United States, who had more faith in photography, and attributed the first failure to the inefficiency of the instruments employed, and not to the photographic operations. Instead of using the ordinary form of photo-heliograph they employed lenses of forty feet focus, giving a direct image of four (about) inches diameter, and the results justified the method. But as instruments of forty feet focus are not easy to set up and use at will, the essential part of the instrument, consisting of lens and tube (the latter corresponding to the photographer's camera), was placed horizontally, and the sun's rays reflected into it by a heliostat, that is to say, a mirror so mounted and driven by clockwork that it followed the motion of the sun. Now, in eclipse observations time and light are too small to be wasted, and the intermediary mirror, cuts off no small portion of the light. In the case of a silver on glass mirror, part of the light absorbed consists of ultra-violet rays most actinic in their action on chemical substances. How, then, could the mirror be dispensed with, and the long tube be pointed at the sun and made to follow the sun's motion?

Where the Observatory is permanent this is not difficult. The mounting, for instance, of the great Lick telescope was not a superhuman task, although the size of the mounting, like that of the telescope, had to be gigantic. But in eclipse observations difficulties of transport have to be considered, and too much time cannot be spent in erecting the instruments. On the other hand, the time of actual observation is short, the position of the sun is accurately known, the instrument is only wanted for that short time, and in that one position. How the problem was solved in this first attempt I will endeavour to give, as nearly as possible, in the simple explanation that Professor Bigelow was kind enough to give me.

An equatorial mounting consists of a stand on which is fixed an axis pointing to the north or south pole of the heavens, according as the instrument is set up in the northern or southern hemisphere. This axis being free to revolve, a telescope mounted upon it could be made to follow a star's motion. But as it is necessary to point the telescope to any particular point of the heavens between the equator and the pole, another motion for the telescope must be added. This is done by fixing an axis, called the declination axis, to the polar axis, and on it mounting the telescope. Now, says Professor Bigelow, the telescope itself, the declination, and the motion round the polar axis, form a triangle. Let us apply it. As the place of observation was only a few degrees south of the equator the polar axis would be a corresponding number of degrees from the horizontal. The first step was so far simple. Now, to one end of this polar axis the telescopic camera was attached. This consisted of a steel tube of forty feet long, made in two parts joined in the centre. The joint was made by two broad flanges, and to the outer edge of the double flange were bolted steel rods whose other ends were attached to the extremities of the tube, conferring upon it great rigidity and freedom from flexure. Joining the object glass end of the telescope to the other end of the polar axis was another steel tube, which gave the proper inclination, or rather let us say declination, to the telescope, but in order to adjust this accurately was a screw motion inserted. Having now got the instrument pointed to the sun, how was it to be made to follow that luminary? Another rod or tube was attached to the telescope tube, giving the whole the appearance of a tripod, two of the feet of which were joined by the polar axis. This last rod had a piston affixed to its earth end, this piston working in a cylinder filled with dry sand. An orifice with a conical tap adjustment at the bottom of the cylinder allowed the sand to run out, and as its rate of flow could be regulated to a nicety, the telescope tube was regularly lowered down at the same rate as the sun sank in the heavens. The steadiness and regularity of this sand clock Professor Bigelow found to be surprising. The ground glass end, if I may so call it, of the telescope led direct into a dark room, and the plates were exposed without the use of a dark slide, effecting a vast saving in time. Nor was this all. Large, circular, sensitive plates were used, enabling a number of exposures to be made by revolving the plate. By means of electrically controlled mechanism, which I cannot briefly describe without a disgram, the exposures were made at definite registered times.

I have been somewhat prolix (not too much so, I trust) in describing this instrument on account of its importance. The mounting of such a large instrument in the field is an entirely new departure, and the admirable simplicity of the arrangement must commend it to all photographers who love beautiful mechanical contrivances. The weather did not allow it a fair trial, yet seventy exposures on the partial phase made before totality, and forty after totality, have demonstrated its utility and regularity. There is little doubt that had not the totality been obscured by cloud a record of the finer detail of the corona near the sun would have been obtained that would have cast into the shade all previous achievements. Although the aperture of the lens was only small, and its focal length forty feet, thus giving a moderate intensity, the length of totality, the known brightness of the inner corona, and the sensitiveness of modern plates, fully justify this opinion. Let us hope that on the next suitable occasion not only will this instrument be requisitioned, but that other similar instruments of larger aperture, and with larger plates, will be used to give a further extention of corona than could be hoped for in Professor Bigewell's instrument.

The next instrument, or rather battery of instruments, worthy of mention was taken charge of by Professor Todd, who was assisted by Major L. N. Jacoby and M. O'Connor, of Columbia College, New York, and Mr. H. S. Davis, of Princeton College, in the astronomical adjustments, and by Mr. E. J. Wright, of Brooklyn, New York, and Mr. J. E. Carbutt, of Philadelphia, to undertake the photographic manipulations. This grand battery was made up of a number of heterogeneous elements, so to speak, all mounted in juxtaposition on the same stand, and driven by clockwork. It consisted of two Brashear reflecting telescopes of 8 inches diameter, four Clark telescopes of 3½, 5, 7½, and 8 inches aperture, the second being fitted with a secondary magnifier enlarging the sun's image to a diameter of 4½ inches, the third being used as a high-power directing telescope, whilst the fourth—a photographic doublet with a ten-inch back lens, loaned by the Harvard College Observatory—was arranged for a series of twelve exposures, two of which were made through an orthochromatising screen provided by Mr. Carbutt; two six-inch Dallmeyer rapid rectilinear lenses of 24 and 38 inches focus; one Schroeder triple objective of 6 inches aperture and 22 inches focus; one Gundlach orthoscope of 3 inches aperture and 21 inches focus; two flint spectroscopes and one quartz spectroscope, loaned by Harvard College Observatory; a duplex photometer of 75 inches focus, also provided by Professor Pickering, and his reversing layer spectroscope for photographing a spectrum trail for fifteen seconds both before and after second and third contacts; a five-inch Ross lens of 42 inches focus; a four-inch Spencer objective of 36 inches focus constructed of the new Jena glass, and a 6·4-inch Merz-Clark objective, both rigid with the means of automatic variation of aperture during totality; and, lastly, two duplex cameras provided by Dr. Wright, of the Sloane Laboratory of Yale University, for photographic record of the polarisation of the corona. In all, there were twenty-three objectives and two mirrors, with their axes adjusted into parallelism.

But the most remarkable part of this arrangement was the apparatus of automatically exposing and changing the plates. Omitting those mechanical details which have no newly applied principle underlying them to excuse the occupation of space which their enumeration would necessarily entail, I will describe only the mechanism which put them into action. The reader has seen, perhaps handled, one of those musical instruments called automaton organs, which are worked by mechanism suggested by that adopted in weaving ribbon, &c., as shown at exhibitions and bazaars. A long strip of parchmentised paper is punched with holes and wound round a drum. As the paper is unwound by turning a handle it passes over a pneumatic contrivance, which sends air through the holes into corresponding pipes or reeds. Such an instrument was modified and brought into requisition. The barrel was rotated by clockwork in connexion with a chronograph, and whenever a puff of air passed through an aperture in the paper, mechanism was brought into action which effected the desired change of plate and exposure. This arrangement of instruments was worked throughout the eclipse, but, of course, the results are *nil*. The plates, over 300 in number, have not been developed as yet, but nothing can be expected to be found on them when the expedition returns. The apparatus worked satisfactorily enough, and it will be generally admitted that our transatlantic cousins here displayed ingenuity in keeping with their reputation far in advance of anything attempted during former eclipses. The pneumatic system, it may be mentioned, was in charge of Mr. G. E. van Guysling, of New York, the apparatus being furnished by Professor M. Sally, of New York.

Another instrument brought into requisition was Professor Langley's mirror of seventy-five feet focus. To handle such a piece of apparatus is by no means easy, for to get the best result the image must be as nearly as possible in the same straight line as the sun and mirror. The mirror, driven, of course, by clockwork, was placed at the bottom of a hill, and the dark room was placed seventy-five feet higher. Diffused light, previous to and after totality, has to be reckoned with under the circumstances, but that being so much inferior to the brightness of the sun's image a photographer who knew his business would keep the diffused light under proper restraint during development. Diffused light need not be reckoned with

during totality exposures, but considering the awkward circumstances under which such an instrument has to be used for eclipse work, I must confess myself sceptical as to whether anything good would have been obtained had the weather conditions been favourable. The instrument was in good hands, those of Mr. Jacoby, and if any one could have obtained anything with so equivocal an arrangement he would have done so. One cannot feel but sympathy for those who have to try such experiments, yet their consolation is in the motto—

"'Tis not in mortals to command success
But I'll deserve it."

Pardon me, Mr. Shakespeare, if I have misquoted you, but I write from memory.

Meteorological observations have always formed part of the programme of a well-equipped eclipse expedition, and in the eminent Professor Cleveland Abbe, of the Signal Service Weather Bureau, meteorology had one of its ablest representatives. Professor Abbe also undertook the organization of parties of observers from amongst the ship's company, and obtained a mass of valuable material. The United States Signal Service's fine organisation was well to the fore as usual, and had an able representative in Mr. E. D. Preston. Readers looking back to the 1883 eclipse reports will find his name mentioned there in connexion with the same work—pendulum swinging for determining the shape, &c., of the earth. "It's a small world," as some one, or some many, have remarked. I was surprised to meet my friend in London some time after the 1883 eclipse; I was far more surprised to meet him in South Africa in 1890. A steady, conscientious worker, devoted to his duties, and trusted by his department, as such men are, he has been in many a place during the time I myself have been vegetating, I trust not unprofitably, near Cape Town. Mr. Preston's pendulum swinging has entailed sundry stoppages on the way of the *Pensacola* to Loanda—happily for Cape Town, here also—and will also entail sundry stoppages on the return journey. Eclipse expeditions may meet with bad weather, and brilliant hopes be spoiled, but some scientific work is independent of meteorology; and Mr. Preston's position is one to be envied when other branches of study are made subservient to his. But, please be it understood, I do not wish to underrate the work of eclipse observers, who have to work hard enough when the time comes, and whose nerves have to bear no enviable strain—besides, I have been through it myself.

African explorers have not all been scientific men, nor can one man master even one branch of study. This American expedition therefore contains amongst its members several specialists, who, whilst in requisition at the time of eclipse, were expected to apply their talents to investigating matters which African travellers could scarcely be expected to take up. Mr. Heli Chatelaine was taken as interpreter to facilitate intercourse with the natives; Mr. G. T. Flint, of Washington, was taken as stenographer; Professor E. J. Loomis, from the Nautical Almanac office, went as naturalist; Mr. C. A. Orr, of Chicago, went as ornithologist and ethnologist; and Dr. D. H. Bartlet, of Amherst, went as apothecary—an important post on a West Coast expedition, for it need scarcely be said that his mission was to care for the health of the observers, and not "to poison the blacks," as one scurrilous joker insinuated.

It is significant that not only were two professional photographers taken on this elaborately organized expedition, one of whom was the son of Mr. Carbutt, the well-known American plate maker, but three other members—Messrs. Jacoby, Davis, and Orr—were amateurs in the art, and had taken up photography to assist them in their ordinary professional duties, as well as to obtain mementoes of their travels. They all carried the new Carbutt celluloid films, not only on account of their lightness, but also for their greater freedom from chance of breakage or other accidents. Of the voyage of the *Pensacola*, the extra official duties of the observers, their doings in Cape Town, and various matters in connexion with photography, I hope to speak of in a future communication, the present one being already of more than sufficient length.

C. Ray Woods.

THE SILVER PRINTING BATH.

[A Communication to the Photographic Society of Philadelphia.]

In the sensitising of paper for the purposes of photographic printing, the exciting or sensitising bath is one of the most important features of the process, hence a few notes concerning its preparation and preservation may not be out of place.

The usual method of making paper of any kind sensitive to the action of light is, after having previously impregnated it (or "salted" it, as it is termed) with an alkaline chloride, to float it for a varying length of time on a solution of silver nitrate. This solution is called the silver "bath," and consists of silver nitrate dissolved in water, with or without the addition of other substances, the strength of the solution varying from thirty-five to sixty or seventy grains of the nitrate to the ounce. The precise strength necessary to produce the best results depends upon the amount of chloride used in salting the paper, but for the several brands of paper now found in the market, both plain and albumenised, a strength of fifty grains of silver nitrate to the fluid ounce of water will be found to be a safe average.

Silver baths may be divided according to their composition into three classes.

The first class comprises such formulæ as direct the use of only the silver nitrate and water. A bath made according to this plan, and containing from fifty to sixty grains of silver nitrate to the ounce, is used at the present time by a large number of professional photographers, and is capable of producing excellent results. It is not apt to discolour with use, and by occasional purification, as afterwards to be described, will last for a long time. It should be kept slightly alkaline in reaction, as the presence of free acid would be apt to act injuriously on the paper. This can be done by the occasional addition of a few drops of ammonia, or, still better, of a small quantity of a strong solution of sodic carbonate. The resulting precipitate of silver carbonate soon settles to the bottom of the vessel, and tends to keep the bath clear by carrying down with it any floating organic matter.

The second class is represented by the old ammonio-nitrate bath. This was formerly in great favour among photographers, and although to a large extent superseded, still has some great advantages, particularly when used in the preparation of silver prints on plain paper. It is prepared as follows:—The silver nitrate is first dissolved in the proper quantity of water; two-thirds of this solution are then placed in a separate vessel, and strong ammonia added, drop by drop, until the precipitate of oxide of silver at first formed is completely dissolved; the remaining third of the solution is now added, and as this causes a slight precipitate again, pure concentrated nitric acid is added cautiously, drop by drop, until this precipitate is just re-dissolved. Although increasing the sensitiveness of the paper and deepening the intensity of the prints, this bath is apt to more easily discolour with use than the previous bath, owing to the separation of free organic matter and albumen from the paper. For prints on plain paper, however, it is particularly adapted, and will give results not equaled by any other method, the prints having a rich velvety appearance. Paper sensitised on this bath does not need to be fumed.

The third class comprises baths which, in addition to the silver nitrate, contain also an alkaline nitrate, such as the ammonium, sodium, or potassium salts. These salts act as absorbents of free chlorine, and also serve to prevent the paper from becoming excessively dry in hot weather. The following formula may serve as a type:—

Silver nitrate	60 grains.
Ammonium, or silver nitrate	60 ,,
Water	1 ounce.

Render slightly alkaline with carbonate of soda, or with ammonia. A few grains of alum are also sometimes added for the purpose of preventing blisters. This bath gives excellent results with albumen paper, and for this purpose is probably to be preferred to either of the preceding formulæ. For plain silver prints is much inferior to the ammonio-nitrate bath, and the prints seem to lose considerable strength during the preliminary washings before toning. Paper sensitised in this bath also requires to be fumed before printing.

In sensitising albumen paper in these different baths, the paper should always be "floated," as it is termed, an operation sufficiently familiar to all photographers to require no description. Plain paper may be either "floated," or the paper may be laid flat on a clean sheet of glass and the sensitising solution applied to the *salted* side by means of a clean swab of cotton flannel, or a camel-hair brush.

It may be remarked here that paper sensitised in either a bath of the first or the third class should always be fumed; with those of the second class it is not necessary. In printing, also, the sensitised paper from the former must be printed much more deeply, as they seem to lose a great deal of intensity in the subsequent washings. In the preparation of plain silver prints with the ammonio-nitrate bath, the writer has found such a small percentage of silver in the wash waters that but a slight reaction would be given to the ordinary tests of silver, thus showing that nearly all of the silver salt remained fixed in the paper, and consequently tended to deepen and intensify the print.

Having now briefly discussed the different forms of the silver sensitising bath, it remains to say a few words regarding its care and preparation. First, as every sheet of paper sensitised robs the bath of so much silver,

its loss must be made good, or in a short time the bath will cease to work properly. The bath must therefore be strengthened from time to time, and this is generally done after each day's work by adding an amount of fresh nitrate of silver corresponding to the quantity abstracted from the bath, thus maintaining it of a uniform strength. The usual practice is to allow about fifty grains of silver nitrate for each sheet of paper sensitised, and if the amount of silver corresponding to the number of sheets used is dissolved in a few drachms of water and added to the bath, and then the bath exposed to the light for a while, it will continue to work satisfactorily for a long time. The hydrometer is also used for determining the strength of the bath, it sinking to certain marks corresponding to the number of grains of silver nitrate in each ounce of the solution. This answers very well for a solution of silver nitrate in pure water, but as the bath soon becomes contaminated with soluble salts and organic matter, the density of the solution increases, and the readings of the hydrometer in consequence soon become incorrect. The chief source of contamination to the bath is from organic impurities carried into it from the paper, in time causing a brownish or reddish discoloration of the solution. This must be removed, since paper floated on such a bath is unevenly sensitised and darkened. Several methods of purification have been proposed. One is to add a small quantity of kaolin to the bath, which is then well shaken up and allowed to stand in the sun. The organic matter is carried down by the kaolin as it subsides, and, after filtration, the bath is again ready for use. Another method is to add a small quantity of a strong solution of potassium permanganate to the discoloured bath, and decompose the organic matter by its oxidising properties. This is immediate in its action, and quite effective, but is open to the objection of introducing extraneous salts into the bath. Another plan is to add a few drops of hydrochloric acid, or, still better, a small pinch of salt, and the chloride of silver thus formed, in settling to the bottom of the vessel, carries all impurities with it. The best method, however, is to add a small quantity of a saturated solution of sodium carbonate, and then set the bottle containing the bath in strong sunlight. The action of the sunlight oxidises the organic matter, and the carbonate of silver formed carries it down as it settles to the bottom of the bottle.

Should it, however, be found impossible to purify the bath by this means, the next resource is to the process of "boiling down," as it is termed. A porcelain capsule, or, still better, an enamelled iron dish of convenient size having been procured, the refractory bath is poured into it, and then placed over a gas stove and gently boiled down to dryness. The heat is then increased until the contents of the dish are in a state of fusion and completely liquefied. The heat is continued for a short time until all organic matter has been thoroughly carbonised, and then stopped and the dish and its contents allowed to cool, the latter dissolved in distilled water and filtered. The filtrate is then made up to the original measure of the bath with distilled water, and a drachm or two of fresh silver nitrate added to make up for waste and loss.

It happens, however, in course of time, that the silver bath becomes so clogged up with soluble salts, such as the ammonium, sodium, and potassium chloride and nitrate, resulting from the chemical reactions occurring during sensitising, that the bath will no longer work. It must, therefore, be set aside, a new bath prepared, and the silver recovered from the old bath.

If the bath has been made according to the first or third class, all that needs to be done is to render the bath acid with nitric acid, and then add a strong solution of washing soda until the white precipitate of carbonate of silver ceases to be formed. This is allowed to settle, the supernatant liquid poured off, and the precipitate washed repeatedly until the washings are free from colour, and all soluble salts have been removed. The precipitate is then drained on a filter, and the moist mass, filter and all, is placed in a dish of porcelain or enamelled iron, and dilute nitric acid (1–10 of water) added until effervescence ceases, and the white precipitate is nearly entirely dissolved. This solution is then filtered and evaporated, first to dryness, and then heated to calm fusion and allowed to cool. The resulting semi-crystalline mass may be considered a pure silver nitrate, and when weighed will indicate what amount of water is to be added to form a bath of the proper strength.

If the old silver bath, however, is prepared according to the ammonio-nitrate formula this method will not answer, as in the presence of the ammonia salt not all the carbonate silver can be precipitated. The best plan is, therefore, to acidify the bath as before with nitric acid, and then add salt until all the silver is precipitated as chloride. This should be well washed, collected on a filter, and dried. It may then be converted into pure metallic silver by fusing it in a crucible with powdered charcoal and nitrate of potassium, or it may be placed in a vessel containing dilute sulphuric acid (1–20 or 1–30 of water) and metallic zinc added. Metallic silver will be precipitated in a very finely divided state, and the zinc dissolved. From this silver the nitrate can be prepared by dissolving it in dilute nitric acid, and then proceeding in the same manner as described for the carbonate of silver.

CHARLES L. MITCHELL, M.D.

PHOTOGRAPHY IN AN AGE OF MOVEMENT.

[A Communication to the Bath Photographic Society.]

OUR age is not only an age of movement but of movements. None of us who aspire to the keeping pace with the times can afford to be indifferent to photography—it is something which sharpens our intellects, and brings things to our notice which we are always passing but never would have noticed but for the knowledge of photography. Besides, there are heaps of things we could never notice—because we never see them—without the aid of photography; so we will call photography an extra bit of sight and an extra bit of intellect, which no doubt it is. And it is not easy to foretell the future of photography offhand, nor yet any other way, so we will keep to the present uneasiness (which is a sure sign of advancement) and dwell upon one or two subjects which are shaping its future.

Now the first is, the interest taken in it from all classes—high, low, rich, and poor; the second is, thrusting its prying eye into everything within the world and, I may say, outside of it too, for it affords the means of depicting the magnitudes and the places of stars which must otherwise have been quite unknown to us. There are still other more marvellous applications of which the camera I am about to bring before you this evening is capable. It will be able to investigate all the movements of the spider making its web, or a cloud as it forms, and thousands of other things too numerous to mention, because you can take 600 pictures a minute on one continuous roll of film by merely turning a handle. When I first saw a roll of paper go through at the rate of ten a second, and stop an instant when the exposure was made, we were like children over new toys, though I was as sanguine as possible, notwithstanding that there was a slight feeling within me of doubt if it would really go on doing it. I think my enthusiam was more than usual over such things. Mr. Mortimer Evans has improved and improved upon it so much that I am positive the results will have a tendency in bringing forward a new kind of photography; in fact, it will make an epoch which will be immensely interesting, for the movements of the centipede, the vibrations of the heart, will have to submit to its power.

Now the next subject I shall connect with this paper, or at least movement or movements of photography, is the ladies, for they are pushing themselves forward in a marked manner. The interest they take in photography, the patience with which they work, and the amount of pains bestowed by them in the different departments, is something alarming, and we men must look to our laurels, for when you bring the words comparison and competition into notice all advancement is brought within the scope of those two words—two words, I should say, that are shaping a future in photography. The ordinary view held by the majority of people as to the intellectual power of women as compared with men is not very encouraging to the fair sex (still, this is comparatively a bygone notion), whose smaller brain is held to be positive evidence of smaller mind, or of no mind at all. This idea is still cherished by some, though in the face of everything tending to show the opposite it has taken a long time to convince some that women are truly capable of rising to any position above that of slavery—socially and physically. In my opinion it won't be long before we shall be convinced of the fact that women, when given the same intellectual advantages and education as men, will prove intellectually equal. I know it is difficult to realise in the increasing battle for existence that men can be confronted by a rival. An argument may be brought forward that these smaller delicate beings, with whiter hands and long hair, are physically and therefore mentally incapable of taking an equal place with men in the intellectual world. Well, what they may be I don't know, but I do know this, as regards their intellect in connexion with the fascinating art of photography, we shall find a hot competition, and one in which if we don't help them to win a place they will win a place for themselves. If you watch closely you can see women's intellect brought into use day by day in connexion with photography.

Women, having had greater educational advantages in the last few years, have proved themselves able to appreciate and to bring their refined and cultivated intellect to bear upon the art of photography, and we only want another Mrs. Cameron to set the ball rolling. She was one who was earnest in her work in photography, as her results show. I wish I had some here to-night to bring before you. She was

one evidently who knew that true knowledge can but make the learner more humble and more willing to learn. A weakness may hinder, but we must all bear in mind it does not crush mental effort. So let me impress upon you, the members of the Bath Photographic Society, to encourage ladies to join the Society, and whatever you do don't ignore their work. Look at it two or three times, compare your ideas with theirs, and you will find you will have soon another idea crop up.

Now, a few concluding words to this Society. Can you not begin a museum of photographic relics? and within this museum can you not start a weekly class for young ladies and gentlemen to learn photography, and let some of the members teach them? FRIESE GREENE.

EIKONOGEN AS A DEVELOPER IN PRACTICE.*

My next experiments were with the sensitometer. I do not intend to give these in detail, for I fear that I have been intolerably tedious as it is with all the details that I have brought before you. It will be sufficient to say that I tried many different kind of plates, and tried over again all the developers that have been described above, with the result that it was certainly possible to get out a little more with eikonogen than with pyro. I think that perhaps there is an advantage equal to about twenty to thirty per cent. in the matter of exposure in the case of eikonogen—that is to say, the exposures might be shortened in the ratio of six to five, or possibly as four to three.

Here, however, came in quite a new element. I had not before tried the use of the preliminary bath of hyposulphite of soda recommended as an accelerator. I tried it now, using a solution of one part of hypo in 1000 parts of water, and merely allowing the plate to rest in this whilst I was mixing up the developer. The result when the developer was poured on the plate was startling. The image flashed out with astonishing rapidity; but I found that development soon came to an end, and that not only did no higher figure come out after the preliminary bath of hyposulphite of soda, but that it was not possible to get out quite so much as without it.

The difficulty of quick development, however, was solved, and I went back to the development of plates exposed in the camera. I now found that with a preliminary bath of hyposulphite of soda, and with a developer containing two grains of eikonogen and ten grains of carbonate of soda to the ounce, the image began to show in fifteen seconds, and development was complete in three minutes—that is to say, the rapidity on development was up to the arbitrary standard that I had set up.

This finished the experimental work that I have done up till the present, and it will be expected that I give the deductions that I have drawn from it. I am tempted to do so by taking an advertisement of eikonogen that sets forth its wonderful properties under ten headings, and to set opposite each of these the conclusion that I draw from the experiments that I have just described. I put the statements of the advertisements and my own conclusions in parallel columns:—

Superiority of Eikonogen.	
1. One of the principal features of eikonogen is the fact that the exposure in the studio can be reduced to half the time required for hydroquinone or pyro.	This is not the case. The exposure cannot be reduced by more than about twenty-five per cent.
2. Eikonogen gives a bluish-black colour covered by a very delicate precipitate, which will bring out the finest details to a degree that is not even approached by any other developer.	The colour is good, but not better than that given by some other developers.
3. It makes the task of judging a negative a very easy one, as its black colour shows the contrast and grades of light and shade much better than a negative of any other colour.	I think that it is a little easier to judge of density in the case of eikonogen than in that of other developers, not for the reason given, but because the density seems to go off less in the fixing bath.
4. A solution of this developer can always be kept on hand ready for use, and will keep over a month. The developer can be used several times, as it does not discolour in the air.	This is true.
5. Eikonogen packed in boxes will keep for years, while hydroquinone and pyro in time deteriorate greatly in quality.	Eikonogen may keep for years, although it is rather difficult to see how this has been established as yet. It is not my experience, however, that pyro, if properly packed, deteriorates. I believe that hydroquinone does.
6. Eikonogen is the cheapest developer, not only in price, but also because it possesses more developing power.	Possibly it is.
7. By using an old developing solution till all the details have appeared and then taking a fresh one, those much-desired high lights will be easily obtained. The old developer may be used in this way three or four times.	This is not very comprehensible. Is it intended to indicate that "those desirable high lights" cannot be obtained working in the ordinary way? If so, it is difficult to see where the advantage comes in.
8. It is unnecessary with this developer to maintain a certain degree of temperature in winter-time.	Low temperature certainly does not retard development so much as with pyro.
9. When plates are under-exposed they should be put for half a minute in a preliminary bath containing some hyposulphite, and details will be obtained which neither pyro, nor hydroquinone, nor iron can give.	A preliminary bath of hyposulphite of soda hastens development, but does not bring out more detail than can be got without it.
10. The greatest over-exposure can be compensated by using old developer and sodium bromide, or by diluting fresh developer with two or three times the quantity of water and a little sodium bromide.	There is certainly great power of compensating for over-exposure.

Just as I have written the above it seems very dogmatic, but I wish it to be distinctly understood that I am not laying down what I write as established facts, but merely as the results of my experience gained from experiments that have certainly been numerous and that have been carried out with due care, but that have all been done with one sample only of the substance in question. I think, however, that it is quite fair to take one sample as typical, because if it be pleaded that that particular sample was inferior, the plea will hold good on either one or other of two assumptions only—namely, that eikonogen is variable in its efficiency, or that it is liable to deteriorate.

After all, I have not answered, even to myself, the question that I started with—namely, shall I prefer eikonogen to pyro for general work? It will be seen that I consider that the claims that have been put forward in its favour are extravagant. On the other hand, it has certain advantages. One of these is its extreme cleanliness. This will probably have more weight with most people than with myself. Then, it is hard to part with old friends that you do, or at least fondly believe that you do, quite thoroughly understand. On the whole, I intend to stick to pyro for at least a little time longer, and this especially considering that I have, I believe, used up the whole store of eikonogen that there is in Japan, and that it will be several months before I can get a further supply.

Postscript.

Some remarks that I read in one of the photographic journals since the time that my paper on eikonogen was written remind me that in the comparative experiments that I made I omitted almost the most important of all comparisons—namely, that of the difference in effect produced by varying the quantity of eikonogen itself. I was led to this omission by having my mind too much bent on the action of pyro. It is well known that in the case of this substance the effect of the increase of quantity is not to accelerate development, either in the matter of time that it takes for detail to appear, or in the matter of the eventual amount of detail that can be got—that is, working within pretty wide limits. It did not strike me that it might be quite different in the case of eikonogen.

I first set myself to establish the statement made above with regard to pyro, which I had in my mind only as a general impression, not as the result of any comparative experiments. Several plates were exposed for the same length of time in quick succession, and a set of developers were made up, each precisely the same except in the matter of the quantity of pyro contained. This was varied from two to ten grains to the ounce. The plates were placed side by side, and were developed by pouring the different solutions simultaneously over them all. Those images which

* Concluded from page 137.

were under the strong pyro appeared to come out a very little before the others. Perhaps there was a difference of five or six seconds between the one and the other end of the row of five plates. After a little time, however, all appeared to be at about the same stage. That is to say, so far as the eye could judge, the same bit of detail appeared on all plates at just the same time.

The plates were removed from the solutions at the same time and fixed together. When they were fixed, those that had had the greatest amount of pyro were the densest, but the difference was much less than I expected. Those that had had the most pyro also had the appearance of having had less exposure than the others, but this was due rather to a certain harshness of gradation than to the actual absence of any detail that was visible in the others.

The few experiments that I could make with eikonogen immediately showed that with this substance the effect of increasing the strength of the solution is quite different from what it is in the case of a pyro solution. Increase in the quantity results in very great increase in the rapidity of development.

Unfortunately, by the time that I had reached this stage, I had too little eikonogen left to enable me to make a set of thoroughly comparative experiments. The results I did arrive at, however, were that increasing the quantity of eikonogen to five grains to the ounce, I got with the same quantity of alkali the same rapidity of development as with a pyro development.

With pyro developer, however, two grains to the ounce gives as great a speed of development as does ten, and gives more satisfactory negatives. I therefore conclude that it takes about five grains of eikonogen to equal two of pyro, and this especially as negatives developed with that amount of eikonogen showed no tendency to hardness.

It will be seen that this knocks on the head the idea of the comparative cheapness of eikonogen, unless the manufacturers reduce the price to less than half that it is at present.

I could not make out that the strong eikonogen had any advantage over the weak in the actual amount of detail brought out.

W. K. Burton.

THE INFLUENCE OF TEMPERATURE UPON PHOTOGRAPHIC MANIPULATIONS.

About this time every winter season we get our regular line of letters containing questions involving difficulties in photographic working that are due directly or indirectly to a total disregard of temperature. The old, old questions: My developer stock bottle contains a number of crystals at the bottom; will these make any important difference in developing? My toning bath works slowly, and after going a certain distance the prints refuse to tone; what shall I do to overcome the difficulty? I have had quite a good deal of trouble lately with my fixing bath; the same brand of plates that I used several months ago, and out of the same box, take twice or three times as long to fix as formerly, and I use the same formula for bath; please tell me the cause of the trouble—have the makers of the plates changed their formula of manufacture?

To all these questions, and a score of others, there is but one answer. Don't forget that the difference in temperature between June and January for this latitude may be as much as ninety-six degrees, and that a difference of twenty-five degrees may occur within twelve hours on any day in January. In summer, the fall of temperature from the heat of daytime to the cool of night has no harmful effect upon photographic processes, but in winter, when the day temperature is only forty or fifty degrees at best, a drop of twenty-five degrees means a reduction of temperature below the freezing point of water.

As some of the results of these low temperatures in photographic operations, we may mention the crystallising out of the salts in the stock solution of developers, the mottling and blistering of albumen paper, slow and obstinate toning solutions, together with hard negatives containing too much contrast.

In the case of developing solutions which deposit crystals it is very important that these crystals should be made to go into solution again, or the character and working qualities of the developer will be entirely changed. A change of temperature such as we have indicated above as possible at this time of year would cause the separation of much of the alkaline ingredients of the developer, and a consequent slowing of its action from this cause alone. In case the developer bottle has become chilled and crystals have deposited, place the bottle in some warm (not hot) water for a short time, and then into water that is quite hot. Don't try to raise the temperature too quickly, or you will surely lose the solution from the fracture of the bottle.

The mottling and blistering of albumen paper can only be overcome by one method of working; always have the silver bath, the toning bath, and the fixing bath at as near the same temperature as possible; and be careful that this temperature is between sixty and seventy degrees Fahr. Slow toning is also due to the use of baths at too low a temperature; seventy degrees Fahr., or even a little warmer in winter time, will be found to give the best results.

As to the character of the negatives produced in cold weather, they are usually hard from want of activity in the developer. Some writers have suggested that stronger developers should be used in winter; but it appears to us that the best course to pursue is to keep up the temperature of the developer. Alfred Stieglitz, writing in the *Photographische Rundschau*, says: "The temperature of the developer in slow development is particularly important; for rapid development deviations are not so important." If the development is slow (and everybody should follow this method, as only by slow development the finest half tones can be realised) the developer must be kept at a pretty constant temperature, fifteen degrees C. (sixty F.) preferred, which degrees can easily be obtained in winter by addition of warm, and in summer by cold, water.

By applying a developer of constant temperature, the time of exposure can be regulated much better. The first appearance of the image, after the plate is in the developer, depends always upon the following three conditions: Time of exposure, concentration of developer, and temperature of the same.

A developer of about thirteen degrees C. (fifty-five F.) acts ordinarily three to five times slower than it would at fifteen degrees C. (sixty F.); that is, at a so-called normal exposure the plate would thereby become hard, while by an increase of temperature of the same developer to seventeen degrees C. (sixty-five F.), with the same time of exposure, quite a weak negative would be the result.

Cold developer gives hard negatives with correct exposure. For under-exposed plates it is therefore best to develop them with warm developer, as already proposed for instantaneous views; care has to be exercised, of course, or the plate will become foggy.

The assertion that more detail could be obtained from a warm than a cold developer is erroneous; the developer applied warm accelerates only the development of the shadows; that is, the negative remains soft, and will therefore furnish harmonious and handsome prints. In short, I would recommend to everybody not to disregard the thermometer during the development of the plate.

To the above timely suggestions we would add that it is equally important to be sure that the fixing bath for the negative is not too cold, in order to secure negatives free from stain and that do not turn yellow with time. A cold fixing bath is slow working, and although it may dissolve out the silver haloid, it may not cause the complete solution of the hyposulphite of silver, and a decomposition of the latter will make the negative turn yellow with age. Therefore maintain a fair average of temperature (sixty to seventy degrees Fahr.) for all photographic manipulations, and very many, if not all, your difficulties in winter will disappear.

—*Photographic Bulletin.*

THREE METROPOLITAN EXHIBITIONS.

On Friday evening last an attractive exhibition of apparatus was given under the auspices and in the rooms of the Hackney Photographic Society at Morley Hall. The tables were well covered with apparatus sent by Marion & Co., Abrahams, Mawson & Swan, the Eastman Company, Watson, Hart, Crouch, Fry, and others. Messrs. Edwards & Co., and the Britannia Company (Ilford), contributed a variety of photographs illustrative of their special manufactures, and many specimens of the work of the members were exhibited.

Among a considerable variety of cameras, we were struck by the ingenuity of an application made by one of the members, Mr. F. W. Gosling, by which the discharging of a shutter by means of clockwork was effected. This enabled the operator to get clear away from the camera and pose himself within a moderate distance before the trigger was pulled by the clockwork. Capital specimens of this "self-photography" formed part of the exhibit. (Some of our readers will remember that an application of a similar nature was in 1887 made to a camera by Mr. A. Johnston, of Wick. In that apparatus—which was exhibited at the Glasgow Convention of the above year, and is now in our possession—the discharge is effected by the end of a lever falling into a notch in the periphery of a brass disc fixed on the prolongation of the pinion of a watch movement.) Mr. Charles Hoddle also exhibited a hand camera in which were several ingeniously devised parts.

On Saturday evening the Holborn Camera Club had an exhibition and ball, numerously attended. An account of this appears on another page.

The annual exhibition of the North London Photographic Society took

place on Tuesday evening last, Northampton Hall being well filled by the members and their friends. We hope to give a detailed account of this next week. The collection of pictures was great, and several were most excellent. At eight o'clock a choice programme of music and recitation was entered upon, at which both professional and amateur musicians "assisted." This was followed by a lantern display of members' transparencies.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

Relative to a notice which appeared in a contemporary to the effect that the annual meeting was adjourned till the 7th inst. the Secretary informs us that the meeting cannot take place on this date, as the Registrar has not yet passed the new rules.

We are also requested to notify our readers that the registered address of the Association is no longer 181, Aldersgate-street, but is changed to 65 and 66, Chancery-lane, E.C., the new Honorary Secretary being Mr. H. J. Beasley, at this latter address.

At the Committee meeting held on the 28th ult., Mr. Bedford, Chairman of Committee, presiding, two applications for assistance were considered, and were both granted.

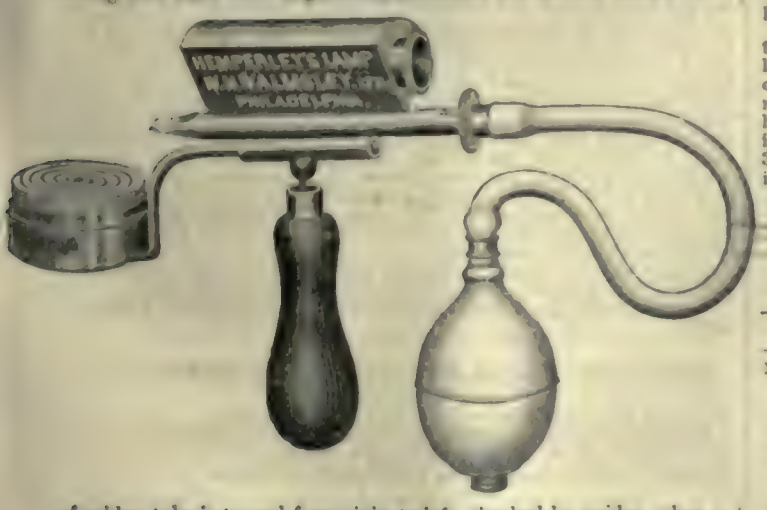
This excellent Association, we may add, was instituted to assist photographers, their wives, and children, when in distress through sickness, death, or want of employment, by means of immediate grants of money, to grant annual pensions to aged members, and to aid unemployed members in obtaining situations.

Our Editorial Table.

Hemperley's Magazine Flash Lamp.

A few weeks only have elapsed since we acknowledged the receipt, from Mr. W. H. Walmsley, of 1022, Walnut-street, Philadelphia, of several flash-light photographs that were among the finest we have seen. They were taken, he informed us, by the Hemperley Flash Lamp, a magazine, self-loading lamp. We are now in a position to give a detailed description of this, the latest, development of American ingenuity.

First of all, it is of dimensions sufficiently small to go easily into one's pocket. It consists of a tube or blowpipe, on one end of which is sprung the end of a rubber pipe connected with a pneumatic ball, the other end of the blowpipe being flattened so as to eject the magnesium powder in a thin, broad sheet across the flame of a spirit lamp immediately in front of it, and shown at the left hand in the diagram. It is in the "loading" of the blowpipe with its charge of magnesium where the ingenuity is mainly displayed. The reservoir on the top having been filled with magnesium, the milled nut seen in front of end



of rubber tube is turned from right to left, checked by guides, when a charge of powder is brought from the reservoir down into the blowpipe, and all communication between the two is completely cut off by a reverse turn of the milled head. By pressing the pneumatic ball the magnesium is forced out and instantaneously and completely ignited. Thus the simple operation of giving a portion of a turn to the milled head suffices to charge the blowpipe with magnesium, so long as any remains in the reservoir. The rubber bulb is fitted with a valve to prevent any powder being sucked back into the tube. This useful lamp is got up in a tasteful manner, and is pretty to look at, as well as being excellent in actual practice.

Jahrbuch für Photographie und Reproductionstechnik.

(Von Dr. Josef Maria Eder. Halle: Wilhelm Knapp.)

This annual contains numerous original contributed articles by the editor, Dr. Eder, and by Angerer, Himly, Hofman, Husnik, Vogel, Schrank, Just, and many others with whose names we are familiar; and it may be considered as divided into two parts, one part partaking of features of a general nature, and the other more or less relating to reproduction processes of a mechanical and photo-typic character, of which there are no fewer than twenty full-page illustrations. In this annual Dr. Eder has got together a plethora of valuable matter.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 2916.—"Certain Improvements in or relating to Hand or Detective Photographic Cameras, in part applicable to other Cameras." E. Underwood and T. A. Underwood.—*Dated February* 24, 1890.

No. 3155.—"Improvements in Photographic Camera Slides." F. A. Gregory and H. F. Ainley.—*Dated February* 27, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 5920.—"Cameras." Raymond.—Price 6*d*.

No. 19,691.—"Cameras." Freewarth.—Price 6*d*.

PATENT COMPLETED.

Improvements in Photographic Cameras.

No. 5920.—Claude Raymond, 23, Boulevard de Strasbourg, Paris, France.—*February* 8, 1890.

My invention has reference to photographic cameras of the kind generally called bellows cameras, and it consists in improved means whereby these cameras can be made to expand or contract as required.

For this purpose I fit the camera with two levers or rods crossing each other in the form of the letter X, and jointed together at the middle. One end of each lever is jointed to a pivot, and the other end slides in a grooved guide. For easier manipulation of these levers, one or both of the sliding ends is, or are, preferably fitted with a milled button, carrying a pinion, which gears with a rack on the guide.

The manner in which my invention can be best carried into effect will depend partly upon the size of the camera. For a small portable camera, I would have one pair of the crossing levers at the top, and another pair at the bottom of the camera. For a larger camera, I would have a pair of crossing levers at each side, and, in order to give additional strength, and to dispense with the bed portion, a third pair can be placed at the bottom, but without a pinion and rack. The levers of this third pair can be ribbed to make them stronger, and there may be a boss at their crossing point to serve as a foot.

One or other of the side pairs of levers can be more or less extended so as to slightly incline to one side of the plate holder, or front part of the camera, carrying the object glass. The levers can also have screw-threaded or extensible parts, so as to allow of inclining the plate holder in a vertical direction.

The claims are:—1. In a photographic camera, of the kind herein referred to, the employment of levers or rods, crossing each other in the form of the letter X, the said levers being jointed together at the middle, and moving at one end in guides, whereby the camera can be expanded or contracted as required, substantially as set forth. 2. In a photographic camera, of the kind herein referred to, the combination, with crossing levers or rods, as claimed in claim 1, of a pinion and rack, substantially as and for the purpose set forth. 3. The improved photographic cameras hereinbefore described, and represented in annexed drawings.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 10	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 11	Great Britain	54, Pall Mall East.
,, 11	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 11	Derby	Society's Rooms, Derwent-bldings.
,, 11	Bradford	30, Godwin-street.
,, 11	Manchester Amateur	Manchester Athenæum.
,, 11	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 12	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 13	Birkenhead	Hamilton Rooms, Birkenhead.
,, 13	Cheltenham	
,, 13	Manchester Photo. Society	36, George-street.
,, 13	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 14	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

February 27,—Mr. H. M. Hastings in the chair.

Mr. A. Haddon, in accordance with previous announcements, gave a practical demonstration of such glass blowing as is practised in the laboratory and is likely to be useful to photographers. Glass, he said, for our purposes may be classified under four heads:—German glass of soft and hard kinds, English soda glass, lead or flint glass, and combustion tubing. The last-named required such intense heat to soften it that it does not come under the manipulations

practicable with the appliances he proposed to use, or that would be likely to be available for photographers generally. The soft German is the glass *par excellence* for our purposes. Of this there are several qualities, one of which will stand heating and reheating without devitrifying; but many kinds will devitrify to some extent, that is to say, the surface ceases to be smooth and becomes covered with wrinkles and creases. This characteristic increases as the glass becomes old. The English soda glass after heating is apt to become ropy and to devitrify. In welding pieces of glass together it is necessary to choose them of the same kind, or nearly so, otherwise, after standing for some time, the joins may suddenly crack. Lead glass does not behave in this way, but is more difficult to work. Sometimes with lead glass the surface will darken, and sometimes it remains clear. The cause of this difference of behaviour is the different actions of various parts of the flame, the outermost part of which has an oxidising effect, whilst the next zone has the contrary action. This contrary or deoxidising action it is which darkens the lead on the surface of glass containing it, but on subjecting the darkened surface to the oxidising influence of the outer zone of flame the blackening is got rid of. This darkening and subsequent clearing were demonstrated to the audience. The structure of flame was illustrated by that of an ordinary candle, in which there are several zones. Immediately round the wick there is vapour of paraffin, wax, or whatever material the candle is composed of; then comes a zone where the hydrogen oxidises to vapour of water; then follows a zone where either the carbon turned out from the hydrogen flame or a hydrocarbon containing more carbon than the original compound is burned. There we have a high temperature. Outside of all the carbonic oxide which has been formed oxidises to carbonic acid. In this outside zone, where we have excess of oxygen and a high temperature, a piece of copper becomes covered with oxide, which is reduced again to bright copper when brought into the next inner zone. The action of the blowpipe is to intensify the heat, which it does by reducing the size of the flame. The same amount of combustion going on in a smaller area the heat in that area is intensified. The first illustration of the use of the blowpipe was to fuse the broken end of a piece of glass rod into a rounded form for use as a stirring rod. Another piece was then more strongly heated, and the end brought down on to a hard, smooth surface, so as to spread it out into the form of a crusher as well as stirrer. Next, a piece of glass tubing was bent into various forms suitable for wash bottles, &c. It was explained that for this purpose nothing is so good as the luminous flame of an ordinary fishtail or batswing burner, as a long flame, and not too much heat, is required. The tube should be rotated all the time in the flame until the operator feels that it has become soft enough to bend. A pressure gauge for gas was improvised, and the utility pointed out of being able to ascertain and regulate the pressure to any required degree when working photographic processes by gaslight. Flash lamps of two patterns, introduced by Mr. Hastings, were next manufactured by bending and welding tubes. Pipettes were then made, and it was explained that the tube must be held in the flame till it thickened before being drawn out, otherwise it would be much too thin in the narrow part. Test tubes were then rapidly manufactured, and this was followed by showing how tubes were sealed when filled with any substance, liquid or solid, which it might be desired to preserve. For welding tubes of different diameters, the ends were first thinned out, then they were fused together, and finally, stopping up the end of one tube and blowing in the other, a neat finish was imparted to the joint. T-pieces were made in a somewhat similar way. Small measuring glasses were made by first sealing the end of a piece of tube and then forming it into a foot by softening and pressing on to a hard substance, as had been done in making the crusher. It was explained that here a difficulty arose from the want of an annealing oven, in consequence of which the foot, if the article were suddenly cooled, might fly at any time. The difficulty was met by wrapping a ball of cotton wool round the foot as soon as it was removed from the flame. The wool charred all through but did not blaze, owing to there being no air at the contact with the hot glass, and the cooling was made so gradual that the article might be used with safety. The next and last articles made were what the demonstrator considered of the most importance to photographers. They were specific gravity bulbs, made by blowing small bulbs and drawing out the necks very fine. These, being filled with coloured liquids until they just floated in liquids of the required specific gravity, were sealed, and, if necessary, the weight finally adjusted by rubbing down the end of the stem with emery. Their use, particularly for ammonia, was pointed out. The bottle of ammonia was continually losing strength as the quantity was reduced by use. If a specific gravity bulb is made that just floats in the ten per cent., or whatever strength of solution is employed by the photographer, it is only necessary to add a little of the strong solution as supplied by the chemist whenever the bulb was found to sink, and the operator will know the strength of what he is using instead of being in the dark in that respect.

Mr. Birt Acres was elected a member.

CAMERA CLUB.

FEBRUARY 27,—Mr. T. Charters White occupied the chair.

Dr. C. S. PATTERSON read a paper on *Photography as applied to Medicine and Surgery*. The lecturer began by stating the qualities which he considered indispensable in a good medical photographer. He then gave a short *resumé* of the history and literature of the subject; and, going on to its present development, he gave the three great directions in which it was used, viz.:—(1) As an investigator, (2) as a recorder, (3) as a demonstrator, giving many examples. He then considered it under its various medical departments, illustrated by lantern slides. He said that before a general audience it would be absurd to go into the photographic details of manipulation, but he would like to lay great stress upon two points—isochromatic plates and the magnesium flash lamp, both of which he found almost indispensable. He impressed on the audience, moreover, the important aid they could render to the medical photographer by influencing hospital authorities to give proper facilities for medical applications of photography. The paper concluded by a short notice of the way in which this work was now gaining ground.

In the discussion which followed, Messrs. Pringle, Elder, Cooper, Andreae, Dr. Massey, and the Chairman took part.

Thursday, March 13, will be a lantern evening. Meeting at eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

FEBRUARY 28,—Mr. G. F. Blackmore in the chair.

Mr. Roe was elected a member.

Mr. CHARLES DIXON read a paper on *Holland House*. The paper was prefaced by a short description of the process employed in the production of the slides. They were, with the exception of a few on chloride dry plates, all produced by the wet collodion process by reduction in the camera from 9×7 negatives, which also owed their origin to the same method of production. In the case of some of the interiors exposures of two hours had been given, the plates being backed with wet blotting paper to keep the films moist. The lecturer traced the history of the house from the time it first came into the possession of the Holland family, in 1600, down to the present time, illustrating his remarks with a large number of interior and exterior views of the house and of the park and grounds.

Mr. Wilson presented the Society with a number of photographic works of reference as a nucleus for the formation of the Society library.

The next ordinary meeting will be held on March 14, when Mr. H. Selby will read a paper on *Stripping Films*.

HOLBORN CAMERA CLUB.

FEBRUARY 28.—This being the monthly lantern night, a good number of members and friends assembled to see the *Illustrated Boston* slides, which were much appreciated.

MARCH 1.—The Club held their annual Cinderella dance and exhibition of pictures and lantern slides at Anderton's Hotel. About one hundred "fair ladies and brave men" supported the Club, and danced through a programme of fourteen dances with pleasure to themselves and satisfaction to the lookers-on. At half-past nine the following prize-winners were announced:—Class 1, "Whole-plate and over:" 1st, Mr. F. W. Edwards; 2nd, Mr. F. Brocas; 3rd, Mr. F. T. Cobb. Class 2, "Half-plate and under:" 1st, Mr. H. Beckford; 2nd, Mr. R. Luxton; 3rd, Mr. N. Baker. Class 3, "Lantern slides:" 1st, Mr. H. Beckford; 2nd, Mr. E. H. Bayston; 3rd, Mr. Chang. Class 4, "Best set of six pictures by a lady member:" Mrs. J. E. Smith.

A large number of prints by members, including some fine enlargements by Messrs. Fry, Marion, &c., were tastefully arranged round the room, and were inspected with much pleasure by the visitors during the intervals between the dances. Several flash-light pictures were taken during the evening by Messrs. Chang, Cobb, and Bayston.

Shortly after midnight about thirty-five members proceeded to the house of Mr. and Mrs. Dear (two of our most enthusiastic members), who had kindly invited them to supper. While justice was being done to the most *recherché* repast provided a flash-light picture was taken and a print from the same passed round before the conclusion of the meal; after which a move was made for the drawing room, where music, songs, and recitations kept the company well amused till an early hour. After a vote of thanks to Mr. and Mrs. Dear for their kindness, "Auld Lang Syne" was sung, and the members departed for their homes, which were not reached in many instances till dawn.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

FEBRUARY 24.—Mr. G. Davison delivered a lecture upon *Pictures by Photography*, illustrating it by about one hundred photographs taken by himself. After speaking of the advances that photography had made and the restrictions it imposed, he proceeded to review what are generally considered the rules of art, and remarked that exceptions to these were almost as much the practice as not among the best photographers, and instanced Mr. Robinson and others who had taken some of their best pictures with the sun in front of the camera, in direct contradiction to one of the known rules. Again, another rule was that the horizon line should not be in the centre of the picture. This and many other rules he referred to, and had one or more pictures to prove that they might sometimes be departed from, and advised that the simplest subjects be chosen, namely, those with as little in them as possible, so that the interest might be centred upon the principal feature, and to endeavour to introduce originality and boldness into their pictures. He then referred to the faults to be avoided and merits to be sought, giving force to his words by a photograph showing that particular feature. The whole lecture was given in such an interesting manner, and was of such a practical nature, that few could go away without having learned something.

A hearty vote of thanks to Mr. Davison concluded the evening. Mr. Stewart suggested that it would be as well to couple with it an invitation back.

Monday, March 10,—Members' lantern night. Visitors invited. Ladies admitted.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 7.—Annual meeting.—The President in the chair.

It was proposed and carried that the President, Vice-Presidents, and Council be re-elected. Mr. H. A. Hutchinson's name was added to the Council. The Secretary and Treasurer (Mr. F. B. Bond) was also re-elected.

DARLINGTON PHOTOGRAPHIC SOCIETY.

THE third annual *conversazione* and exhibition of the above Society was held in the Mechanics' Hall on Friday, the 21st inst. The gathering numbered about one hundred and fifty members and friends. The hall was pleasingly decorated with drapings of art muslin, plants, &c.; and a string band, conducted by Mr. G. Newby Watson, enlivened the proceedings.

The photographs sent in for competition, both artistically and technically, showed great merit. There were also on view a number of very fine enlargements, being prizes won by members in previous years.

After a short speech of welcome from the President (Mr. E. Ensor, B.A.), a number of excellent lantern slides, made by the members, were thrown on the screen by means of a lantern.

The list of awards, which was read by the Hon. Secretary (Mr. W. Garritte Brewis), was as follows:—For the best frame of six photographs: 1st, Mr. E. Ensor; 2nd, Mr. T. Howlett. The *Amateur Photographer's* bronze medal, for the best single picture in the exhibition, was also awarded to Mr. T. Howlett. For the best six lantern slides: 1st, Rev. C. G. Davis; 2nd, Mr. P. J. Cooper.

BATH PHOTOGRAPHIC SOCIETY.

FEBRUARY 25.—Annual meeting.—Mr. W. Pumphrey (President) in the chair.

Messrs. Baldwin, Cleakley, Christopher Morris, Charles Terry, and W. S. Wilkins were elected members.

The Treasurer's balance sheet was produced; it showed a balance in favour of the Society, and in all respects was a most satisfactory one.

The HON. SECRETARY AND TREASURER (Mr. W. Middleton Ashman) read a carefully prepared and exhaustive report of the Society's proceedings.

The CHAIRMAN, in moving the adoption of the account, said the Society had cause to be very well satisfied. The principal expenses would not have to be incurred again; part was met out of the income and the rest by a loan from officers of the Society. He thought they would accept the financial statement as being thoroughly sound. The report speaks for itself, but the last paragraph, asking each member to induce a friend to join, he desired to lay emphasis upon.

Mr. FRIESE GREENE seconded the motion, which was carried.

The election of officers was then proceeded with, and all who served during the past year were unanimously re-elected, as follows:—*President:* Mr. W. Pumphrey.—*Vice-President:* Mr. Austin J. King.—*Committee:* Messrs. Philip Braham, Friese Greene, Augustus F. Perren, George F. Powell, and Walter Pye.—*Hon. Secretary and Treasurer:* Mr. W. Middleton Ashman, 13, Brunswick-street, Bath.

Mr. GREENE read a paper entitled *Photography in an Age of Movement* [see page 152]. Both the instrument and examples shown were regarded with much interest.

The SECRETARY exhibited one of the "Collins" detective cameras, and explained the details of working it. The neatness and simplicity of this instrument were remarked upon. It is too well known to need description here.

The CHAIRMAN then explained the method of producing photo-micrographs. He exhibited a number of specimens and the apparatus used to produce the same.

The leading points requiring attention having been dealt with, a brief discussion followed, in which Messrs. Ernest Pitman, Greene, and the Secretary took part.

Mr. KING, in moving thanks for the papers, spoke of the advantages of such a process for obtaining permanent records in microscopy, and the work could be done of a winter evening. He also referred to the more certain determinations of astronomers to-day than before photography was employed in their calculations.

There will be a lantern competition on March 26. Slides and particulars of process should be in the hands of the Secretary the day previous.

LIVERPOOL UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

FEBRUARY 26.—Dr. Kolin (the President) in the chair.

Mr. PAUL LANGE (one of the Vice-Presidents of the Society) read a paper on *Detective Cameras*. The various working parts of a detective or hand camera were explained and shown on a camera made by Swinden and Earp. A hand camera, Mr. Lange said, should be used for obtaining pictures suitable for lantern slides or enlargements, and the most convenient sized camera for this is one taking a 5 × 4 picture. The lens, which the lecturer said was the most important part, should be of the best quality, of medium focus, and for 5 × 4 work a half plate lens should be used. The shutter was the next part to be considered, and the more rapidly this worked the better was the result. As regards plates, Mr. Lange said he used the Ilford ordinary (yellow label); and the developer he employed was the washing-soda one, the pyrogallol be added dry. This gave a greenish negative, and one not very nice to look at, but one giving splendid prints, especially platinotypes. The plates he backed with red paper, and by this means he avoided loose paper in packing the plates, and also kept his plates in better condition.

In answer to a question from Dr. Kolin, Mr. LANGE said that hydroquinone was one of those developers which gave very pretty looking negatives, but that these negatives only gave poor prints. For pinholes in the negatives he used Prussian blue in water. Stripping films and Carbutt's films Mr. Lange had used, but he had given them up for glass, which, up to the present, has not been beaten for giving good pictures. The best subjects are sea views; a hand camera does not do for interiors, and pictures should not be attempted from a moving train.

After the paper Mr. Lange exhibited some fifty of his best slides by the lime-light lantern. Several very fine pictures of bathers diving from rocks and boats, yachts taking part in the Mersey boat races, and slides of some of our men-of-war were shown; also two fine hoar-frost scenes, and many fine cloud effects taken at sunset and sunrise, with many others.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

FEBRUARY 27.—The President (Mr. Paul Lange) occupied the chair.

The following gentlemen were elected members, viz.:—Messrs. Hugh R. Jones, M.A., John H. Welch, H. F. Tildesley, Geoffrey Cather, William Rock, jun., and William J. Bell.

The PRESIDENT announced that letters of resignation had been received from Messrs. J. H. Day and G. H. Rutter, as members of the Council, and from Mr. Walter Hughes, the Hon. Secretary. The vacancies thus caused in the Executive of the Association had been filled up as follows, viz.:—Mr. W. P. Christian, *vice* Mr. J. H. Day; Mr. T. B. Sutton, *vice* Mr. G. H. Rutter; Mr. W. Hughes, *vice* Mr. E. M. Tunstall; and that Mr. Edward M. Tunstall had been appointed Hon. Secretary in the place of Mr. Walter Hughes.

The list of the members of the several Sub-Committees for the year 1890 were also announced.

The attention of members was drawn to the extra meeting to be held at the City Hall, Eberle-street, on Thursday, March 20, for which evening a concert was being arranged by Messrs. A. J. Cleaver and F. K. Glazebrook to form the first part of the programme, and after which the President would conclude with his illustrated lecture on *Norway*—the first time it would be exhibited before a Liverpool audience.

The PRESIDENT also announced that the Council had arranged for a series of practical demonstrations in photography for the special benefit of beginners, to be given in the Club rooms, 3, Lord-street, fortnightly. On Wednesday, March 5, at half-past six, p.m.; subject, *Cameras and Lenses*; demonstrator, Mr. W. Tomkinson. The second of the series to follow on March 19; subject, *Focussing and Exposing;* demonstrator, Mr. J. L. Mackrell.

The Council had also arranged to exhibit the pictures (sixty in number, 15 × 12) of Mr. H. Tolley, the gold medallist, of Nottingham; these would be on exhibition for a short period in the Club rooms.

It was hoped they would prove an attraction, as through the exhibition of Mr. H. P. Robinson's series thirteen new members had been induced to join the Association.

It was announced that the expenses of the lantern exhibition of the "Photography Competition Slides" held in the Public Sale Room had been covered.

Mr. BENJAMIN T. SAYCE then submitted a most ingenious hand camera made at a very trifling cost, and meeting all the requirements of the amateur photographer.

Other business being concluded, the general public gained admittance, and Mr. D. Lewis gave his paper on *A Fortnight in the Netherlands with a Camera*, followed at eight o'clock by Mr. W. P. Christian, with *Moor and Don, or Studies in Algeria and Spain*. Both lectures were illustrated with Messrs. Archer's oxyhydrogen lantern.

The Manchester lantern competition slides lent to the Association were then exhibited. These slides were judged by the Liverpool Society some weeks ago at the request of the Manchester workers, but had to be returned immediately for exhibition at their own *conversazione*.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

FEBRUARY 5.—The President (Mr. Frederick Graff) in the chair.

The Secretary announced that an International Photographic Exhibition would be held at Newcastle-on-Tyne, England, from April 23 to May 3, and expressed the hope that members would show their appreciation of this fact by sending a goodly number of fine exhibits.

A paper was read by Dr. Charles L. Mitchell on *The Silver Printing Bath*.

Mr. BROWNE said that in listening to the very interesting paper, his mind reverted to many years ago, when he had a great deal of trouble with the discolouration of the silver bath, and he mentioned one point that occurred to him. He had found, after many trials, a process of preparing the silver bath which obviated all difficulty from discoloration. He had been using it since 1863, and it was yet as clear as crystal. It was made originally of seventy grains of nitrate of silver to each ounce of water. To every quart of silver solution, a half ounce of concentrated ammonia was added, which, of course, made a precipitate that was cleared up with solution of nitrate of ammonia; then an ounce of alcohol was added to a quart of silver solution. It seemed odd to put in so much organic matter as an ounce of alcohol, but the bath never discoloured.

Dr. MITCHELL referred to a process he had tried in treating a bath that had become discoloured, and in which he used a solution of caustic potassium. Warmth had caused an explosion.

Dr. WALLACE, as an old pupil of Mr. Browne, said he had worked on the same idea as Mr. Browne described, making a slight departure. He had used sixty grains, afterwards reduced to fifty, increasing the alcohol to ten per cent. of the total bulk, and making an addition of alum as recommended by Mr. Anthony, of New York. It had never discoloured unless exposed to light immediately after paper had been floated upon it. The solution was always in order.

In reply to a question of Dr. Mitchell, as to the evaporation of the alcohol, Mr. WALLACE said that when the bulk became reduced, alcohol was added.

Mr. MCCOLLIN exhibited and described Decoudun's photometer.

Mr. PANCOAST related an experience in making lantern slides. During warm weather he had been quite successful, but on the coming of cold weather he found it was impossible to get anything but a dull green tone or black-grey without any life to the slide. Upon investigation, he found this was due to the temperature; by warming the developer a little, he increased the warmth of tone. If the developing solution was below sixty degrees, the results were bad; but at sixty to sixty-five, satisfactory results were obtained.

Mr. PANCOAST passed around slides, and asked the nature of the deposit on the cover glass. The sky of the slide was covered with a crystalline deposit. The slides were made by Mr. Rau two years ago by the wet process, and were mounted in the usual way. They were stored in a pine box without being separated.

Mr. COATES said this occurred in ten per cent. of slides, and would all rub off. It was in the covering glass.

Mr. RAU had a box of slides made one and a half or two years ago, and on opening the pasteboard box in which they were, he found them covered with the same sort of deposit. They had been made on a fine quality of French glass.

Mr. BELL said that the cover glasses of Daguerreotypes were affected in a similar manner. The mercury with which the pictures were developed, he thought, afterwards evaporated and formed the deposit. If mercury had been used in any form on the slides, this would perhaps account for it.

Mr. RAU said mercury had not been used.

Mr. SUPLEE thought the deposit might be organic, and come from the gum or paste around the edges.

Mr. PANCOAST thought it must be in the subsequent treatment of the slide after development.

Mr. CARBUTT thought the remedy would be to coat the slide itself with collodion, and the glass too, before putting them together. The moisture that gets between the plates had a good deal to do with the trouble, he thought.

Mr. WALLACE asked if oil or glycerine would not answer the same purpose as collodion.

Mr. CARBUTT said he would not advise the use of glycerine, as it might get into globules. He thought that the chemical composition of the glass might have something to do with it.

Mr. EARLE asked what would be the effect of using Canada balsam between the glasses, as it hardened and made a good medium for light to pass through.

Mr. CARBUTT thought that would be a preventive.

Mr. BELL said balsam would necessitate the use of plate glass.

Mr. COATES found as lenses grew old they split apart, either by the balsam drying and becoming too thin to fill the space, or by some warping action—perhaps the contraction of the glass—requiring them to be taken apart and re-balsamed. This would ruin the lantern slide.

Mr. PANCOAST mentioned in that connexion that lenses in India were particularly susceptible to the fungous growth, and only remained in condition a few years—due to the damp weather between December and April. It was a matter of heat and moisture.

Mr. SUPLEE thought it might be organic.

Mr. CHEYNEY thought that one of the slides showed decidedly inorganic matter that had taken the form of crystallisation.

Dr. MITCHELL said an article in a photographic paper he had read ascribed it to chemical action, the glass being actually etched.

Dr. MITCHELL referred to an article by Captain Abney in one of the recent journals, in which he stated that on trying a colour screen tinted with turmeric on some mountain views in Switzerland, in connexion with ordinary plates, he found no advantage in the use of the screen. On repeating the experiment with a screen coloured with aurine, however, and increasing the exposure thirty times, very satisfactory results were obtained.

Mr. BELL thought turmeric was adapted to the work with orthochromatic plates, and was as good as anything.

Mr. CARBUTT said aurine was very much better under certain circumstances where the colour must be held down while exposing for greens or browns, or reddish browns. A very strong colour could not be got from turmeric.

Mr. MCCOLLIN had had occasion to copy a painting, and had made a colour screen, using it in place of a stop. He had used picric acid. The stop itself was made of thin glass.

Mr. CARBUTT said that while taking some views during a visit to the Lotus Club Gardens, at Bordentown, he became convinced that the proper place for the colour screen was between the lenses.

Mr. BELL spoke of his experience in orthochromatic photography. He commenced by putting the colour glass in the diaphragm slot, taking thin mica and coating it with collodion. He had found no material difference when putting in either at the front or back, but thought it much more convenient to put it in the back.

Mr. PANCOAST asked whether in using the back combination of a Ross portable symmetrical lens as a single lens the stop was in the right position. A writer in one of the recent journals had said that in using a lens in this manner the stop should be moved forward, so as to be one-fifth or one-sixth the focal length of the lens in front of the glass. In the portable symmetrical lens, if the stop was changed to this position, it would seem as if the light would only be admitted to the plate in almost parallel rays, so that only three or four inches square would be covered.

Mr. REDFIELD mentioned that Mr. J. G. Bullock had used quite extensively a six-inch Ross portable lens as a single lens on a $6\frac{1}{2} \times 8\frac{1}{2}$ plate, and had made some of his finest landscape work in this manner.

Mr. CARBUTT suggested the use of an adapter to change the position of the stop about half an inch forward.

Correspondence.

ONE-HUNDREDTH OF AN INCH.

To the EDITOR.

SIR,—It is useful and practical information to your general readers to know:—(1.) That at a distance of seventeen inches from the eye a circle of out-of-focus confusion, measuring one-hundredth of an inch in diameter, subtends an angle of two minutes of a degree, and under these conditions is in appearance sufficiently small to be considered, topographically, a point; a series of such points and those of a lesser diameter in a photograph making a so-called sharp picture.

(2.) That for vision at this distance, tables have been constructed and published that give the nearest distance of the foreground to be chosen and focussed for, beyond which the above conditions are maintained.

(3.) That the intelligent use of such tables, under other than the above conditions, has been fully explained in my first letter on this subject.

It is my desire and intention that your general readers may benefit by the space occupied by my letters in your columns. I have no time to waste on *words*.—I am, yours, &c., THOS. R. DALLMEYER.

25, *Newman-street, Oxford-street, W.*

[Our friends having now had this question so thoroughly ventilated, we propose that it be allowed to drop.—ED.]

STEREOSCOPIC VISION.

To the EDITOR.

SIR, I am very unwilling, as I have before explained in your columns, to pose as one understanding the stereoscope. Mr. Pringle some time ago told me I did not know much about it, and I believe I admitted the impeachment, at least I hope I did. I have, however, for some years tried to understand something of its principles, and in the interest of others who, like myself, may have been misled by text-books, I write to object to Mr. Macdougald's notions, and also to some of those of his censor, Mr. Andrew Pringle. Both these gentlemen seem to err in the same department of the subject, and in the same way. I am rather inclined to think that neither of them understands that there is a converse of stereoscopy, namely, pseudoscopy.

How is it that in nature we see stereoscopically? Thus, I think:—We have two eyes, separated by some two and a half inches. Each of these eyes forms by means of its lens an image of the object looked upon; the two images are unlike, but *the brain combines them*, and our sense of sight receives a single impression, but an impression enabling us to judge of the amount of solidity or rotundity of the object looked upon, and of its distance from us and from other objects. The two latter attributes of our vision are in great measure due to the fact that the two images thrown upon the retinæ are to a certain extent unlike.

Now as to a stereoscopic "slide." This consists of two "small" photographic pictures, which, if I remember rightly, Mr. Pringle sneered at some time since because they were small. Their size, however, is not altogether a matter of taste, but one of necessity, dictated by the distance apart of an average pair of eyes. When viewed by means of lenses in a stereoscope these pictures are magnified, and being taken usually by short-focus lenses, and viewed by lenses of similarly short focus, the impression conveyed to the brain, so far as size is concerned, is about the same as the natural object conveyed to the brain of the photographer, and, therefore, the combined picture looks *as large as life*. The stereoscopic "slide" is merely a card, or a transparency, on which are two of these small pictures suitably placed (I need not define suitability here), and as we hold one of these slides before us, we have the picture taken by the left eye of the camera to our left, and the one taken by the right eye of the camera to our right. Now for the moment let me speak of both Mr. Macdougald and Mr. Pringle. Mr. M. says we may see a slide, such as I have described, stereoscopically without an instrument, and to do this, "one way is to cross the axis of vision of the eyes, so that the right eye looks at the left picture, and the left eye at the right picture. . . . The other method is to look at the right picture with the right eye, and the left in like manner with the left. Some people can do this." But Mr. M. cannot. To this Mr. Pringle retorts: "He admits he cannot do it; still, so far as stereoscopicity goes, in which his soul delights" (Mr. P. evidently still scorns all things stereoscopic), "his inability is no loss, for there is no stereoscopic vision in the case."

Now, do either of these gentlemen know *anything about it?* May I tell Mr. M. that he will not get "stereoscopicity" by squinting at a properly mounted slide, but will get pseudoscopicity? and Mr. P. that he *will* get absolute stereoscopicity, as absolute as with a stereoscope, if he direct the vision of the left eye to the left picture, and that of the right eye to the right picture? The muscles of my eyes are very obedient. I can converge their axes, as in ordinary vision, or I can make their axes parallel, and so direct my left to the left picture of a slide, and my right to the right; or I can make their axes cross, as described by Mr. M. With parallel axes I have, literally in the twinkling of an eye, all the advantage of a stereoscope, and with the axes crossed I get the pseudoscopic result alluded to above; or I can see a negative stereoscopically (which a stereoscope would show pseudoscopically), and can, of course, see on the ground glass of the camera the picture as in a stereoscope. There is a curious phenomenon connected with these two kinds of vision which it may be worth while mentioning, namely, that the size of the image given by the two methods differs very considerably; the "cross-eyed" one reduces it, the "parallel-eyed" one enlarges it.

Although I have written at some length already, may I just say a few words on another part of the subject on which these two gentlemen do not agree? Mr. Macdougald says, "a true perception of solidity may be obtained by looking" (in a stereoscope) "at two duplicate pictures," and Mr. Pringle denies it. But both are right, and both are wrong. I am not sure, but I think that Mr. Pringle once pointed out that by shutting one eye you can see a photograph, somewhat stereoscopically, with the other, and this is so. But when two like pictures are combined in the brain (let us never forget that it is in the brain only they are combined, not in the stereoscope) a considerable amount of apparent solidity is the result, the two pictures being, in fact, viewed as with one eye; also, on account of the shadows being intensified, by this manner of viewing them, without their transparency being diminished, the appearance of solidity is increased. But it is quite true that the real stereoscopic effect is not, and cannot, be produced by two like pictures, and the whole principle of the stereoscope depends on their being unlike. ABEL HEYWOOD, JUN.

CELLULOID AND ELECTRICITY.

To the EDITOR.

SIR,—May I add to the information bearing upon this point the fact that a gelatine bromide plate which, in the making, has adhered to the drying shelf by an overflow of emulsion, gives off a bright flash when forcibly removed?

I had been impressed with the fact that some commercial plates with emulsion on the backs were more liable to fog than others of the same make, the backs of which were clean, and when I noticed the phenomenon here mentioned, I accepted it as a possible explanation of the peculiarity.

It would be interesting to examine the films complained of for evidences of cementation to a support.—I am, yours, &c., HENRY E. BURN,

President, Walton (Liverpool) Photographic Society.

14, *Dover-road, Orrell Park, Aintree, March* 4, 1890.

ETHOXO *VERSUS* THE NEW LIMELIGHT.

To the EDITOR.

SIR,—My thanks are due to Rev. T. F. Hardwich for giving so favourable a report last week of the working of the warm bath saturator. Several points of his letter seem to need a little comment on my part, not by way of opposition, but to remove uncertainties.

With regard to the comparison between the warm saturator and Dr. Broughton's vapour tank, I claim to obtain with the former, when sufficiently heated, a higher degree of saturation of gas than is obtainable with the latter, used cold.

This may seem an unfair position to take, inasmuch as some other tanks are provided with a heating arrangement in the form of a projecting strip of copper, the tip of which is heated by a spirit lamp. No doubt, if the tank was warmed to the boiling point of the fluid used, the degree of saturation would be greatly increased. Hence it may be better to say that the warm bath supplies a *safe* method of heating a stuffed saturator; while the heating arrangement of the tank is not so safe, because there is a possibility of the liquid boiling over into the tubes, and also sending steam into the gas bag.

The act of heating a stuffed drained vessel produces, of course, a little steam; this steam drives the liquid away from the sides of the vessel, and as the stuffing prevents any free movement of the liquid, it collects in the centre as a column. The capillary attraction of the stuffing being insufficient to retain all this fluid, a part of it descends to the bottom of the vessel and forms there a pool of liquid, which immediately rises again by absorption into the wool when the heat is withdrawn.

If the lower end of the saturator were warmed as much as the sides, it is obvious that the liquid, having no further place of refuge from the heat, must boil nearly as it would do in an unstuffed tank. To prevent this boiling, a cold reserve chamber is supplied by the simple device of heating only the upper half of the saturator. This cold chamber contains most of the liquid when the upper vessel is warmed, and protects it from the heat until a further supply of fluid is needed above. Thus an automatic adjustment of liquid is carried on internally.

When comparing the warm bath and Ives's saturators, I think they are equal in point of safety from explosion, because they are both stuffed with wool. Ives's vessel contains a roll of flannel, with a straight horizontal air passage through the centre; the warm bath holds as much loose wool as can be conveniently packed into it; the air passage, five-sixteenths of an inch in diameter, being in the form of a worm or coil in the upper half of the vertical cylinder. I have purposely produced many "pops" when using the warm vessel, and have seen the flash go right through the saturator, but have never had a vessel rent asunder or seen any damage done. Hence I consider pumice tubes unnecessary.

The warm bath and Ives's saturator are equal in saturating power if both are used cold; but when the nightlight is lit in the former, the saturation is doubled or trebled, so that in this respect it is much superior to Ives's pattern. This high power of saturation renders the use of ordinary benzoline, and even methylated spirits, practicable with the warm bath saturator for single lanterns; although, of course, gasoline (a light benzoline) and ether are best for dissolving lanterns.

"Short circuiting" can only happen in the warm bath through great displacement of the wool—an event which has not occurred yet—and even then there would be no danger of explosion, though there might be a pop. To test if the stuffing of a bath saturator, charged with gasoline, is in good order, all that is needed is to blow through one of the tubes—using a long rubber pipe—and to light the air issuing from the other nozzle, when a flame three feet in height should be procurable without using the nightlight. If the flame is small, it indicates either short circuiting or deficiency of fluid.

There is no objection to the use of pumice tubes with gasoline; but with the benzoline of the oil shops, it cannot be used unless it is fitted to the mixing chamber of the jet. When benzoline is being used, there is a small amount of condensation in the tube leading from the saturator to the jet; and a pumice chamber here would prevent the condensed liquid draining back into the saturator.

Rev. T. F. Hardwich's theory of the mixing chamber of a jet acting as a cure for vibration and inequalities in the flow of gas is quite new to me, and throws light on a difficult subject; it explains certain failures which have perplexed me when experimenting with nipples and jets.

There seems much uncertainty on the question as to which flame gives the highest actual temperature. The bath saturator has practically introduced several new flames, viz., those obtained by burning oxygen saturated with vapours of gasoline, benzoline, wood naphtha, bisulphide of carbon, benzole, methylated spirits, and other fluids. If brilliancy of limelight is a fair test of temperature, then the oxy-benzole flame is king over all, while oxy-benzoline is the heir-apparent.

Condensation of fluid in the tube leading from the saturator to the gas bag never occurs when oxygen is passing through the vessel; and if a flexible tube of five feet in length is used, no vapour or fluid can get into the gas bag under any circumstances, as the very small quantity of steam produced is completely absorbed by the rubber,—I am, yours, &c.,

Ashcombe-road, Weston-super-Mare. ALBERT W. SCOTT.

FIRE INSURANCE.

To the EDITOR.

SIR,—In the JOURNAL of the 14th ult. a letter appeared, signed "LUX," in response to your article of the previous week upon the question of insurance, and you invited photographers to state their grievances through your columns. Well, sir, I have been waiting each week for some further discussion upon the subject, but none has been forthcoming; therefore, in order that some slight benefit may accrue to those who are interested in the matter, I will briefly state the particulars of my own case.

My studio is built of wood, upon a six-foot stone foundation, and is covered with galvanised corrugated iron and glass. It is built between two houses, one of which is separated from it by a passage. In the winter I use a paraffin oil stove—one of the safest possible. I only keep a small stock of oil, and never more than a gallon of methylated spirit—no collodion whatever. Yet in order to insure my place I have to pay at the rate of ten shillings for 100*l.*! This charge I consider to be very excessive, as in fact my building is considerably safer than any ordinary dwelling house or shop. Add to this the fact that I employ no young persons of either sex in my establishment, and I think that most photographers will agree with me that the rate for studios similar to mine ought to be lowered very considerably. I may remark that the Company I am insured with is a very well-known and old-established firm.—I am, yours, &c., HERBERT WELFORD.

The Promenade Studio, Penrith, Cumberland, March 3, 1890.

PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.

To the EDITOR.

SIR,—So many applications have been received for copies of my pamphlet on *Methods of Conducting a Local Photographic Survey of Warwickshire* (methods which are equally applicable to other districts), that I have had it reprinted, and copies can be obtained, post free, price sixpence each, from Mr. A. J. Lesson, 20, Cannon-street, Birmingham (Hon. Secretary, Birmingham Photographic Society), or from yours, &c.,

Science Laboratory, Board School, W. JEROME HARRISON.

Icknield-street, Birmingham, February 26, 1890.

P.S.—The price named just about pays for printing and postage, but any profit will go to the Society's funds.

SODIUM ALGINATE.

To the EDITOR.

SIR,—The following may interest your correspondent, "Algin," in last issue:—

Sodium Alginate can be obtained from the Algin Company, Clydebank, N.B. The English patents relating to this substance are:—No. 142, January 12, 1881, and No. 13,433, October 11, 1884. The patentee, Mr. Edward C. Stanford, is always ready to supply information upon the subject.—I am, yours, &c., F. E. THORNTON.

St. Mary's-street, Deansgate, Manchester, March 3, 1890.

Exchange Column.

Will exchange tricycle, value 6*l.* 10*s.*, for whole-plate set.—Address, H. LEA, Athelhampton, Dorchester.

Will exchange Snider rifle with bayonet for background on roller, interior or exterior.—Address, A. L. SMITH, 233, Uxbridge-road, Shepherd's-bush.

Will exchange silver watch for a good detective camera or half-plate camera, lens, stand, and two double slides.—Address, C. GILKES, Photographer, 63, Estcourt-road, Watford, Herts.

Marion's exterior background (No. 150), an 8×7 interior, 7×5 seascape, and ship's mast, balustrade, and pedestal; want 10×8 or larger camera.—Address, W. C. CHIPPER, 39, Highgate-hill, N.

James's triple flash lamp, Cowan's changing box for 10×12 plates, and large glass dipping bath, in exchange for background, plain or otherwise.—Address, ARTIST, 17, King's-road, Upton-park, London, E.

Wanted, photographic accessories; exchange, highly finished model engine and boiler, silver watch, sewing machine, and English accordion, by Keith, Prowse, & Co., inlaid cut pearl keys.—Address, GANNON, Chelmsford.

Wanted, a good quarter-plate lens in exchange for THE BRITISH JOURNAL OF PHOTOGRAPHY for 1885 to 1888, and the *Photographic News* for 1895 to 1897, unbound.—Address, M. HOPE, 31, Sarah-street, Newcastle-on-Tyne.

Wanted, a quarter-plate box camera for wet plates, in good condition, in exchange for Vols. I. and II. of *The Camera* (unbound), Marion's *Manual of Photography*, and Pritchard's *Studios of Europe*.—Address, J. McKAY, 53, Falconer-street, Newcastle-on-Tyne.

Wanted, good lantern slides of Rome, present time, remains of ancient buildings, &c.; will exchange slides of United States scenery. Would exchange use of suitable negatives. Send rough prints.—Address, C. H. GOULD, 95, Dearborn-street, Chicago, U. S. A.

Will exchange splendid show case (size when closed, three feet by three feet eight inches, with two wings to open, making it three feet eight inches by five feet nine inches) for 2B Dallmeyer lens and cash adjustment.—Address, F. PREECE, Photographer, Hereford.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

"MORE LIGHT."—Will a recent writer who adopted this *nom de plume* kindly communicate?

F. MCKAY.—Sharland, Thavies Inn; Levy, Furnival-street; and many others. See a London Directory.

SLIDE.—The lantern slides you so much admire are by the wet collodion process. The major portion of the slides of commerce are by that process.

POSITIVE.—See leaderette on the subject in another column. It is better to remove the black backing by scraping it off than treating it with benzole.

R. E. MACK.—There are numerous landscape photographers who are ready to do such work as you require. It would be invidious were we to name any in this column.

IN A FIX.—Send us two or three more examples. The effect is strange, and as yet we can see no cause for it. We shall be glad of any further details which may assist us in arriving at a conclusion.

SIGMA.—The best plan will be to have the work reproduced in its entirety by photo-lithography. This is the cheapest process that will be at all suitable for the work. We do not think the firm in question works that process.

PARIS OIL.—The statement made at the North London Society was on the authority of the Paris manufacturers of the oil, and not vouched for by the speaker. We shall report upon it as soon as we receive a sample promised.

G. STONER.—Some of the cements sold for mending china will answer for mending the earthenware dish; but as it is such a small size would it not be better to purchase a new one? The same remark applies also to the ebonite one.

W. W. W.—The easiest way to make a solution of gelatine is to soak it in cold water till thoroughly softened and then apply gentle heat. Your difficulty has been due to attempting to dissolve the thick gelatine without soaking.

B. C. G.—In dissolving bleached lac in spirit there is always a portion which will not dissolve; therefore, a clear solution cannot be obtained except by filtration or allowing the solution to stand and settle, then decanting off the clear portion.

H. B. writes: "Would any of your readers kindly tell me where I could find detailed instructions for making a really serviceable hand camera, one that will take quarter-plates? I fancy that *Amateur Work* or some such periodical might contain what I want."

WILLANS.—It is quite illegal to copy a bank note by photography or any other method, even if the size is made somewhat smaller. We have seen better photographs of notes than that forwarded. The sale of such copies would certainly not be permitted.

H. H. MEWRULES.—The best process for taking positives which can be given to the sitter in short time is the old glass positive process. We should advise you to employ this, or the ferrotype process. Bleached negatives will not be nearly so good as direct collodion positives.

REGULAR READER (Banbury).—For such a studio as that shown in the sketch, we should advise three blinds, five feet or a little more wide, working from the ridge to the eaves, and curtains for the sides. With this arrangement any effect of lighting can be obtained. Blue holland is a very good material. The background can be placed in any position if the light be arranged to suit it.

ANNER.—In photographing the fans a considerable advantage in most instances will accrue from the employment of orthochromatised plates with colour screens; but these must be used with judgment. The formula for the orthochromatising mixture is very good, but we should prefer to use it more dilute—say, half the strength—and immerse the plates for a rather longer time. Such a very brief "dip" is apt to produce inequalities.

R. H. T. says: "On reading the article in last week's JOURNAL on *Stereoscopic Effects*, the thought struck me, Would the bringing the two images of stereoscopic lenses to coincide on the plate and give simultaneous exposure, give one image with stereoscopic effect suitable for the lantern?"—In reply: A photograph formed in the manner suggested by our correspondent would only be a confused one, owing to the overlapping of two dissimilar images.

W. J. SHORT.—1. All will depend upon the quality of the lens. We should doubt if its aperture can be much enlarged to give good definition; *f*-13 is a fair-size opening for a single lens.—2. It is the equivalent focus of a portrait lens that must be considered in numbering the stops, not the back focus at any distance.—3. Better take the formula as it stands. Even if the one salt could be substituted, what end would be gained? Certainly no improvement.

H. CLIFTON says: "I have a bath of nitrate of silver which has had some acid put into it for making ready-sensitised paper—I think it is citrate acid. Would you kindly tell me what to put in it to take the acid quite away?"—If an organic acid has been added it will be very troublesome to get rid of. The simplest way to deal with the solution will be to put into it some strips of copper, which will precipitate the silver in the metallic state, then, after well washing, to redissolve it in nitric acid, or else to precipitate the silver as chloride and add it to the residues.

B. S.—1. Our candid opinion is that all the group pictures are good, and that your customers are over fastidious. However, as the family are good customers it may be well to give them a resitting. Still the thing is vexing.—2. Instead of using salt for precipitating the silver employ hydrochloric acid; the commonest qualities will answer. After it has been added stir the whole of the contents of the vessel violently for a few minutes. Then, usually, the chloride will subside in the course of a few hours.

PUZZLED writes as follows: "Can you tell me how to prevent the formation of air-bells on silver prints when washing in running water after fixing, the result being that they all rise to the surface in a mass, not to mention that the film of air must prevent proper washing?"—There is no way of preventing the air-bells adhering to the prints if they are produced in the water. The only thing we can suggest is to prevent their formation if possible by breaking the force of the water as it comes from the main. There is no question that the adherent air does interfere with the perfect washing of the prints.

W. T. H. inquires "if a negative intensified with mercury is permanent—I mean if it should be left from the mercury bath without going on any further with it? If not, how will it fade? Will it go all over white alike, or go dark? Also, how long will it keep when you leave off intensifying it?"—In reply: No fading of the negative will result from its being treated with mercury. This treatment may either be suspended as soon as the image is darkened, or after the action has been prolonged till whitening takes place. But it is absolutely imperative that the mercury salt be thoroughly removed by washing.

T. JONES.—Without examining the instrument it would be impossible to say anything of its merits. From the description and sketches, it is an obsolete form of portrait lens of French make and of small commercial value. The object of the centre lens is to shorten the focus of the combination, and the front lens is adapted for taking views when used by itself and placed at the back of the tube. The lenses of the back combination will be in their right position if you just reverse them, so that the most convex surface of A is nearest the front combination and the fattest sides of B next the focussing screen. The stops would be better in the centre.

M. MOORE.—1. The plan shows the position to be fairly good.—2. Nine feet is not wide enough for a studio for convenient working. If for professional use, twelve or thirteen feet would be better.—3 and 4. We cannot quite understand these queries.—5. Continue the glass in the roof from about four feet six or five feet from either end.—6. The window will answer, but it would be better a couple of feet higher.—7. Corresponding with the glass on the other side of roof.—8. Four feet six or five feet.—9. About four feet.—10. The only ill effect of an excess of glass is that more blinds will be required, and the studio will be hotter when the sun is upon it.

INTERROGATOR puts the following queries: "1. What strength the gelatine solution should be used for enamelling silver prints.—2. Is it necessary to coat the collodion plate with gelatine?—3. When should the prints be spotted, before immersing in the gelatine or after stripping, and how should the spotting be done?—4. What is the best mountant for carbon prints developed on collodionised glass?"—In reply: 1. One part of gelatine to six or eight of water, according to the quality used.—2. No, though some do so.—3. Before immersion in the gelatine. The spotting can be done with oil colour thinned with turpentine.—4. Starch paste or a solution of gelatine; we rather prefer the latter.

ERRATUM.—For "W. G. Crote" as a prize winner at the lantern-slide competition of the Manchester Society, read *W. G. Coote.*

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, March 12, *Stereoscopic Photography;* March 19, adjourned discussion on *Artificial Light as an Adjunct to Daylight.*

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Next meeting, March 11, 1890, at Mosley-street Café, Newcastle. Subject for discussion, *Stereoscopic Photography.* Over one hundred examples will be shown.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Ordinary meeting, Tuesday, March 11, at 5A, Pall Mall East, at eight p.m., when the adjourned discussion will take place on the paper read by Dr. Lindsay Johnson at the annual meeting, and Mr. John Spiller, F.C.S., F.I.C., will read a paper, *Experiments by Dr. Percy and Mr. George Shaw on the Chemical Phenomena of Light.*

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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REFLECTED *VERSUS* DIRECT LIGHT FOR ENLARGING.

The heavy snowfall of the early part of last week, accompanied as it was by an unusually bright light for the time of year, afforded an opportunity for making a number of experiments that is not at all times possible.

Somewhere about a quarter of a century ago a correspondent of The British Journal of Photography called attention to the fact that when snow lay heavily on the ground it was advantageous in printing to incline the printing frames downwards to the snow rather than to the sky, the printing action being then more rapid. We remember at the time repeating the experiment, and under a somewhat leaden sky the result proved just as claimed, though the difference in favour of the snow was not great.

Last week we again made the experiment, this time under different circumstances, for while in suburban and outlying districts the snow lay pure and white, bright sunshine and a frosty atmosphere were the accompaniments. Here we had a choice of experiments in comparing direct sunshine and diffused light with diffused and sunlight reflected from the snow.

A negative of moderate density and good gradation was cut in halves, in order to secure as nearly as possible similarity in the two test plates, and a good sample of ready sensitised paper supplied the only other requirement. Exposed simultaneously to a clear north sky, and to the snow untouched by sun, the latter had a slight, but decided advantage, being probably about one-fifth quicker. Sunlit snow compared similarly with the clear, diffused light from the sky proved nearly twice as rapid; but, as might have been expected, direct sunshine carried off the palm, but the difference was not greatly in its favour—perhaps one-fourth to one-third. The frame used for the snow exposures was in every case fixed at an angle of 45° with the ground on a framework four feet high.

The result of these experiments tempted us to extend them in other directions. For contact bromide paper printing and similar purposes, obviously, there is no advantage to be gained by utilising a more powerful diffused light, the difficulty being generally to sufficiently subdue its strength when daylight is employed. For purposes of reproduction in the camera, however, the increased rapidity, combined with absolute evenness of illumination afforded by an extensive surface of sunlit snow, appeared to us to promise decidedly beneficial results.

Accordingly we first got out our lantern-slide camera, and, reversing its usual position, directed it from an upper window at an angle of about 40° towards an open, sunlit field, the ground surface being entirely unbroken by the slightest unevenness to cast a shadow. It may here be remarked that for convenience of focussing or of arranging or examining the image this position of the camera is infinitely superior to and more comfortable than the usual one, but, of course, special arrangements must be made for holding the negative in position.

The illumination, upon examining the focussing screen, was found to be superb, rivalling anything we have ever previously seen under the same optical conditions, unless it be direct sunlight intercepted by a translucent screen to diffuse it; but in the case of snow the uniformity was greater. So intense was the light that even with slow gelatine plates it was necessary to stop the lens down to *f*-45 before it was sufficiently under control. Turning then to collodion emulsion, we found that whereas with a sky exposure, and using the lens at *f*-10, it was necessary to give an exposure of at least thirty seconds, when the apparatus was directed to the snow the time was reduced to ten seconds, and even then a better exposure given.

We should have liked to practically test the same idea in connexion with enlarging, but the unwieldy nature of our enlarging arrangements and want of time prevented us, but the application is equally obvious.

What we have now to suggest is, that in enlarging and for similar purposes it would be frequently found not only more convenient, but advantageous in other ways, to direct the optical arrangement towards a whitewashed wall or other white screen placed in sunlight, rather than employ direct skylight or the silvered reflector in general vogue. The pleasantest and most comfortable enlarging arrangement we ever remember to have used was a horizontal one, the illuminant being a stable door painted white, and opened to the proper angle to catch the sun, the enlarging table and easel being moved about accordingly. We throw this out as a hint to our readers.

PICTORIAL DEFINITION IN PORTRAITURE.

In two previous issues we have called attention to the subject of large direct portraiture, more particularly to point out one reason, at least, why this class of work has met with a less degree of success than many professional photographers could desire. The primary object of those articles was to protest against the employment of such short-focus lenses as are now almost universally being used for large portraits; and also to suggest a trial by professional portraitists of a moderate degree of diffused, or pictorial, definition as yielded by lenses possessing a certain amount of uncorrected spherical aberration, instead of the microscopic sharpness given by the perfection of the optician's skill in photographic objectives.

It is tolerably well known among the profession that worked-up enlargements, made from cabinet negatives, taken at such a distance from the sitter as is customary with lenses of the present day, give greater satisfaction than do portraits of similar size if taken direct with large lenses; that is, if they are worked up to the full size they are catalogued to take, and that quite apart from the hand work that is upon the picture. It may be explained that if, in the first instance, the small picture were taken from a point as near to the model as is customary with large lenses, and then enlarged, the picture would be but scarcely more satisfactory, in an artistic sense, than the direct picture, as the conditions would be practically equal. Hence it does not follow that enlargements are necessarily better artistically than direct pictures, for they are not, provided the small negative were taken from the same standpoint as the large one.

It may be asked if enlarged portraits are not (except in the matter of sharpness)—seeing that it is often said that they are—equal to direct ones? For, if so, then where is the necessity for large and expensive apparatus if crisp sharpness be no longer desirable? A small negative can be taken under the best conditions, and sharp too, and afterwards enlarged—the lens of the enlarging apparatus being put out of focus if excessive sharpness be objectionable. An answer to this is: In a pictorial sense, enlargements are quite as good, and generally better, if they are produced under the conditions just indicated—that is, from negatives taken with lenses of suitable foci. But they are not so satisfactory from a photographic aspect, unless a considerable amount of hand work is expended upon them. There is a quality difficult to describe about a direct picture, whether it be crisply defined or otherwise, that is not found in an enlargement. Furthermore, the more operations involved in the enlarging, the more the lack of that quality becomes apparent. The enlargements that most resemble direct pictures are those which are made direct from the original negative in a single operation, as with enlargements on bromide paper, collodion transfers, or those on albumen paper made with the solar camera. Still, with many of the most successful of these, there is a something which renders them unmistakable as enlargements, even in the eyes of a novice in photography.

If enlargements possessed the same qualities as direct pictures it would be an immense advantage, particularly to amateurs who are now devoting attention to large figure studies in which a certain amount of diffused definition is introduced. Small negatives can, as every one knows, be made with much greater facility than large ones, and, of course, they are in every way less costly to produce. To say nothing of the outlay for apparatus, the cost of plates, when they exceed, say, eighteen inches by fifteen, is a considerable item, especially when, as is usually the case where the result is dependent upon a particular expression, or a nicety in the pose of the model, several have to be exposed before the desired picture is obtained. This frequently acts as a deterrent to many with limited means.

There are one or two points in connexion with "pictorial definition" which may as well be referred to here. It has before now been asserted that the same effect is obtained by taking a portrait with a perfectly corrected lens, put somewhat out of focus, as with one possessing a certain amount of uncorrected spherical aberration at its best focus. Notwithstanding that this might appear to be the case, it is not found to be so in practice.

Here is another point bearing on this subject to which it may be as well to direct attention. As with direct pictures so it is with enlargements, under certain conditions. We have often noticed that in enlarging from a microscopically defined negative with a well-corrected lens, put slightly out of focus to destroy some of the definition, the result is different from that obtained when using a lens that has a moderate degree of spherical aberration, *i.e.*, imperfect definition. In the latter case the enlargement more nearly resembles a direct picture in appearance, taken with pictorial definition, than the former. Again, with two negatives, the one taken with a lens possessing a limited amount of spherical aberration, and the other with one giving crisp definition, if the unsharp negative be enlarged with the enlarging lens sharply focussed, and the other with it sufficiently out of focus to render the definition in the two pictures equal, the effect will also be different. The former will appear more like a direct diffused picture than the latter.

The above facts are worthy of attention by those who may be inclined to essay figure studies of large dimensions, and adopt enlarging instead of taking them direct.

THE PRESENT POSITION OF ISOCHROMATIC PHOTOGRAPHY.

PHOTOGRAPHY has indeed advanced since the "good old times." In those days it was perfectly understood that certain colours "would not take" in their true luminous value in the photograph, reds and yellows being represented by black, while blue and violet came out white. This peculiarity in the ordinary process is still well recognised, but it is, perhaps, not so widely known to what extent, thanks to modern research, the difficulty has been overcome and progress made in rendering the various colours in their true gradation in photographic monochrome.

From time to time results have been shown on isochromatic plates which, when compared with those obtained on ordinary plates, presented such startling contrasts that they were sometimes received with incredulity, even by old and practised photographers. We remember that at the Birmingham Convention an experienced operator stated his belief that the great difference shown between two copies of an oil painting was due to an elaborate system of retouching; others have also expressed their opinion that the contrast was, in some instances, unduly forced, and that better results could have been obtained on the ordinary plates. Quite recently, at a meeting of the French Photographic Society, on the occasion of the presentation by Messrs. B. J. Edwards & Co. of some prints from negatives taken on their isochromatic plates, together with proofs from negatives on ordinary plates, one of the members did not hesitate to assert that in the case of two copies from an old oil painting the results shown were obtained unfairly by means of an alteration in the system of lighting. This was reported in our columns at the time. It has since been demonstrated by Mr. Edwards, before the same Society in Paris, that this supposition was entirely erroneous. The picture having been photographed in the position it occupies in the National Gallery, any alteration in the lighting was manifestly impossible.

In order more fully to elucidate the matter for our own satisfaction, we have recently witnessed several crucial comparative experiments with ordinary plates of excellent quality, as against

Edwards's isochromatic plates, on subjects in which the colours were both strongly pronounced and very varied. We purpose relating them for the benefit especially of those who, probably residing at some distance from centres where examples of isochromatism are to be seen, may have an inadequate idea of the importance of this—one of the latest phases of photographic progress. The various experiments were conducted from first to last with the utmost fairness, and in every case the competing plates were exposed in such close succession as to practically ensure identity of conditions as to lighting in each set.

The first subject was a vase of flowers. The vase itself was porcelain, of a bright yellow colour, partaking of an orange tinge. The flowers, which were not artificial, but natural and fresh, consisted of yellow daffodils, blue hyacinths, violets, and lilies of the valley. An ordinary plate exposed for one minute gave a negative which yielded a print (negative and print are now before us) in which the yellow daffodils are rendered nearly black, whilst the dark-blue hyacinth appears lighter, the violets being light against the vase, which is dark, and shows strong contrasting reflections of light from the windows.

An isochromatic plate exposed for the same length of time (without screen) gave a print in which the yellow daffodils are very much lighter than the blue hyacinth, but not quite so white as the lilies of the valley; the violets are here dark, and the yellow vase is quite of a light colour, although not white; the reflections from the glazed surface of the porcelain are almost suppressed, and, contrasted with their strength in the former one, scarcely noticeable.

An isochromatic plate was next exposed with a pale yellow screen inserted between the lenses, the exposure being three minutes. In the print from the resulting negative the yellows are brought too near the whites in value; the hyacinth and violets still remain dark, but the daffodils and vase are lighter than their true colour values, while the reflections from the vase have almost entirely disappeared, being only faintly discernable.

In the second set of experiments a different subject was selected, viz., an oil painting of fruit, consisting of two bunches of grapes, one purple and the other green, both lying in juxtaposition, an orange, a half of an orange, with its severed surface exposed, a silver tankard, and a wine glass. In a print from an ordinary plate the purple and the green are so much alike that one is altogether undistinguishable from the other; the orange is black, the stems of the purple grapes are in many cases lost, while those of the green grapes are black. A print from an isochromatic plate shows the colour values correctly rendered, and the brush-mark reflections almost obliterated. The two kinds of grapes which in the previous experiment were not to be distinguished from each other, in this are altogether unlike, the green ones being quite light, although not white. The orange, too, is light.

The third experiment was made with an old and much discoloured oil painting of a Madonna. With an ordinary plate (the exposure being two and a half minutes) it was found to be absolutely impossible to make any approach to a decent negative, the brush marks being strong, and the details being altogether conspicuous by their absence. With an isochromatic plate and a yellow screen, the exposure being six minutes, a good copy was obtained, in which the reflections from the brush marks are reduced to a minimum. The surroundings of the prints show that both negatives had received a proper exposure.

The fourth and last experiment was made on a species of test object which we brought with us. Those who are personally acquainted with the editor know that his hair partakes largely of colours of low refrangibility of the spectrum, and, although not dark to look at, invariably shows exceedingly dark, if not black, in a photograph. This was the test object referred to. When photographed on an ordinary plate, true to photographic use and wont, the hair was dark, and some considerable amount of retouching would be required to make it represent the correct colour value of the original. With an isochromatic plate the hair was lighter, the shadow side of the face standing out from the background, and the necessity for retouching much reduced.

From the experiments here recorded, we conclude that when photographing strongly contrasting colours of natural objects, such as those described, isochromatic plates should be used without the intervention of a screen in order to obtain the truest effects, as a screen produces an exaggeration; while for oil paintings, especially old and faded ones, a screen is desirable.

Considered in the light of these experiments, we believe that the remarks to which we have referred as having been made at the French Society must have been uttered in ignorance of the subject, and we can only regret that our columns were utilised to give expression to such statements. We would not by any means condemn honest criticism, but those who make such sweeping assertions as those alluded to ought to make sure of the facts before asserting that such results could only be produced by unfair dodging, as criticism of this nature has the effect of hindering the progress of our art, and may be the means of doing injustice and injury to those who are aiding in removing one of the acknowledged weaknesses of photography, and thus affording us the means of ensuring by scientific methods a more true and perfect representation of nature.

Apropos of the discussion on stereoscopic images we note a letter in the *English Mechanic* last week from a Dr. E. Schobbens, of Antwerp, in which he asserts that he has been able to obtain stereoscopic effect by the superposition on the screen of two stereoscopic transparencies projected by two lanterns. In the ordinary sense of the word, this feat, of course, as has been explained by us times without end, is impossible; but not so, *à priori*, with Dr. Schobbens's method. He inserts in one lantern a red glass, and in the other a green, and provides each spectator with a pair of spectacles, with one glass green and the other blue. "The blurred image was through the glasses analysed into a sharp wonderfully stereoscopic image. The colours were well blended in a lightly tinted white, only the light was less brilliant. In moving the head the objects on the screen seemed to have parallactic movements."

An investigation, which might possibly be of some use to photography in large cities, was under discussion at the last meeting of the Royal Horticultural Society. A resolution was passed to the effect that application should be made to the Government Grant Committee of the Royal Society for pecuniary aid in order to ascertain the chemical constituents of London fog. It is a notable fact that the action of fog on some plants in the gardens has injurious effects far beyond what would be produced under similar conditions of temperature and hygrometric state of the air. Recent correspondence has shown that the Indian climate is very injurious to lenses from causes that appear to be unknown, and in our own country the climate injures the pictorial rather than the mechanical aspect of photography.

Nevertheless, that the atmosphere can, in one place more than another, injure the appearance of lenses, we lately had most effective proof. We were shown two lenses purchased at the same time from

one of the best makers, and sent to two different towns; the usage they experienced was, it might be believed, very similar. One, after ten years' use, had the lacquer very little the worse for wear; the other was most injuriously affected. It was pitted over with dark spots, and when it came into the maker's hands for relacquering no amount of polishing sufficed to get rid entirely of the marks. Whether the difference was in the care taken, or the atmosphere of the town, or both, is matter for opinion. Judging from the circumstances brought before us, we should say that a polluted atmosphere was the main cause of the evil.

In the *Figaro* M. Camille Flammarion gives a graphic and enthusiastic account of the great Lick telescope, under the heading of *A New Eye*. "The eye whose visions I have just admired," he says, "measures more than a metre in diameter and fifteen metres in depth. Its crystalline lens is formed of an immense piece of glass, and its retina of a highly sensitive plate. The eye of a giant, in verity, as the man possessing it should measure, in our organic proportions, one hundred metres in height. . . . It sees quicker, farther, longer, and—precious faculty—it fixes, prints, and preserves what it sees. . This new eye is the photographic eye," &c.

Some highly interesting facts as to the warm weather of this winter have been published from the records at Greenwich. Thus, the mean of the maximum and the minimum temperature for January was 43·4°, which, with the exception of 43·5° in 1884 and 43·6° in 1846, has not been exceeded for fifty years. Again, the mean of the highest temperatures was 48·5, which is higher than any January during the last fifty years. Whether owing to this or other causes, we believe that photographers away from the great fog-producing centres have been busier during the month of January, 1890, than for many years past.

"An Old Positivist," writing anent our final leaderette in last week's issue on copying tarnished glass positives, says, "Why go to the trouble of making first a transparency and then a negative, which latter, if the original positive be any good, can only be inferior? Why not proceed at once to copy it in the camera *through* the glass? The tarnish will not show at the back of the collodion film, and if any other kind of stains are there visible they will interfere quite as much with the reproduction in the printing frame as in the camera. I should, myself, select that method of copying, and have very frequently done so in preference to working from the collodion side, even though it necessitate the removal of the black backing, because in addition to getting, as I think, a better copy you have *the original* in correct position. Of course, if you want the positive reproduced as it is, you *must* copy from the front."

We were unable last week to comment upon Mr. S. Herbert Fry's article on celluloid and electricity, and have now only to allude to the conclusion he arrives at, namely, "that in practice such conditions obtain as completely exclude the probability of any electrical action." This we must emphatically combat. If no greater trouble were necessary to *permanently* de-electrify the celluloid than to wash it or immerse it in water, or to stick it down to a sheet of glass by means of "some hygroscopic substance" our article would never have been written. But Mr. Fry appears to have overlooked the fact that after washing or "cleansing by some other method" the celluloid has to be dried, and it seems impossible to perform this operation or to "prepare" the material for coating without resorting to friction in some form or other. What then becomes of its de-electrification?

Again, the interposition of a hygroscopic substance between the glass and the sheet of celluloid may prevent any electrical discharge from the *under side* of the sheet. But what about the other surface? Celluloid will not absorb moisture, and so become de-electrified throughout its thickness, consequently, though one side of it may be insulated by the hygroscopic substance, it does not follow that the celluloid itself is not in a highly electrical condition, and capable of discharging sparks from its upper surface if any conducting substance be presented to it in coating. Not that we imagine much injury would thus accrue to the emulsion while in the liquid state, indeed we do not attach any great importance to the danger at this stage, and so far agree with Mr. Fry that, *practically*, his conditions do obtain up to this point.

But what about the coated celluloid? Mr. Fry will scarcely care to argue that the *dried* and *sensitive* celluloid is in any worse condition to become charged with electricity in handling and packing than is the raw material; and surely if, as he acknowledges, the latter exhibits electrical conditions when unpacked, why not the sensitive film? It is rather to the handling before, during, and even after packing that we attribute the danger, and this applies with still greater force to the celluloid wound on spools. In this latter case not only is the thinner material more easily excited, but the tension employed in winding is calculated to set up the very conditions necessary for excitement. What is wanted either in packing or winding is the interposition of some extremely thin conducting medium which will, like *water* or moisture, carry off the electricity silently and innocuously.

We may point out a slip that occurred at the close of the report in our last issue of Mr. Haddon's demonstration of glass blowing before the London and Provincial Photographic Association. The lecturer, after exhibiting the method of making specific gravity bulbs, specially recommended their use for the purpose of ensuring uniformity in the strength of the ammonia solution. The report says, "If a specific gravity bulb is made that justs *floats* in a ten per cent. . . . solution . . . it is only necessary to add a little of the strong solution as supplied by the chemist whenever the bulb is found to *sink*." The words "float" and "sink" should be transposed, because, as all our readers know, the *stronger* the solution of ammonia the *lower* its specific gravity; therefore, a bulb that will just sink to the bottom of the bottle containing ten per cent. ammonia solution will gradually rise to the surface as the liquid becomes denser by loss of ammonia. It is as well to call attention to the mistake, though it would scarcely mislead those of our readers who have the least knowledge of chemistry.

En Passant, it may be remarked that Mr. Haddon's lecture and demonstration was one of the most practical and really useful that we ever recollect to have been given before a photographic society, and we dare say his hearers will join us in sincerely wishing that more of the same sort may follow. We have become so thoroughly accustomed to discourses of the "hydroquinone as a developer," or "photography in its relation to art," type, that we are more than usually glad to welcome a departure into a new line, especially as the subject is one so useful, and at the same time so unknown to photographers. Glass blowing is supposed by most people to be an occupation carried on in a state of nearly nudity at the door of an immense furnace, and few photographers are aware of innumerable varieties of more or less useful or ornamental articles for laboratory or home use they may make with no more elaborate appliances than those employed on the occasion of Mr. Haddon's lecture. That gentleman is to be congratulated on having "scored" one.

THE ART OF RETOUCHING.

I.—Introductory.

From the number of articles written by our most eminent photographers and scientists, both professional and amateur, one would be likely to think that all the subjects in connexion with photography must necessarily be exhausted; but it is not so. Photography to-day is more exhaustless than it was years ago. Constant improvements, changes in the various modes of production, enlargement in its field of operation, I feel sure will always keep photography, as an art-science, in a prominent position. Of late years there was nothing which caused such a revolution in its working as did the introduction of the dry plate process, followed by the almost complete abandonment of the old wet plate one as a natural result. All these changes and developments have received, and are receiving every day, ample

treatment by members of the photographic profession of the most undoubted ability.

There was one branch, however, that received but scant attention, in public, from any of the recognised professors of the art of photography, although it had remained steadily indispensable in the production of really first-class and marketable photography from the moment of its first introduction. It is this branch, the art of retouching, that will demand our complete attention. It is not *now* so much neglected as it was, but until I wrote a series of papers a few years ago, at the request of the editor of THE BRITISH JOURNAL OF PHOTOGRAPHY, no one had treated the subject exhaustively for, I should think, ten to fifteen years. Since then, however, *many* works have appeared on the subject.

At the present moment there is not a leading or fashionable photographer who does not largely utilise the services of the artistic retoucher. It is, however, an amiable weakness of the former to forget his indebtedness, and many scarcely deign to acknowledge the necessity of employing the retoucher at all. Notwithstanding all this they *do* employ him, and must acknowledge that his services are a necessary factor in the production of their self-styled "art photography." Indeed, personally, I think that the retoucher lends a certain justification to the qualification of the science of photography as an *art*. Suppose we were to ask, "What is there *artistic* about photography if it be not the retoucher's work?" The only answer that suggests itself to me is the *posing* and *lighting* of the subject under treatment. This would leave the photographic portion to be considered purely *mechanical*, or, if preferred, *scientific*, but most assuredly *not artistic*. In fact, absolute success in this regard—posing, lighting, and the general composition of a picture—tends more to entitle the operator to call *himself* an *artist* rather than photography *an art*. I may here mention that in Paris many of the leading houses retain *artists proper*, if I may so put it, for the sole purpose of posing the sitter and arranging the draperies, to the absolute exclusion of the operator, however clever he may be, and leaving him nothing to do beyond working the camera and exposing the plate. This may be carrying matters to an extreme, and, personally, I think it is so, and is exceedingly hard upon many operators who are undoubtedly possessed of very considerable artistic instincts.

I believe we should all work, great and small, for the exaltation of *the art* by which we make a living, and not by individually running each other down. One branch should not seek to lessen the importance of another, for by doing so nothing is gained, but much may be lost. I say this advisedly, because where the retoucher is treated as of little importance he will become careless, and his work less meritorious. I have myself worked years with a photographer who looked upon retouchers as impostors—I might almost say pickpockets. He considered that we absolutely deprived him of what he had to pay us, that our work was altogether unimportant, and it was only the ridiculous fad of the customers that would have their photographs retouched. Of course, we knew that a good deal of this was "*bosh*," but still, there it was, and it had its effect.

I have often asked myself how it was that none of the photographers who so ignore the poor retoucher have ever had the courage of their oft-expressed opinions, and dared to offer to the public *even their most successful work* without having previously passed it through his despised hands. There may be, one of these days, some adventurous photographer who will essay this experiment, but when he does I advise him to have his "instantaneous shutter" in good working order, for he will certainly have to use it. As for his productions, I feel sure a very "short exposure" of them will suffice to establish their unsaleable qualities. Notwithstanding these oft-expressed adverse opinions, and many really talented men have not hesitated to put the same in print, I beg most humbly to say, after many years of varied experience, both in this country and abroad, that the art of retouching is not only a help or accessory, but an absolute necessity in the production of the successful marketable photograph of the present day, and of the future as well. Were this not so I fear many of my fellow-workers would be left to starve unless they turned their abilities to some more appreciated branch. There is no need, however, to lose courage; we are not to be done without. Our position at present is secure, but we must study and practise to keep it so, and be always able to show our rivals that we can not only improve their *good* negatives, but likewise make their bad ones at least *presentable*, if not absolutely successful I fear the little *family jars* between the retoucher and operator are close akin to those which sometimes crop up even in the best regulated families, but they will never reach the point that means *separation*. I fear, like the latter, we are "necessary evils" one to the other.

In this treatise my endeavour will be not only to point out the close relationship of art retouching to art photography and the benefits derived by the latter from their combination, but also to give in simple and complete form the necessary instructions to enable the reader to acquire a complete mastery over the different methods employed. I feel sure there is a general want for such a work as the present one, as it is my intention to go more exhaustively into the matter than any one who has hitherto written on this interesting subject.

The treatment of landscape negatives I do not think has ever received sufficient attention, although so much may be done to them to increase their excellence, however good they may be. It is needless to say, the more perfect the negative the less work it will require, and, of course, *vice versâ*. There are many first-rate negatives of this class which may in their natural condition be somewhat spoiled by a small defect; by the retoucher's help this may be set right, and so an otherwise really good negative saved. Great relief may be given to a negative by the introduction of a cloud; should this not be in the negative, the retoucher must "raise the wind" and produce the cloud.

The reproduction of faded photographs and pictures of all descriptions, of broken negatives and positives, the copying of oil paintings and other works of arts, are all cases that demand the utmost skill on the part of the retoucher to force up such *details* as may get lost through the impotency of photography, or *defects* which may be the results of natural decay in the originals, or *injuries* by breakage and accident. In many cases the negatives taken of some very old oil paintings are absolutely useless until the defective portions have been worked upon by the skilful retoucher. To all these facts I will draw special attention as this work progresses.

It must be clearly understood that the mere perusal of the instructions hereafter given will not prove sufficient to enable every reader to become a thorough master of the art of retouching, and thus become a competent and skilful retoucher; still, the careful carrying out of them in practice will enable any one endowed with an ordinary amount of taste and artistic feeling to, in a short time, produce very creditable results. If a year of careful study and steady practice should bring taste and artistic feeling to the student, he should be very well satisfied indeed. To those who are anxious to more *rapidly* acquire proficiency in the art, I would advise *personal* lessons from some sound, practical retoucher (one of long experience, who has had a fair art education), under whose direction success will be absolutely assured.

It is usual to say that a thorough art education is necessary before becoming a good retoucher. With this I do not quite agree. I believe a man can become a very good retoucher indeed, and yet not have had an extreme artistic training. Most certainly those who possess a thorough art education will find it of very great service as they go along, and decidedly their work will be superior to the work of those who have not had one, or those who have had one to a less degree; but it is not an absolute *necessity*. This, providing all things else are equal.

One cannot be too careful in selecting a method or style of working, as much of their future success assuredly depends upon it. Assuming that a certain method has been adopted, the utmost vigilance must be exercised lest we fall into thoughtlessness. Thoughtlessness in our work will assuredly lead to its becoming mechanical. If once we become thoughtless and mechanical in our treatment of a subject, and allow this method of working to firmly lay hold upon us, farewell to our ever producing work with any pretension to artistic excellence. Above all things, *think* as you *work*. Never become the slave of routine. A head may be treated in an off-hand, thoughtless, and somewhat mechanical manner, and yet be very pretty and effective; but it is never *lifelike*. It will have a wooden appearance, and be devoid of all intellectual beauty. Under these circumstances it is only to be expected that the truly artistic *operator* should question the legitimacy of our work, for, instead of removing the defects or

adding something to the beauty of the negative, we will be simply robbing it of all the artistic merit that may have given him a world of trouble to secure.

The photographer cannot shift from himself the responsibility in many such cases. He will unhesitatingly engage a really first-rate man as *operator*, and accordingly give him a big salary. Possibly he will produce a very superior class of negative; we will concede that he does. But now begins the trouble—What kind of a *retoucher* has he engaged? If an equally good man as his operator, no doubt the result will be magnificent photography. But suppose, as is too often the case, a cheap and inferior man occupies the position—well, all the excellence of the operator is of no avail. This fact is not in many cases attributable so much to the photographer's desire to economise in his expenses as to his failing to appreciate or care for the department represented by the retoucher.

To argue seriously as to the legitimacy of genuine and artistic retouching I think would be useless, for whatever the result, the fact would remain that we must have it. The operator must be bigoted, I might indeed say blind, who would deny the natural shortcomings of his own department. Suppose a lady with auburn locks and a plentiful supply of freckles should sit for her portrait, how does photography treat her? She might as well have had very dark hair and been badly pitted from small-pox. Could it be insisted that she should accept this as a true likeness of herself? In life, such a subject might be truly pretty, whereas the plain, unretouched photograph makes her look positively dreadful. All this the skilful retoucher may set right with a touch, not necessarily limiting his efforts to simply removing the natural blemishes of the untouched negative, but by cleverly imparting a more pleasant expression to the face can greatly enhance its beauty and value. There are many such examples of nature being badly misrepresented by photography see, too, how the lines in the face are at times exaggerated. This is all supposing that the operator is a "first-rater;" let us see how it would be if he were not. We would have badly lighted pictures, bestowing on every sitter hollow, sunken eyes, dark blotches under the nose and chin: in a word, the poor retoucher might exclaim, like the Gilbertian policeman, "the retoucher's lot is not a happy one."

I am perfectly willing to acknowledge that there are retouchers about who would ruin any negative entrusted to their care. A great deal of the inferior retouching of recent years may be classed as the *cheap and nasty*, but as long as the photographers will patronise the would-be artists who produce it, simply because it is *cheap*, they must not complain. The real cruelty is that really good men are obliged to share the opprobrium brought upon their profession by their inferior brethren. But, practically, this does not effect the art of retouching, for such men never possessed the art, or any artistic feeling.

To all, therefore, who would seriously master the various methods of artistic retouching this little work will, I hope, provide the *theory*—the reader must provide the taste and the brains.

REDMOND BARRETT.

A WORD ON EIKONOGEN, HYDROQUINONE, AND PYROGALLOL.

I WROTE a short paper some time ago for the Photographic Society of Great Britain on the subject of eikonogen, and I suppose that that paper has come to light on the other side of the world before the time that I write this. I believe the paper may be of some little use, but such usefulness as it might have is certainly greatly marred by a most foolish omission in the series of comparative experiments on which the paper was based.

I set about to try the effect of varying the ingredients of the developer, but tried variations of all the constituents *except* the actual developer itself, omitting to try variations of it. The reason was that I was trying for the efficiency of the developer in regard to two particulars only, namely, speed of action and amount of detail that could be got out. Now, in these two matters, in the case of the pyro developer, variation in the quantity of the actual pyro itself has within wide limits little or no influence. It is very different, however, with eikonogen, at least in one respect, namely, in the matter of rapidity of action.

I wrote a brief postscript to my paper to the Photographic Society on this subject; but it was hastily written, and I should like to supplement it with a word or two here, especially as I have had some experience of the developer in actual work since I wrote the said postscript. The effect of the postscript was, briefly, that whereas increase in the quantity of pyro had no effect within wide limits in increasing the rapidity of action of the developer, increase in the quantity of eikonogen in a developer had the most marked effect, but that it had little or no effect in increasing the actual power of the developer, that is to say, in bringing out more detail, or, in other words, in permitting a reduction of the time of exposure.

Substantially I believe these statements to be correct. I find that to have the eikonogen developer as quick in its action as the ordinary pyro developer (say, with carbonate of soda) it is necessary to use as nearly as may be 2·5 times as much eikonogen as is commonly used of pyro in a developer. If more than that be used the development with eikonogen will be quicker than that with pyro. I state six grains to the ounce (1·25 per cent. about) to be the strength that will most nearly make eikonogen correspond with a pyro developer in rapidity of action.

But does increase in the quantity of eikonogen permit of reduction of exposure? In the postscript above referred to I denied that it did so at all. I will, however, now admit that perhaps it does *a very little*, but it is certainly but little. There is a continual tendency on the part of photographers to confuse *rapidity of development* with development that will admit of particularly short exposure, and I have no doubt that the statements—in my opinion, at least, very much exaggerated as to the extent of reduction of exposure permissible by the use of eikonogen—have arisen from confusing rapidity of action with actual power of action. I have as yet failed to find any eikonogen developer that, with any plates I have used, will allow of the reduction of the exposure by more than 25 per cent. of that needed with a good pyro developer.

The latest experience that I have had with eikonogen has not been so much in work done by myself as in seeing and giving advice in connexion with the work of visitors to this country. We have a constant flow of tourists coming here for a little time—"Globe-trotters" we irreverently call them—a very large percentage of whom come out armed with cameras, and I have the privilege of giving advice to a good many of these. In this way, besides having further experimented myself, I have seen a good deal of eikonogen work done by others, and I may say that by far the greatest difficulty generally found is that of getting density. Increasing the quantity of eikonogen increases the rapidity of the action of the developer, and would doubtless lead to increase of density could the development be continued as long as with the weak developer; but with at least by far the greater number of plates it cannot, for if the development is very long continued, fog ensues. To prevent this, the addition of a little bromide of sodium or of potassium (in no case of ammonia) is necessary, and if enough be added to secure *the same density* as would be got with a normal pyro developer, I find that the eikonogen—vary it as I will—is a slower developer than pyro. On the other hand, if thin negatives, such as are good for bromide printing or for solar enlargements are needed, eikonogen is in every way excellent; the half tone given by it is more delicate than that got by a pyro developer purposely modified so as to give a thin negative.

All this is true of such plates as I have myself used for comparison or have seen used by others; but I by no means wish to say that it must be true of all kinds of plates. I have always insisted strongly on the fact that "one plate's poison is another plate's food" in the matter of development, and there may be many kinds of plates that are more particularly suited by eikonogen than were those I tried. How much a developer may suit one kind of plate better than it suits others will be well illustrated by what I have to say of hydroquinone.

The hydroquinone developer has many good qualities, but has never, in my hands, given as good all-round results as I can get with pyro and an alkaline carbonate with sulphite of soda. It gives an excellent colour, and is very cleanly, but with most kinds of plates it needs a *longer* exposure than is necessary with, say, pyro and potash, and development is very slow. This is, however, not the case with all kinds of plates; with some, the exposure may be somewhat reduced by using hydroquinone.

The reason for this was well hit on by Swan in his paper of about a year ago on hydroquinone. It is not because hydroquinone has a greater reducing power than pyro that it forms, in some cases, a more powerful developer than pyro, but because it has a greater "elective" reducing power, acting on that bromide of silver only that has already been acted on by light, whereas pyro has a comparatively powerful reducing action on bromide of silver that has been acted on by other causes—damp, heat, impure atmosphere, &c., or that something that tends to produce "chemical fog" in a plate from the beginning. In other words, hydroquinone has a comparatively great power of differentiating that form of latent reduction of silver bromide produced by the action of light (whatever it may be), and all other kinds of latent reduction of silver bromide. This was pointed out by Swan, but I think the example he took (ammonia developer) in comparing pyro with hydroquinone was not a fair one to the former, for pyro ammonia is the developer of all others that is liable to reduce silver bromide that has not been acted on by light at all, producing green fog, red fog, and all kinds of fog in a plate under-exposed and much forced. A fair developer to take in comparison with hydroquinone would be pyro potash, which is not given to the eccentricities of pyro ammonia. I think that had Swan compared the action of pyro potash with that of hydroquinone he would have come to the conclusion that, inasmuch as the former is a more powerful reducer than the latter, and is not liable to produce green and such-like fog, burying fine detail, in case of a very short exposure, more can be got out of *most* kinds of plates with it than with hydroquinone. Not out of all kinds of plates, however. I here give an example of a case in which hydroquinone allowed of a distinctly shorter exposure than any pyro developer, and this distinctly on account of what I have described above as "elective" power.

I had a set of plates that gave a slight *surface* fog with any pyro developer that I used. It was not the iridescent surface fog seen only with ammonia, nor yet colour fog, but a grey surface fog showing under pyro, with either potash or soda, as well as with ammonia. When an ample exposure was given, so that development might go on very easily, the fog was scarcely perceptible; when the exposure was cut down at all, and it was attempted to compensate for this by continuing development, even with a weak developer, the fog became so strong that the finer detail was all buried in it, and the plate had the appearance of being much under-exposed.

When, on the other hand, hydroquinone was tried, there was no trace of the grey fog, even if development were very long continued. The detail which, in the case of the pyro developer, was completely buried came out clear and strong in the case of hydroquinone simply by prolonging development, with the practical result that the plates could be worked with about half the exposure with hydroquinone that had to be given with pyro. This was simply due to the fact that, although hydroquinone is the less powerful reducer of the two, it acted only on that bromide of silver that had been affected by light whereas the other acted both on such bromide of silver and also on bromide of silver that happened in the case of these particular plates to have been affected in some other, to me unknown, way. The action thus was an absolute one in the case of the hydroquinone, only a differential one in the case of the pyro; and we may state with some confidence that pyro will prove the more powerful developer in the case of plates containing bromide of silver that has not been reduced by anything other than light; whereas hydroquinone *may* prove the more powerful in the case of plates that are reducible by the pyro developer without the action of light. W. K. Burton.

P.S.—I have spoken of the hydroquinone developer as slow in my hands. It has always proved so, even when I have used a caustic alkali with it, as recommended by Swan. If I have increased the quantity of the caustic alkali, so as to increase the speed of action, frilling has always ensued.

HARDWICH ON SCOTT'S WARM-AIR SATURATOR.

In my last communication on this subject I looked at the question from a purely practical point of view; the saturator worked well, and I had no hesitation in recommending it.

On reading through Mr. Scott's paper in The British Journal of Photography, however, I see statements made which are contrary to my own experience, and with which, as a chemist, I am not able to agree. Mr. Scott himself, indeed, seems doubtful of their accuracy, and apologises for some of them by saying that "a bad theory is better than no theory at all." To give one illustration of what I mean, he calculates the temperature of the "oxycarbon" flame to be half as much again as the "oxyhydrogen." The truth, however, appear to be that when carbon is burnt in oxygen, the heat generated is very much less than that of the oxyhydrogen flame.

Sir Humphry Davy found that a given quantity of oxygen, which in combining with carbon evolves heat=1, gives 1·6 with bicarburetted hydrogen gas, and 4·3 with hydrogen. Dalton, Dulong, and Despretz have also published their experiments, and although there is considerable discrepancy between the results obtained by these eminent men, yet they all agree in putting hydrogen at the top of the list, and carbon at the bottom; light carburetted hydrogen gas and ether being intermediate.

These experimental determinations correspond more or less with what we find in actual practice with the limelight; for although you can force up oxyether almost to a level with oxycoal gas, yet you have to burn a larger quantity of oxygen. And although I was much pleased with the really brilliant light I obtained with the Scott gasoline saturator and one-fourteenth nipple, the pressure gauge on the oxygen cylinder showed that the gas was running out with marvellous rapidity.

The increased consumption of oxygen need not, however, be a very serious objection, because we have now three companies producing compressed oxygen by Brin's method, and if we have more to pay for that gas, we have less to pay for the other, supposing benzoline to take its place.

I am not at all sure that in the end the saturators may not prove to be as safe, or safer. Two fatal accidents have happened already at the works with cylinders used in the oxyhydrogen process, and although the companies with praiseworthy celerity have determined to adopt new precautions, yet it seems to me that there are one or two sources of danger that have been overlooked.

For example, suppose you are working with two cylinders of oxygen and coal gas, respectively, sent out on hire, with regulators by different makers; one cylinder being full, and the other half empty. In such a case (and it is not an imaginary one) there may be a difference of as much as twenty inches water pressure in the stream of issuing oxygen and hydrogen. And although this can be corrected by the jet taps, yet I question whether it is safe. At all events, it is well to point it out as a possible source of danger. Many persons suppose that a regulator *is* a regulator, and that when you have screwed it on, you must, of necessity, have a uniformly rapid flow of gas, whether the cylinder be full or nearly empty.

Some ten years ago, when I first commenced the use of the oxyhydrogen limelight, I took an opposite view to that given above, and maintained that *equal pressure* on the two gas bags was not of importance, seeing that the operator could regulate the flow by the taps on the jet. Mr. Newton, of Fleet-street, however, who commenced his speech by saying that he had had, perhaps, as much to do with oxyhydrogen exhibitions as most people, expressed a hope that I would modify that statement. The person in charge of the taps does not always attend to his duty, and the gas under greater pressure may then pass through the mixing chamber, the wrong way, back into the gas under less pressure. Of course, cylinders are a little different to bags, but still no harm will be done by calling attention to this point.

I wrote some time since to a friend in London, likely to know, asking him if hydrogen gas under great pressure ever *deposited* anything on the interior surface of the cylinder. His answer was, nothing in the case of pure hydrogen, but coal gas may deposit a little tar. If such be the case I am sure that a cylinder once used for coal gas ought never again to be employed for oxygen, whatever it be painted—red or black.

In answer to my question as to the diameter of the three feet of air passages in his saturator, Mr. Scott says the diameter is five-sixteenths of an inch. This seems to me to be uncomfortably large, but only actual experiment can decide as to its safety. I am not as young as I was, and things which used to be a recreation and a pleasure are beginning to be a trouble. Nevertheless, I think I must make up my

mind to put Mr. Scott's saturator to a really severe trial, and see if I can burst it. If it passes triumphantly through the ordeal it will prove a valuable invention, and will, I believe, be much more generally used than it is at present. T. Frederick Hardwich.

NORWAY.

Mr. E. Howard Jaques, Vice-President of the Birmingham Photographic Society, is to deliver a lecture to members and friends at the Temperance Hall, Temple-street, Birmingham, on Monday the 24th inst., the subject being "A Trip to the Nordfjord and Geiranger" (Norway), and already the applications for tickets ensure a large audience. The lecture is to be illustrated by about 200 photographic lantern slides, to be shown with special lanterns on a 16 × 16 foot screen, and they include many striking mechanical and other effects.

Judging from Mr. Jaques's previous lectures on Norway, and his long acquaintance with the "Land of the Vikings," a very successful paper is anticipated, and we hope shortly to give full particulars of the route, which will be of much interest to photographers, the excursion embracing almost all classes of scenery—mountains, glaciers, forests, lakes, waterfalls, log villages, &c. Mr. Jaques's negatives were all taken last season, and on part of the journey Mr. Paul Lange was for several days only a few miles ahead of him. The whole of the proceeds will be placed to the credit of the Society Lantern Fund.

Arrangements are pending for a lecture on "Southern Norway," by Mr. Jaques, at the Crystal Palace Show, and the date will most probably be the 21st inst.

Foreign Notes and News.

A discovery of very considerable importance has been recently made by Professor Erich Harnack, of Halle. Ordinary albumen, as is well known, when evaporated and ignited always leaves behind it a certain amount of ash, consisting of iron salts and phosphates. Professor Harnack has succeeded in preparing a pure albumen which leaves no ash, and this pure albumen possesses qualities calculated to upset all pre-existing ideas as to the nature of this important substance. The pure albumen was prepared by a new method from the copper-albumen compound, and it displays the following characteristics:—Immersed in water it gradually swells up into a yellowish transparent mass, and finally forms a colourless solution. Boiling considerably expedites the formation of this solution, from which fact it is plain that pure albumen does not coagulate, and it is very probable that the coagulation of ordinary albumen is due to the presence of the very bodies which form its ash. In addition to these peculiarities it is not precipitated from solution by alcohol, ether, or phenol. This discovery renders the possibility of obtaining crystallised albumen, which has long been a desideratum for certain purposes, conceivable.

Regierungsrath Professor Dr. Hornig, whose death was chronicled some time ago, was not only President of the Vienna Photographic Society and Editor of the *Correspondenz*, but supported the cause of photography at the cost of his own private purse in a way and to an extent which is, unfortunately, only too exceptional. Dr. Hornig bought up the *Correspondenz* many years ago when that journal was faring rather badly at the hands of its supporters, and afterwards had the generosity to make it over free of cost to the Club for the Promotion of Photography. Dr. Hornig commenced his career as Professor of Chemistry at the Commercial School of the third Government Department. His widespread reputation ultimately brought him many distinctions and honours. He held the "Iron Cross" of the Franz Joseph Order, the Swedish Order of the "Northern Star," and was an officer of the Légion d'Honneur. Four years ago he was attacked by paralysis, and finally fell a victim to influenza.

The Dutch Photographic Societies intend arranging an international exhibition to be held at Amsterdam in the spring of next year. The preparations are already actively in progress, and it is to be hoped that English photographers will avail themselves of the opportunity afforded them of showing once more to the Continent that they are foremost in everything connected with their profession. A number of photographers, both professional and amateur, have already promised to compete for the prizes offered. Others desirous of doing so should address Herr van der Musch Spakler, 23, Vondel-straat, Amsterdam.

The *Photographisches Archiv* points out that the present year is the centenary of the promulgation of important scientific theories and discoveries. In 1690 Huygens first published his researches on the undulatory theory of light; in 1590 Jansen constructed the first microscope; and in 1790 Galvani made the celebrated observation in reference to the limbs of a frog, which has been so extraordinarily prolific of subsequent discoveries.

An amateur photographic exhibition is to be held in Buda-Pesth from April 15 to the end of May. Exhibitors are not required to be Hungarians, but the subjects must *either* relate in some way to Hungary, *or* be scientifically interesting. If Herr von Gothard send any exhibits he ought to be pretty sure of getting first prize, as his works exhibited in Berlin were recognised as being among the most valuable scientific contributions, and his observatory is situated in Hungary (Herenyi).

Let travelling photographers beware of the Ottoman Empire, or if they stray thither be careful how they practice their calling there. One of the fraternity recently attempted, during a stay in Constantinople, to photograph the Sultan on his emergence from the mosque. He was, however, promptly pounced upon by a police officer, and—refinement of cruelty—his camera *smashed*. For three weeks he was compelled to languish in prison, and when finally liberated was ordered to remove himself from Turkish territory within twenty-four hours. This was rather severe punishment for not knowing that the Koran forbids portraiture of the faithful.

The Parisian Chromo-lithographic Company is now manufacturing celluloid developing and fixing dishes of various colours—red, blue, white, brown, &c. These dishes possess the advantages of being light, unbreakable, and of resisting the action of acids, and they are not more than a millimetre thick. The difference of colour is of considerable practical utility, as one can appropriate dishes of different colours to the different reagents, such as black for hyposulphite, red for pyro, and so on

THE CRYSTAL PALACE EXHIBITION.

The feature which first arrests the attention of the visitor to the apparatus section of this exhibition is the absence of a large proportion of those London manufacturers and dealers who were last year represented. This, however, has its sunny side for those from the provinces, who, by such withdrawal, have better chances of attracting attention to their exhibits. Birmingham, also, which last year put in so goodly an appearance, remains outside—that is, so far as we could discover from a visit made on the opening day, when as yet the catalogue had not been got ready. For want of the catalogue it is impossible to enumerate all exhibitors, for at the time we were there, some were only getting their stalls fitted up.

Among London manufacturers, Messrs. Watson & Son have a fine display of their new Acme camera, constructed in various sizes. In one of these we observed that the tripod head, which is sunk into the baseboard, is formed of aluminium, by which a considerable saving in weight is obtained, without any seeming sacrifice in the strength. Among their studio cameras is a magnificent one for 24 × 20 plates. They show a large selection of folding stands, some of them being extremely portable; and also platinum-toned silver prints on plain paper. The paper and toning agent have, we are informed, been sold by the firm for the last two years.

Mr. W. F. Stanley has a large show of cameras, optical and dark-room lanterns; many useful appliances for every-day use, and a very large studio camera on a stand. In one of their long-extension conical bellows cameras we noticed a useful feature, viz., tags on the bellows by which it could be attached to the front board, thus practically reducing its effective length when using short-focus lenses, and preventing sagging of the body.

Messrs. R. & J. Beck's collection of apparatus includes lenses and microscopes with cameras specially adapted for enlarging from microscopic objects. One very large studio camera is noticeable from the completeness with which every adjustment is under the control of the operator from behind; even the raising and lowering of the lens is effected by rods gearing into beautifully finished bevelled wheels.

Messrs. D. Noakes & Son, whose speciality is the optical lantern, demonstrate that they are practical makers by having assistants at work at turning lathe and bench. Here we can witness the operations of screwing and fitting lens tubes and similar work. Among other things they show a "gas regulator," alleged to stop all noise and roaring when compressed gases are used. They also exhibit transparencies, plain and coloured, condensers in great variety, lanterns, fittings, and cameras.

At the stall of Messrs. J. Theobald & Co. there are three girls busily engaged in transferring chromo-lithographs from paper to glass as a means of manufacturing cheap coloured lantern slides; a fourth being seen painting with the brush. This firm also exhibits a large collection of outline figures on glass, with cameras and lenses of a class which seems intended as an appeal to the multitude.

The Platinotype Company exhibit specimens of their work, together with paper and chemicals for hot and cold development. Messrs. Sharp & Hitchmough have among their exhibits a very useful collection of fittings for cameras, which includes bellows, bodies, racks, pinions, screws, and many other things of like import. They also exhibit their Aptus hand camera, which is adapted for a variety of purposes.

Mr. W. Scorer exhibits his patent camera with rotating fronts for bringing the lens opposite any part of the plate; also a huge landscape camera for 30 × 24-inch plates, erected on a stand of corresponding dimensions.

Messrs. Pearson & Denham exhibit reducing cameras for lantern slides, the "Circumbra" camera, and some burnishers of marvellously low price. Mr. E. G. Platt shows a collection of brass fittings for cameras; and Trevor & Co. exhibit wrappers for cabinets and *cartes*. The well-known Perfection lamp is displayed to perfection.

Lenses of various kinds, and in various styles of mounting, are exhibited by Messrs. Taylor, Taylor, & Hobson; and Messrs. B. J. Edwards & Co. have a collection of negatives and specimens illustrative of the capabilities of their isochromatic plates.

Messrs. Holmes, Sadler, & Holmes have studio accessories, such as rustic seats, &c.; while Messrs. Houghton & Son, Sands & Hunter, and J. F. Shew each exhibit large selections from the goods in which they are so well known to deal.

By the time we next visit the Palace the exhibits will be all in their places and the catalogues ready. We shall then resume.

"HALATION" AND "SOLARISATION" AS EXHIBITED BY EXPOSURES THROUGH APERTURES OF VARIOUS GEOMETRICAL FORMS.

It is now some time since the writer endeavoured to show that the phases of "normal," "neutral," "reversal," "second neutral," and "second normal," were obtained, *ceteris paribus*, by exposures respectively t, t_R, t_R^2, t_R^3, t_R^4, and so on. Another rather striking phenomenon, namely, that the superficial extent of the "halation" between "t" and "t_R^2," increased in a very definite ratio, was also pointed out*; but the details which characterise the various stages of "reversal" were not then given, chiefly for the reason that a sufficient number of experiments had not been made to justify any attempt at a reliable summary.

The mere fact of an alternate recurrence of darkening, greying, brightening, greying darkening, greying, brightening, and so on, under conditions where everything appeared to be constant, except the duration of the exposure, having seemed to be consistent with the laws of no branch of natural philosophy which did not take cognisance of attraction and repulsion, the conclusion was deduced on *prima facie* evidence that, the action of the developer being allowed to be electrical, the cause which produced normal reversal, abnormal, and re-reversal alike—*i.e.*, light—must of necessity be admitted to be electrical also.

Sufficiently delicate apparatus, in the shape of electrometers and galvanometers, not having been available, a consideration of the different distribution of electric density on solid conductors of various forms suggested the idea that the shape of the developable image might be so regulated as to demonstrate whether or no there was any marked distinction between the action of an obtuse and an acute angle in influencing the direction of the deposition of the metallic silver.

It was assumed at the outset that, with reasonable care, the disturbing causes—reflection, inflection, and interference—might be expected to be so trifling under the circumstances as to allow of their being ignored; and one or two preliminary experiments seemed amply to justify this decision.

Triangular apertures having been cut with a sharp lancet in pieces of black cardboard, one angle was painted with Chinese white, and it was found that the outline of the images produced by exposing plates underneath exhibited no visible variation at any point on being developed. Circular and square apertures exposed with constant motion, and perfectly steady, to perpendicularly falling and extremely oblique light, from a simple point of light to a full No. 4 Bray jet, showed no perceptible variation in the harshness or softness of any portion of their margins.

But the alteration of the geometrical shapes of these same apertures made manifest a vast difference in the degree in which at various stages of their illumination they "reversed" under the action of the developer—the same developer.

Circular apertures were at first tried. These, without exception, gave an equal depth of halation all round for every exposure, the superficial extent of the degradation varying simply as the exposure was prolonged or the developer was "accelerated." Square openings—particularly those of considerable magnitude—gave a circular halation, and very palpably showed that the halation was at a maximum in the middle of each bounding edge; at a minimum in each corner. Isosceles triangles of various proportions amplified beyond all question the evidence showing that, whatever the cause might be, the halation with a slightly "over-exposed" aperture, or with one which, "correctly exposed," was treated with a developer in which the "accelerator" disproportionately preponderated, was greatest at the edge of straight lines and "obtuse" angles, least at "right" and "acute" angles.

Beyond this it was seen that in the case of very acute angles there was a certain exposure (or development) which gave not merely a minimum of halation, but an angular area of exceptional clearness, as if in the space enclosed by the protracted lines either no action, or a reverse action, had been initiated. Thus, suppose the direct action of light to have penetrated between the upper lines of the letter X, that portion would, under the conditions detailed, be blackest; a half-tone, soft margin would occupy the angles to the right and left; a bright, clear space would be enclosed between the lower lines.

It was formerly stated that the "reversal" commenced in the centre. This is true. But numerous experiments have since shown that, while at a certain early stage the centre is the clearest portion of the exposed aperture, a dark margin, soft on the inside, abrupt and harsh at the extreme limiting outlines, invariably accompanies every example in which the "solarisation" is seen to commence in the centre. Moreover, the blackness, or density, by transmitted light is found to be the greater the more acute the bounding angle.

It has been argued by some that at the acute angles the light has performed less work. Granted! The margin is absolutely sharp nevertheless, and neither the eye nor the microscope can detect the slightest trace of interference bands. It has been argued by others that the insolated or illuminated molecules have set up a reflex action upon adjacent molecules which have not been directly affected by light, and it has, further, been shown that under these circumstances the phenomena exhibited would be precisely those which are found to result. Granted also! Can any laws of chemical affinity, or any laws of molecular physics which do not consider attraction and repulsion, explain why a prolonged duration of the disturbing cause can produce alternating and re-alternating phases of black and white in the same spot when tested by the same reagent?

HUGH BREDNER.

Our Editorial Table.

AN AUTOMATIC REPEATING SHUTTER.

(THE BLACKFRIARS PHOTOGRAPHIC COMPANY. Surrey-row, Blackfriars.)

WHILE all other shutters have to be "set" by some means or other, this automatic one is always ready to respond to pressure upon the pneumatic ball. Two thin plates, each pierced with a circular aperture the size of the lens, pass each other in opposite directions under circumstances which ensure a full and clear aperture at the central stage of the passage. The curious thing is that by merely repeating the pressure on the ball they again pass, and so on *ad infinitum*. A quick, sharp pressure ensures greater rapidity than when slow pressure is applied. By pulling out a small button at the

end the shutter remains open, subject to a second pressure of the ball by which it is closed. The means for fastening the shutter to the hood of the lens is also ingenious. It is placed loosely on, and by turning a milled-headed ring, an interior ring contracts and clasps the hood firmly. It will prove a most useful instrument.

From the same firm we have received a species of photographer's pocket compass, devised by M. Decoudun. It is smaller than a watch. When one is taking his walks abroad or in the city, and observes the direction in which the light falls upon any object so that it is properly illuminated, he has then to point the handle of the compass to such object, and opposite to it, on the floating card, he will see the hour of the day at which the light will fall direct or obliquely. Having entered this in his note-book as a future guide, he can resume his tour of inspection.

Platinum Toning.

(By Lionel Clark, C.E. London: Hazell, Watson, & Viney, Limited.)

The readers both of our volume for last year and of our current Almanac are aware of Mr. Clark's method of toning silver-paper prints by platinum. In this manual he enters into the subject in a more elaborate manner than could easily be done in a paper contributed either to a society or to a serial, and devotes special chapters to the chemistry of platinum toning and its history, describes experiments, and gives plain directions for printing—from the selection and preparation of the paper to the mounting of the prints. Mr. Clark treats his subject in a lucid manner.

Marion's Photography.

(London: Marion & Co.)

This excellent work has now reached its fourth edition. The present one is brought up to date by the insertion of topics which have sprung into existence, or to which force has been given, since the publication of the previous edition. It is a safe and reliable guide throughout, whether in its optical, chemical, or manipulative departments. A useful addition to the work is a singularly comprehensive catalogue of the various goods manufactured or sold by the publishers, who are recognised as occupying a place amongst the foremost of enterprising and extensive photographic merchants.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3392.—"A New or Improved Detective or Hand Camera." W. Griffiths.—*Dated March* 4, 1890.

No. 3393.—"An Improved Flexible Film as a Support for Photographic Negatives and Positives." E. W. Foxler.—*Dated March* 4, 1890.

No. 3446.—"A Photographic Camera and Receptacle or Bag therefor." A. P. Riley.—*Dated March* 4, 1890.

No. 3482.—"Improvements in Photographic Cameras." L. van Neck.—*Dated March* 4, 1890.

No. 3571.—"New or Improved Apparatus for Controlling and Effecting the Discharge of Flash Lamps and the Release of Photographic Shutters." R. Slingsby.—*Dated March* 6, 1890.

No. 3597.—"Improvements in Photographic Cameras." A. Penhiro.—*Dated March* 6, 1890.

No. 3730.—"Improvements in or applicable to Photographic Cameras." M. Evans.—*Dated March* 8, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 5374.—"Photographic Printing." Nicol.—Price 6*d*.

No. 5525.—"Photographic Hand Cameras." McNamara.—Price 8*d*.

No. 6353.—"Photographic Apparatus." Darier-Gide.—Price 1*s*. 3*d*.

No. 6385.—"Stereoscopes, &c." Ransome.—Price 8*d*.

1890.

No. 611.—"Magic Lanterns, &c." Hughes.—Price 6*d*.

No. 765.—"Cameras." Communicated by Fichtner. Browne.—Price 6*d*.

No. 782.—"Photographic Lifting Thimble." Clark.—Price 6*d*.

PATENTS COMPLETED.

Improvements in and in Connexion with Photographic Printing.

No. 5374. William Walker James Nicol, Mason College, Birmingham, Warwick.—*February* 15, 1890.

My invention has for its object the production of photographic pictures or images in silver on paper, wood, or other surfaces.

For this purpose I apply to paper or other suitable material a coating of a ferric salt, alone or mixed with the other salts hereinafter specially mentioned; the surface thus prepared is sensitive to light. The ferric salt used may be that of any of the organic acids afterwards mentioned, which prevent the precipitation of iron by ammonia; or it may be any other ferric salt sensitive to light, and the precipitation of the iron is in this case prevented by the addition of a sodium, ammonium, or potassium salt of one of the organic acids, which prevent the precipitation of iron by ammonia, and this may be employed either in the solution with which the paper or other material is coated, or it may be added to one or other of the solutions subsequently used.

The surface sensitive to light is then exposed to the action of light under a negative, or other screen of similar character, when after some time a faint image becomes visible; it is then brought in contact with a solution containing silver nitrate or the other salts of silver (subsequently mentioned) dissolved in ammonia, to which has been added potassium oxalate, or the other salts mentioned later, which may tend to increase the rapidity and vigour of the development, alter the tone of the finished picture, or prevent the precipitation of the iron by the ammonia. The print is then washed in water, to which has been added ammonia, and a salt of one of the organic acids, which prevent the precipitation of iron by ammonia. A subsequent washing in water, followed by drying, completes the operation.

Hitherto no means have been known by which, when using ferric salts as sensitisers (*i.e.* for coating the paper) and developing with solutions containing silver salts, a print could be obtained, the tone of which was such that toning with gold or other metals, followed by the use of sodium thiosulphate could be dispensed, I therefore greatly simplify the operations involved, and add to the permanency of the finished print.

According to my invention I use paper, wood, glass, woven or other material, the surface of which I prepare and render sensitive, by applying to it in any convenient manner a solution prepared in one of the following ways:—

I. I make a solution of normal ferric sodium citrate ($Fe\,Na_3\,(C_6\,H_5\,O_7)\,2$) containing twenty per cent. of the salt as expressed by the above formula, and add to it five per cent. of normal potassium oxalate ($K_2\,C_2\,O_4$), but I do not confine myself to these exact proportions, they may be altered according to the vigour and tone desired in the resulting picture.

In place of the ferric sodium citrate mentioned above I sometimes use other salts as follows:—Ferric ammonium citrate or ferric potassium citrate, or the corresponding salts of tartaric acid, also ferric tartrate and ferric citrate, and I sometimes use a mixture of these ferric salts with citric, or tartaric, or oxalic acid, or the salts of these acids with potassium, sodium, or ammonium.

I have also been very successful with solutions of ferric salts which are precipitated by ammonia, either alone or with one or other of the above salts and acids. Thus I have obtained excellent results with the following:—

II. I make a solution containing five per cent. of normal ferric oxalate ($Fe_2\,(C_2\,O_4)\,3$), and five per cent. normal ferric tartrate ($Fe_2\,(C_4\,H_4\,O_6)\,3$), and one per cent. of tartaric or oxalic acid; in this case the precipitation of the iron is prevented by modifying the developer or subsequent solutions, as stated below. I do not, however, confine myself to these exact proportions, as they may be altered according to the effect desired, as stated above. In general, however, I prefer to use one other of these solutions, the composition of which I have stated in full.

In some cases, depending on the nature of the surface to be coated—if, for instance, it be glass, wood, or cloth—thickening material, such as gelatine, starch, arrowroot, or gum arabic, may be added to the above solutions; usually this is not required for paper.

The paper or other surface prepared with one or other of the foregoing solutions is dried, and is then ready for use. After exposure to light in the usual manner I apply to it the developing solution.

I use solutions of various soluble salts of the metals of the alkalies or ammonium.

I have been most successful with the following, namely:—Potassium, sodium, or ammonium oxalate, acetate, borate, citrate, or tartrate, either alone or mixed together.

I. Thus, with paper sensitised with No. 1 solution, for cold blue-black tones I prefer a solution containing—

(*a*) 20 per cent. potassium oxalate;
1·5 per cent. silver nitrate.

The precipitate formed being nearly dissolved by the addition of ammonia.

(*b*) For black neutral tones:—
10 per cent. potassium oxalate;
1·5 per cent. silver nitrate.

(*c*) For sepia tones:—
7 per cent. borax;
1·5 per cent. silver nitrate.

In both cases ammonia is added as above.

II. When the paper is sensitised with No. 2 solution, I prefer a solution containing—

(*a*) 15 per cent. potassium citrate;
10 per cent. sodium acetate;
1·5 per cent. silver nitrate; or,

(*b*) 15 per cent. potassium citrate;
10 per cent. potassium oxalate;
1 5 per cent. silver nitrate.

Ammonia being added in both cases as above.

The developing solutions I. (*a*), (*b*), or (*c*), may be used with paper prepared with sensitising solution II. if the prints, after removal from the developing solution, are placed for a short time in a solution prepared thus:—

Clearing solution:—
20 per cent. solution of citrate or tartrate of potassium, sodium, or ammonium, rendered distinctly alkaline with ammonia.

When greater contrast is desired in the print I obtain this by adding an oxidising agent to the developer, preferably a salt of chromic acid in quantities of from 2 to 10 c. cms. of a 5 per cent. solution of potassium chromate to the litre of developer.

I do not confine myself to any definite temperature of the developer, though I prefer to use this at the temperature of the air.

The developer may be applied to the printed surface in any convenient way.

After treatment with the developer the print is washed in successive changes (*i.e.*, till iron and silver salts are removed) of the washing solution.

I prepare this as follows :—

Washing solution :—

A 25 per cent. solution of sodium citrate is mixed with an equal volume of strong ammonia solution. This is then diluted with ordinary water in the proportion of 150 c. cms. to every 10 litres of water.

Potassium or ammonium citrate, or potassium, sodium, or ammonium tartrate, or sodium, potassium tartrate, may be used in place of the sodium citrate of the above.

The prints are then washed in water and dried.

Having now particularly described and ascertained the nature of my said invention, I wish it understood that I do not confine myself to the mixtures mentioned or to the exact proportions of the ingredients given therein, but employ on occasion other mixtures and proportions of the salts particularly mentioned as suitable for my purpose, nor do I confine myself to aqueous solutions of the said salts, but may, for the purposes of preparing the sensitising and developing solutions, use other solvents where these are permitted by the chemical nature of the salts employed, and I therefore claim as my invention as follows :—1. The use of paper or other surfaces, coated with ferric salts, as described above, to be used for the production of photographic images in silver, along with the class of developing solutions already given and particularly referred to in my second claim. 2. The use of solutions of silver salts dissolved in ammonia in conjunction with salts of the alkalies or ammonium, with oxalic, acetic, boric, citric, or tartaric acids, for the purpose of producing on paper or other surfaces previously coated with ferric salts sensitive to light, images in silver which are of such a colour as not to require toning with gold or other metals. 3. The combined use of ammonia and a potassium, sodium, or ammonium salt of citric or tartaric acid in a solution used for washing prints obtained on surfaces coated with ferric salts, and developed with solutions of silver salts in ammonia. 4. The use of the solutions—sensitising solutions I. and II. ; developing solutions I. (*a*), (*b*), and (*c*), II. (*a*), (*b*), and (*c*) ; clearing solution, washing solution—in the way and manner substantially as described and set forth in the foregoing. 5. The use of an oxidising agent, such as chromic acid or any of its salts, in a developer prepared as described and set forth.

Improvements in Photographic Hand Cameras.

No. 5525. Denis McNamara, 25, South-terrace, Inchicore, Dublin.—*February* 15, 1890.

Its novel features are (first), a dry plate is changed and placed in focal position and the shutter set by the one movement, thereby preventing the possibility of exposing the same plate twice over through inadvertence or otherwise ; (second)ly, the one button or knob serves all purposes, viz., for changing dry plate, for setting and discharging the shutter. Hence the advantage by which a number of dry plates may be exposed in very rapid succession.

In outward shape it consists of a rectangular box or case, one end of which is recessed to receive the lens. Within said case is a grooved box open at the side next to the lens, its depth a little more than double that of the sensitised plates of which it is capable of holding twelve or more ; each of the latter is inserted in a thin metallic sheath ; midway on the inside of the two opposite walls of said box is formed a horizontal groove parallel to the axis of the lens, through which is passed a thin metallic plate or partition dividing it into two compartments, the upper for the unexposed, and the lower for the exposed plates, and on which it is capable of sliding. The ends of said partition are attached to the walls of outer casing, and a slot is cut in the former sufficiently large to allow one plate with its sheath to drop through at a time from top to bottom compartment. Immediately beneath partition and in said bottom compartment is a rod, one end crossing said slot so as to prevent a plate from dropping through, and is kept in position by a spiral spring. The other end passes through wall of outer case at the end opposite to the lens, and terminates in a joint, to which is attached a lever actuated by a bar placed longitudinally on the outside of camera, one end bearing at right angles against said lever, the other terminates in a knob or button, which is used for setting and discharging the shutter, and also for changing the dry plates. On the bottom of the outer case is a sliding cover, through which the grooved box is charged with dry plates. In fixing on the plates are placed in their grooves in the lower chamber, the camera being inverted according as grooved box is moved along the partition ; each time a plate passes over the said slot it drops through into the upper compartment, the rod being kept back so as to clear the slot by pressing upon the knob during this operation.

The instantaneous shutter is inside the camera. A nozzle or rim is formed at the back of the lens, on which is fitted a cap capable of opening by a hinged joint at the bottom and actuated by a spindle, one end of which passes through the outer wall of camera, terminating in a cross-piece forming a T with said spindle. At one end of said cross-piece at right angles to it and parallel with wall of outer case is secured, or formed, a thin flexible arm of spring steel, the end of said arm resting upon a ledge or stud when the shutter is closed, the other end of cross-piece, forming a rank with said spindle, is used for the purpose of opening the cap by means of a hook hinged on to a sleeve and kept in position by a flat spring. Said sleeve is capable of sliding upon the bar, to which is attached knob or button heretofore mentioned, and is actuated by a spiral spring slipped over said bar, one end bearing against the sleeve, the other against a moveable pin for regulating the speed of the shutter. When said bar is pushed forward by the knob, the sleeve and hook are carried with it, the spiral spring becomes compressed, the hook coming into contact with cross-piece and having a wedge-shaped end loops on to it. When the finger is removed from said knob the latter returns to its original position, being acted upon by the spiral spring in grooved box ; the hook retaining its hold upon the cross-piece, the shutter is now set.

To discharge the shutter, the knob is pushed in the opposite direction, thereby bringing a thin, flat, projecting piece, secured to said bar, into contact with flexible arm resting upon projecting ledge, which yields by its flexibility and is pushed off said ledge ; the spiral spring now acting on the hook shoots its forward, thereby turning round the cross-piece with it and opening the cap ; when said cross-piece arrives at a certain angle, the hook slips off, but the momentum imparted to the cap causes the latter to strike an elastic band or spring, which causes it to rebound and lock itself once more on projecting ledge.

To change a plate, the knob is pushed forward, the shutter becomes set as before, the bar bearing against the end of lever draws out the rod in grooved box and a plate is dropped into bottom compartment ; the pressure of the finger is now removed from said knob, and the spiral spring brings back said rod into its original position, but the latter, when returning, comes into contact with the top edge of plate which has just dropped and pushes it forward, and, being in its groove, it carries the entire grooved box along the sliding partition until the next plate following up drops a short distance down into slot in partition and rests on top of rod ; said plate becomes jammed in the slot by the pressure of the rod still bearing on top edge of plate in bottom compartment, thereby keeping the plate steady for exposing.

The plates when dropping would be liable to stick after being jammed in the manner described. To overcome this, the partition where it is attached at both ends to camera is made to slide longitudinally through a short distance. A lever is hinged on inside to wall of camera, one end bearing against a stud on partition, the other end against a similar stud on rod ; when the latter is drawn out the said lever moves the partition, the grooved box remaining stationary, and liberates the plate which had been jammed in the slot, thereby allowing it to drop freely, said partition being brought back again to position by a spring.

An indicator is attached to camera for the purpose of registering the number of exposed plates. It consists of a flat graduated bar connected to grooved box and capable of moving in a guide on the inside of camera, with a hole in the latter forming light-tight communication with said guide, and through which the number of exposed plate can be read from the outside.

Improvements relating to Stereoscopes and Cameras.

No. 6385. Harry Ransom, 47, Friars-street, Sudbury, Suffolk.—*February* 15, 1890.

My invention relates to an improved stereoscope, which is also applicable for use as a camera, for taking stereoscopic pictures.

In carrying out my invention, I make the body of my combined camera and stereoscope with bellows, so that it can be extended to suit the focus of the lenses. The back of the instrument is fitted with a frame carrying a light-diffusing medium, preferably ground glass, which frame can be reversed when the instrument is being used as a stereoscope for looking at transparent photographs or pictures, and which is provided with a holder for the pictures.

The top of the instrument is provided with a reflector, the frame carrying which is adapted to fold back to allow the introduction of the dark slide or plate holder which is employed when the instrument is used as a camera. The front of the instrument is fitted with two boards, having vertical and horizontal movements.

On the baseboard of the instrument I fix two concentric metal rings, the inner of which is adapted to be rotated in the outer. In the inner ring I form a number of holes or slots to receive the heads of the legs of a tripod or stand.

The claims are :—1. A photographic camera, adapted to take stereoscopic pictures, and to be used also as a stereoscope, substantially as described. 2. In a combined camera and stereoscope, a chamber adapted to hold a screen of ground glass or the like, in either of two positions, according as the screen is being used as a focussing screen for the camera, or a light-diffusing medium or back for stereoscopic pictures, substantially as described. 3. In a combined camera and stereoscope, having a chamber as described, providing the said chamber with a pivoted reflector for reflecting light on to the pictures when the apparatus is used as a stereoscope, and for closing the said chamber when the apparatus is used as a camera. 4. In a combined camera and stereoscope, a screen having springs which serve to maintain the said screen in position, and, when the apparatus is being used as a stereoscope, as a holder for the pictures, substantially as described. 5. A combined camera and stereoscope, the lens-carrying sockets of which are adjustable relatively to each other, substantially as described. 6. The combination with the apparatus hereinbefore described of the dark slide or plate holder, having a central slide or partition adapted to press against the backs of the sensitised plates, and hold them firmly in position in the slide, the plates being introduced into and removed from the slide at one end, substantially as set forth.

A Lifting Thimble for Photographic Use.

No. 782. Charles Clark, 3, Cavendish-place, Eastbourne, Sussex.—*February* 15, 1890.

The object of this invention is to provide improved means for lifting negative and other plates out of development and other baths used in the practice of photography.

The improved device for this purpose consists of a thimble adapted to fit the finger and be retained thereon, said thimble provided with a hooked or claw-like projection at the end, adapted to be slid or placed under the plate to lift the latter from the bath as aforesaid.

In carrying this invention into practice I construct the thimble with the hook or projecting claw in material such as ebonite, vulcanite, rubber, or compound thereof, or of guttapercha, silver, porcelain, or any other material which shall not affect or be affected by the bath or baths used in photography.

Claim :—A lifting thimble for photographic use constructed with a hook or claw-like projection, substantially as set forth.

[The invention is similar to what was described by Mr. A. Johnston in our Almanac for 1883 on page 170.—Ed.]

Photographic Club.—Wednesday, March 19, adjourned discussion on *Artificial Light as an Adjunct to Daylight* ; March 26, monthly lantern meeting.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 18	North London	Myddelton Hall, Islington, N.
,, 18	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 18	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 19	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 19	Bury	
,, 19	Hyde	
,, 19	Manchester Camera Club	Victoria Hotel.
,, 19	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 19	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 20	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MARCH 11,—Mr. J. Glaisher, F.R.S. (President), in the chair.

The adjourned discussion on Dr. Lindsay Johnson's paper on *The Formation of a Photographic Institute* was opened by the reading of a letter from Mr. G. L. Addenbrooke, who had been announced as the first speaker, but who had been called away from London. He thought that the fulfilment of Dr. Johnson's scheme could only be carried out either by the Society obtaining a charter and charging fees for diplomas, or by the munificence of private donors.

A letter was also read from Dr. Emerson, in which he said that he had read Dr. Lindsay Johnson's paper with great interest, and expressed the views that the proposed institute should be independent of any other body, that a Royal Charter should be obtained, and that the public be appealed to for funds. The institute should contain a library, a museum, a laboratory, exhibition room, and a dark room; there should be a bar for light refreshments, but no smoking. Courses of lectures should be given, and diplomas granted to those who attended them, and, in the first instance, to members of societies without examination. The Society's *Journal* had sadly neglected the art side of photography; he thought that some one interested in the department should be associated with the editorship. Amateurs and professionals should be on the management of the institute, but they should all be practical men; any who treated photography merely in a *dilletante* way should be kept out of office.

Mr. W. S. BIRD said that the question was whether a scheme could be drafted that could be carried out. He thought that members should start a list of subscriptions. If they started with 2000*l.* they could appeal with better grace either to the public or to the City Companies. He knew that Dr. Johnson had a strong feeling that if a proper programme were set out they could get help from these Companies.

Mr. T. SCAMELL said that the first thing to do before going to the public was to get some notion of the probable cost of such a building as would be required. It seemed to him that if each member contributed 10*l.* the sum would go a very small way towards what would be required. If, however, a list were made stating the number and character of rooms desired he would be happy to calculate the probable expense.

Mr. W. E. DEBENHAM did not like the suggestion which had been made that diplomas were to be granted which would be supposed to indicate ascertained ability, but which in the first instance were to be bestowed indiscriminately upon every one who happened to be a member of a photographic society.

Mr. W. BEDFORD said that the broad principle of the ideas put forward by Dr. Johnson and Dr. Emerson should not be lost sight of. There was an ideal, and it was perhaps well to pitch that ideal rather high, but the first question was that of a charter. Before going to the public or to the City Companies for assistance they must be in a position to show that the proposed institute would advance photography. He thought that photography might very well lay claim to a share of the public munificence, but they must first see whether a charter could be obtained. For himself, he would rather go on on the basis of improving the present position of the Society.

Mr. CHAPMAN JONES said there seemed to be an idea that photographers would have to obtain a license from the institute in the same way as medical men had to obtain their qualification.

Mr. BIRD said that it could not be supposed for a moment that compulsory powers would be vested in the institute, but it was perfectly certain that traders in photography would find it to their interest to obtain their diplomas. Such a programme as had been sketched must, in any case, take several years for its fulfilment.

Mr. T. SEBASTIAN DAVIS said that it was a question whether it was absolutely desirable to have exhibition and meeting rooms at the same premises; it might be more practicable to get what was required separately.

The PRESIDENT suggested that it might be an instruction to the Council to ascertain the expense and the means of obtaining a charter.

Mr. JOHN SPILLER then read a paper on some early experiments by Dr. Percy and Mr. George Shaw. He premised that he had been personally acquainted with the late Dr. Percy, having been his laboratory assistant at the School of Mines, and had received a note-book containing the experiments, which he would describe, having had permission from Mr. Shaw and from the executors of Dr. Percy to do so. These experiments referred principally to the direct action of light upon silver chloride in sealed glass tubes under varying hygrometric conditions and in atmospheres of either air or nitrogen. One of the experiments referred to a Daguerreotype plate which had been coated with chloride of silver by exposure to chlorine gas, and he inquired of Messrs. V. Blanchard and W. England, as old Daguerreotypists, whether the Daguerreotype plate of the period referred to was made of rolled standard silver on a copper back or was electroplated.

Mr. ENGLAND replied that in 1844 only rolled plates were in use, but that electroplate was afterwards introduced, and was decidedly superior.

Mr. BLANCHARD concurred in this view.

Mr. F F. Baggalley was elected a member.

The CHAIRMAN mentioned that the ordinary meeting in April would be held on the 15th, and not on the second Tuesday, as was usual.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 6,—Mr. R. P. Drage in the chair.

A letter from Mr. F. York was read, in which he said that when at Trinidad he had met with an old lanternist who had a large quantity of slides showing the effect of ground glass. He (Mr. York) had at first thought that the slides, which were of French production, had suffered from a blistering of the varnish. The owner attributed the effect to the humidity of the climate, which during the summer months was so excessive that telescopic objectives after a stay of some time in the island had to be sent home to be repolished. Gelatino-bromide plates, too, although carefully packed, were found to be covered with a fungoid growth. Specimens of the slides were shown and opened, and it was found that the ground glass effect was, as in the case of the slides from India shown some months since, due to erosion of the covering glasses.

Mr. A. HADDON attributed the roughness, as in the other case mentioned, to the effect of moisture upon glass containing excess of alkali, and recommended that for all such purposes the glass should be boiled for some time, by which means the superabundant alkali on the surface would be dissolved. After this treatment the glass might be expected to resist any rapid action of moisture upon it.

Mr. T. E. FRESHWATER had seen many slides that had been to Barbadoes. In slides of English preparation he had never seen any corrosion such as that now exhibited, but with French ones it was of common occurrence.

Mr. H. D. ATKINSON inquired whether treatment of the glass with nitric acid would not serve the same purpose as boiling it.

Mr. HADDON replied that it would not.

The CHAIRMAN inquired as to the method for removing the carbon image from a ground opal plate.

Several members recommended grinding it off with silver sand and water. One member thought that that treatment roughened the surface too much, and advised Bath brickdust rubbed on wet.

Mr. HADDON suggested the use of warm hydrochloric acid.

Mr. F. P. Cembrano showed a lantern carrier made in brass from the design of one formerly described by Mr. A. Cowan, the most striking feature in which was that the slide in position was screened by a curtain, and at the moment of complete covering was replaced by one that had been inserted in the proper groove.

Competition prints from three negatives were then shown, and the votes of the members taken, when it was found that in two of the subjects Mr. Cembrano's prints were considered the best, and in the other subject a print by Mr. J. B. B. Wellington was preferred. All three were platinum prints.

CAMERA CLUB.

MARCH 6,—Mr. Francis Cobb occupied the chair.

Mr. A. PRINGLE gave an address on *The Optical Lantern.*

Previous to the lecture a handsome testimonial (a silver jug and three goblets) was presented by the members to Mr. E. G. Spiers, as a friendly recognition of his valuable services as late Hon. Secretary to the Camera Club Company.

The SECRETARY handed round a copy of the work called *Giphantia*, published in 1761, in which was found the singular forecast of photography read at a previous meeting. The book, which had been lent by Mr. A. C. Lyster, is a translation from the French work, *Giphantie*, by Tiphaigne de la Roche, published at Cherbourg. The Secretary also handed round a convenient little actinometer arranged as a small printing frame, in which a small scale of letters of different densities printed on silver paper served as the indication of sufficient exposure for printing in platinum. He believed the instrument would be brought out by the Platinotype Company.

Mr. T. Charters White also exhibited a series of photographs bearing on the subject treated of at the previous meeting—*Photography as applied to Medicine and Surgery.* The photographs showed in succession the means adopted for patching up and giving artificially a normal appearance to the face in the case of a patient who had suffered severe ravages from cancer.

Mr. PRINGLE introduced and carried through his subject in a lively and interesting manner. He discussed the general optical system employed in the lantern, treating of the different forms of condensers, of projection lenses, and of the lamps and jets used for the purpose. Condensers could not be too small consistent with reasonable covering of the slide. The projection lens should be one of flat field, and should transmit the maximum of light. Lantern bodies, he thought, were absurdly large, and he exhibited two, one of which, a practical instrument by Mr. Beard, would go into a box ten inches cube. "Cottages" were very well for public lectures. He also showed a double lantern specially adapted for scientific lectures or demonstrations, and a historical set of jets and lights, including the Beechey jet, one of the oxycalcium system, and several samples of blow-through jets. The demonstration of the working of Mr. Albert Scott's gasoline saturator and jet was of great interest to the meeting, the light obtained being very excellent.

Mr. Beard also showed the working of the Broughton ether tank, &c.

Mr. PRINGLE referred to many other points of interest connected with difficulties and phenomena in lantern work, and treated of the choice and use of limes, the making of gases, regulators, pressure gauges, carriers, and screens.

Some interesting remarks by Mr. J. TRAILL TAYLOR followed, and in the discussion Messrs. Elder, Baker, Whatton, J. F. Roberts, Beard, and Dr. Patterson took part.

On Thursday, March 20, there will be an exhibition of lantern slides at the Society of Arts in connexion with the Conference.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 4.—The annual exhibition of photographs was held at Northampton House, St. Paul's-road, Highbury, and the proceedings took the form of a *conversazione*. Many members sent in specimens of their work for exhibition. The whole of these pictures were tastefully hung round the room under the superintendence of Mr. Coventon, assisted by Messrs. Oakley, Reader, and

Few. The doors were opened at seven o'clock, and a large gathering of members and friends soon filled the hall, and spent the first hour most profitably in admiring and criticising the various specimens of the photographic art displayed upon the walls.

At eight o'clock the PRESIDENT (Mr. J. Traill Taylor) made a few remarks, congratulating the Society upon the marked advance made in the annual gathering of the Society and in the work shown upon the walls.

An excellent programme of music and recitation had been arranged, which was then gone through, and the evening's proceedings were concluded by an hour's exhibition of photographic slides in the lantern.

The next ordinary meeting of the Society will be held at Myddelton Hall, Upper street, on Tuesday evening, March 18, when a demonstration on *Printing on Albumenised Paper and Bromide Printing* will be given by the Britannia Works Company.

HOLBORN CAMERA CLUB.

MARCH 7.—Mr. Chang presented the Club with framed prints and lantern slides from the flash-light exposures made by him at the Club exhibition. The slides were then shown on the screen.

Next Friday there will be a lecture on *Enlarging from Small Negatives.*

EAST DULWICH AND PECKHAM PHOTOGRAPHIC SOCIETY.

MARCH 7.—F. W. Edwards in the chair.

Subject: *Interiors, Hand Cameras.* Mr. ABRAHAMS explained his two forms, the Minor and Lord. He also showed a working stick stand for hand cameras which he has just introduced. It is made entirely of metal, and though light is rigid when set up, and is fitted with a ball and socket joint.

LEWES PHOTOGRAPHIC SOCIETY.

MARCH 4.—The President in the chair.

Two new members were elected.

A letter in accordance with the widow and family of the late Mr. Simeon Norman was passed.

The slides sent in to the first quarterly competition were then exhibited. The names of the Judges were as follows:—Class 1, "Landscape," Mr. A. H. Wellings; Class 2, "Architecture," Mr. Percy Morris; Class 3, "Any other subject," Mr. G. E. Constable. There were fourteen sets sent in from seven competitors, and the work was of good quality.

At the next ordinary meeting to be held on April 1, Mr. E. Miller will open a discussion on *Pinhole Photography.*

SHEFFIELD PHOTOGRAPHIC SOCIETY.

MARCH 4.—Mr. R. J. Taylor (President) in the chair.

The Judges' awards in lantern competition for the best series of six slides were announced as follows:—In the opinion of the Judges no set of slides was of sufficient merit to take the first prize, the same was, therefore, withheld. The second was awarded to Mr. W. T. Haynes, who also secured the prize for the best slide in the competition. The whole of the slides was afterwards passed through the lantern.

Mr. G. BROMLEY gave a demonstration and lecture on *The New Process* Screens as applied to the *Optical Lantern.* He commenced by showing the working of the ordinary screen and jet lights. Having explained the details and points requiring care and attention, he passed on to the other light. Attention was next drawn to the length and heating arrangements—firstly, the method of charging being shown; next, the warming appliances for increasing the ventilation of the theatre, and, lastly, the connection with gas and lantern jet.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

MARCH 6.—General meeting.—Mr. D. Ireland in the chair.

Eleven competitors entered for a lantern slide competition. The votes having been counted up the following were declared the prize-winners:—1st, Mr. D. Ireland; equal 2nds, Messrs. J. R. Stewart and A. Wilson; 3rd, Mr. V. C. Peck.

Mr. A. STEWART gave an account of his visit to Western Norway in the s.s. *St. Sunniva.* After a few introductory remarks he showed a number of lantern slides, which, with his graphic descriptions, made the evening a most instructive and enjoyable one.

PHOTOGRAPHIC SOCIETY OF FRANCE.

THE above Society held their monthly meeting on Friday evening last, the 7th inst., M. Bardy in the chair.

Several photographic societies on the Continent have sent their adhesion to open their laboratories to the members of other societies when travelling, in order that they may change, and even develop their plates. A control has been proposed in this wise: the applicant must have a card certifying that he is truly a member of said society, accompanied by a C.-D.-V. portrait of himself. Under such conditions the bearer will be received with open arms, and be made welcome. This friendly interchange between the photographic community is very desirable, and can be appreciated by those who have travelled abroad. I here make an appeal to the English societies that they send in their acceptation, so that the names may be published in the journals of the Society. We have up to the present, the Photographic Society of Florence, the Photographic Society of France (Paris), the Photographic Society of Lyons. The adhesions of other societies will soon come in—as soon as the news gets abroad. The members of any society about to make a photographic tour, should not fail to request the Secretary to write to the Photographic Society of France, wishing to take part in the International Union of Photographic Societies.

The prizes for the competition of 1890 were distributed, and the prize pictures exhibited. M. St. Senoch obtained a vermeil medal. Four bronze ones were also awarded. The lantern slide competition prize: M. Bouquet. A magic lantern exhibition of these slides obtained the approbation of the members.

M. Vallot presented a "contretype" negative, obtained by the process called "imbibition," in this wise: a gelatino-bromide of silver plate is plunged into a solution of bichromate of potash; when dry it is exposed under a negative; it is then plunged into a bath composed of any colour; the gelatine soaks up the solution in those parts unacted upon by the light, whereas those parts rendered insoluble by the exposure repel the coloured liquid. When fixed, a very fine *cliché* is obtained. The one presented had been developed, if I may use the expression, in a solution of Indian ink.

M. Guilliminot presented a number of proofs taken upon his paper, prepared with platinum salts, &c.; some were very good. M. Guilliminot also presented a new developer in a bottle—it looked like a lot of sweetmeats; it appears that one or two of these lozenges are dissolved in an ounce of water, and the developer is thus ready for work. The inventor (Euer) has succeeded in doing away with scales, &c., which is, indeed, a boon for travellers. It appears to be a mixture of caustic potash, hydroquinone, and sulphite of soda. Two or three of the members spoke very much in its favour.

Messrs. Mariller and Robelet presented a new instantaneous shutter, and as there is a new feature in it, I will endeavour to describe it. In the first place, it goes into the slit of the diaphragm; a double flange opens and closes the aperture. A great rapidity can be obtained. In this it resembles all other shutters. When a certain exposure is required, it is here that the inventor has ingeniously taken his model from a clock, a musical-box, or a spring-jack. Every one knows that in the striking part of a clock a vane is adapted in order to regulate the strokes on the dial, and this vane can be seen turning a long time after the last stroke. If the vane be large it offers more resistance to the air, and the strokes are slower; if small, the clock strikes faster. The inventor of the rapid shutter has adapted a similar contrivance to his apparatus. Several vanes of different sizes are sent out with the shutter; each vane is marked from one-tenth of a second to two seconds of exposure. We were informed that these exposures were perfectly correct as to time.

A strange coincidence: M. Cornu and Messrs. Lumière, of Lyons, had been studying the effect and causes of halation, and they both came forward last night to make their experiments public; both had come to the same conclusion, but M. Cornu did a little more—he informed us how this defect could be abolished. In the first place, he informed us that it was well known that the halo was due to the glass plate, and that several dodges were *preconised* to destroy or prevent its effects. The thicker the glass plate, said he, the larger the halo. Several lantern slides were exhibited showing the different halos on glass plates of various thicknesses. A double halo was also obtained by placing a crystal of feldspar on the back of the plate. Experiments were also made with prisms—a triple halo was thus formed. M. Cornu then threw a proof of each on the blind, but this time the halo had completely disappeared. He then mentioned the different methods which had been *preconised* to prevent the formation of the halo—such as painting the back of the glass with paste in which a little yellow ochre had been incorporated, and such-like. After many experiments he had come to the conclusion that none of these were perfect, inasmuch as it was absolutely necessary that the varnish or paint employed should be of the same refraction as the glass. He had found that by a mixture of essence of cloves and cinnamon the result can be obtained in this way.—The mixture is placed in a clean glass phial, a strip of window glass is put in, one or the other of the two essences is added, until the piece of glass becomes invisible; a little lampblack is added, and the backs of the plates smeared over with it. This, said he, completely prevents halation.

M. Balagny then exhibited some lantern slides of sculpture in the late exhibition. This gentleman also showed the members some very fine fatty-ink proofs obtained by his new process, which gives not only very fine proofs but is very rapid in its results.

Mons. Vidal then gave a long and interesting lecture on "orthoscopie," a name he has created, which means isochromatism or orthochromatism. The object in view, said he, is to reproduce upon the photographic plate the object as seen by the naked eye.

PHOTOGRAPHIC SOCIETY OF JAPAN.

JANUARY 23,—Mr. H. Holms in the chair.

Mr. Igarashi Norikazu was elected a member.

Mr. Kajima Sobi showed a number of silver prints of different tints on silk of various light shades. Amongst other specimens were several Japanese *obi* with photographic prints produced directly on them. Silk appears to form a very effective support for photographic pictures. The prints were all done by the process already described in the *Shasshin Shimpo.*

Mr. Asanuma showed, and Mr. OGAWA explained, the action of, the "Kodak."

After this there was a lantern exhibition. A duplex limelight lantern had been kindly lent by Mr. Nakashima Matsuchi, who worked it during the evening. He brought a large collection of excellent slides, and others were lent by the Rev. C. T. Cocking and by Messrs. Fenollosa, Ogawa, West, Burton, and Yai. Amongst others was a series to illustrate the distortion that might be produced by the abuse of the "wide-angle lens," an instrument that is useful enough within certain limits. One photograph represented an enormous pair of feet, or rather boots, with a long perspective of legs, and a very small head, and body apparently in the "middle distance behind them;" another showed a jinrikisha and fare, the jinrikisha man a giant filling up half the picture, his fare apparently far in the distance, the shafts preternaturally long; and another of a man holding out a glass of beer at arm's length, the glass exaggerated to about the size of the man. It is the introduction of this distortion, to a degree less than that described, but yet quite evident to a trained eye, by the ignorant use of wide-angle lenses, that has induced some artists to state that a photograph is never in "correct drawing," a statement that a very elementary knowledge of optics shows to be entirely wrong.

In spite of the bad weather that seems to be the fate of the Society, there was a large attendance, and a thorough appreciation of the exhibition was shown.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

MR. MACDOUGALD'S PAPER, *STEREOSCOPIC VISION.*

To the EDITOR.

SIR,—Not having seen the remarks made on my paper until late last week, I was unable to reply in time for your last issue.

Mr. Andrew Pringle does not seem to be pleased with some of my remarks, and has evidently gone to some trouble to map out a course of reading for me. He has read a number of text-books, and combats a new theory with reference to stereoscopic vision, which he supposes I have taken the trouble to think out, or (to speak more correctly according to Mr. Pringle's views of things) which I have taken the trouble to write about without thinking.

I am surprised to find myself placed as a theorist on stereoscopic vision. In writing the paper for the Dundee and East of Scotland Association I was very conscious of writing nothing having a claim to being new. Some things therein stated are considered new by Mr. Pringle and others, and not only so, but very wrong and absurd. I generally write with an ordinary amount of care, and next to the surprise of finding myself broaching new theories is finding "nearly every sentence" of what I have written so erroneous and disgustingly bad, generally, as almost to cause Mr. Pringle to contemptuously pass on the other side.

Amongst my "optical utterances" (as Mr. Pringle calls my remarks) is the following:—"One may mount two prints from the same negative, and such prints will give the appearance of solidity when viewed either by the unaided eye in the manner above mentioned, or through the stereoscope." Mr. Pringle exclaims, "Here is news, indeed!" Not being quite sure of his position, he continues, "But if there were the slightest foundation for such an assertion, who so foolish as to carry a stereo-camera and make stereo-negatives when single ones will do?" This question is amply answered in my paper, but that Mr. Pringle may have something specific I answer: Because prints from double negatives are, having for an object the attaining the illusion of solidity, *better* than two prints from one negative. Is this satisfactory to Mr. Pringle? Immediately following the sentence above quoted Mr. Pringle says: "If Mr. Macdougald will consult 'Hardwich & Taylor,' or, indeed, any class-book on optics, he may derive some benefit;" quite a good thing to say: but will Mr. Pringle point out specifically where Messrs. Hardwich & Taylor say anything antagonistic to my statements?

My paper was written mainly with the object of showing that our perception of solid effect—which is all that is meant by the word stereoscopic—in pictures or nature does not *altogether* rest on the use of two eyes, each having a distinctly different view, *as is commonly supposed.* I began by speaking of the perception of solidity by a single eye (of course, Mr. Pringle will dispute the possibility of having "solid vision" or stereoscopic effect by one eye, but that cannot be helped). I then spoke of two eyes combining two *identical* pictures as leading up to the more perfect solid or stereoscopic vision, as obtained by viewing two non-identical pictures. I made the assertion that the appearance of solidity is obtained by viewing two *identical* pictures. I have not had the honour of reading the remarks made by yourself, Mr. Editor, but I understand you, along with Mr. Pringle, "Free Lance," &c., deny this.

Mr. Pringle makes an important confession. He confesses to be under the impression that "vision giving the appearance of solidity *requires* that each eye looks at the object from a different standpoint."

Now that is precisely the impression I wished to remove to some extent. If we insert two words and read thus,—vision giving the *most perfect* appearance of solidity *requires*, &c.,—I agree. This, I think, is amply acknowledged in my paper; but that was not what was being discussed. In connexion with my subject I happened to mention the binocular microscope, and did not think it necessary to minutely describe the instrument which occurred to me as proving the point I was discussing. What does Mr. Pringle do? He goes into a description of the class of binocular, of which the Wenham may be taken as a type, and which, I may remark, does not have the slightest bearing on the subject, and proceeds to make very depreciatory remarks, which, I am sorry to say, are also indulged in by "Free Lance" to an offensive degree.

I attempted in my paper to show, in fine, that our perceptions of solidity depend not on one thing, as is commonly supposed, but quite a number of things, and I think I made it clear that it was only when all of these conditions were present in viewing a picture that we had the *most perfect* form of solid vision. It will be apparent that I deny the exclusive use of the word "stereoscopic" to the most perfect form of vision. I also endeavoured to show wherein lay the difference in our impressions between looking at a perfect "stereogram" and looking at nature.

With reference to the suppression of surface theory, Mr. Pringle says, "I do not believe in this theory of his at all. I attribute the illusion to brain action chiefly." Does it not occur to Mr. Pringle that something more may be said than that it is "brain action chiefly," whatever that may mean? Is it not remarkable that in this instance one eye should give a more solid effect than two, when under most conditions two eyes tend to create a better solid impression than one? The second eye clearly interferes in some way. In what way does it interfere? The correct answer seems to be as I have stated it—that the other eye so powerfully localises the surface of the picture, in virtue of its power to measure distance accurately, as to interfere with the illusion of distance and solidity. Will Mr. Pringle please say specifically what *he* means and what his objections are?

Mr. Abel Heywood, jun., says he is inclined to think that neither Mr. Pringle nor myself understands that there is a converse of stereoscopy, and asks, "Do either of these gentlemen *know anything about stereoscopic vision?*" This question naturally makes one look up to Mr. Heywood.

Reversed stereoscopic vision, unfortunately called pseudoscopic vision, has been mixed up a little in the remarks made on my paper. Mr. Pringle has got a little mixed over the subject himself—I dare say the result of a momentary slip, which, of course, it would be incorrect to make capital of, although the temptation to do so, arising from the large style adopted by my critic, is considerable. I admit it is sometimes a mistake to keep too closely to the real meaning of a word, and I dare say I would have saved myself the buzzing of a nest of hornets about me (not a personal remark, only a figure of speech) had I introduced the term pseudoscopic (a bad term, by the way, if used to mean something distinctly apart from stereoscopic). Pseudoscopic vision, so far as the purpose of my paper is concerned, is stereoscopic. The one undoubtedly includes the other in the strict meaning of the word. One may "pseudoscopise" (excuse the word and its application) a man's hat—turn it inside out, without adding or taking away any "solidness." Stereoscopic vision means, primarily, seeing accompanied by the impression of solidity.

One might write a great deal more on this interesting subject, and about my critic's ideas in particular, but ordinary restrictions forbid.

Mr. Pringle says that, "Every treatise on elementary *optics* with any pretension to completeness" answers my question, "In what, then, does stereoscopic vision consist?" Perhaps Mr. Pringle can definitely name such elementary optical works as make things clear to his understanding. In *Kirk's Physiology*, tenth edition, pp. 706–7 we have the following:—

"The circumstance of the inner portion of the fibres of the two optic nerves decussating at the commissure and passing to the eye of the opposite side, while the outer portion of the fibres continue their course to the eye of the same side," "naturally led to an attempt to explain the phenomenon (of binocular vision) by this distribution of the fibres of the nerves."

"By another theory it is assumed that each optic nerve contains exactly the same number of fibres as the other, and that the corresponding fibres of the two nerves are united in the sensorium."

"According to a third theory, the fibres coming from identical points of the two retinæ are in the optic commissure brought into one optic nerve, and in the brain either are united by a loop or spring from the same point," &c.

Might I be permitted to add that in my opinion offensive and damaging personal remarks are not helpful, nor do they add to the dignity of the writers making them, nor to the subject, especially when accompanied by little argument?

In conclusion, and as a last wish, If you, sir, Mr. Pringle, "Free Lance," and Mr. Heywood incline to deal any more "death blows" (Mr. Pringle's term) at each other and myself, I, speaking for myself, shall feel obliged by very specific statements; and I suggest that fragments of a volume, giving line and page, are more effective than hurling complete volumes about, as Mr. Pringle seems to be in the habit of doing. You can understand, sir, a moderate ambition aiming at burial in a shroud free from holes.

G. D. MACDOUGALD.

Dundee.

To the EDITOR.

SIR,—Your "Free Lance" has put me under an obligation by pointing out the strange and evident slip I made in exactly reversing the state of matters which I wished to explain. Of course, for stereoscopic vision the right eye must see the right picture, and the left eye the left. The crossing of the optical axes would result, as "Free Lance" says, in pseudoscopy, of which, suggests Mr. Abel Heywood, I know nothing.

Like Mr. Heywood, I do not wish to pose as an authority on stereoscopic vision nor on any other optical matter. I have never really *studied* it at all, and the little I know has been picked up rather in my casual reading of physiological text-books than in optical research, for which I have no turn. Mr. Heywood is "inclined to think" that I am ignorant of the existence of pseudoscopy, which he calls a "converse" of stereoscopy; it is not a "converse" of stereoscopy; and as I pretty fully explained pseudoscopy in the binocular microscope, I can hardly be said to be unaware of its existence or wholly ignorant of its nature.

Now, as to Mr. Heywood's definition or explanation of stereoscopy. He begins well, saying that we have two eyes, that the two eyes receive different images, and that the brain combines them; but he goes on to say that the single optical impression enables us to judge of the amount

of solidity or rotundity of the object, and of its distance from us and from other objects. This is the truth, but not by any means the whole truth, for Huxley, among other authorities, distinctly says that the sense of touch and previous experience are absolutely necessary to our impression of solidity and judgment of distance. Touch, experience, two eyes, and reasoning power are all essential to stereoscopic impression; an adult suddenly or rapidly attaining eyesight is not at first capable of judging distance, size, or form by his eyes alone. But Mr. Heywood is, I think, correct so far as he goes, only there is not much use in building an edifice without the foundation.

Mr. Heywood is less happy when he leaves fact to enter upon mere controversy. He said I "sneered" at stereo-pictures because they are small. I never "snore" in my life; I can use as big a "D" as my neighbour, but I never sneer; and I challenge Mr. Heywood to produce my sneer. I have already to "Free Lance" admitted my error in regard to the manner of viewing two pictures mounted suitably, but Mr. Heywood can also "score one." I was so impressed with the difficulty I always find in seeing stereos without a stereoscope that I probably got confused; and I still think that not one person in a thousand can see stereoscopically in that way. Being Andrew I for one am not Abel. Regarding the interesting fact mentioned by Mr. Heywood about the varying size of the picture as seen with cross and "parallel" axes, I may say that Dr. Maddox tells me he finds the same thing. I think it can be accounted for, but this is not the place for the discussion.

I am not aware of having made the broad statement that merely by shutting one eye we can see "somewhat stereoscopically." I should require proof of this before accepting it. By looking at a single picture through a cylinder there is an illusion—due to the brain, I believe—of stereoscopicity. I confess my inability to understand Mr. Heywood's last paragraph, unless he is simply straining a point to put me in the wrong. As I read the paragraph it means that duplicate pictures viewed in a certain way are at once stereoscopic and not stereoscopic. Mr. Macdougall making a statement, and I contradicting it, are "both right and both wrong." We have yet to learn how two duplicate pictures can be seen *really* stereoscopically; we have nothing to do with unrealities.

Though I take these objections to Mr. Heywood's views, still it is evident that he is pretty well up in the subject, and his letter is a valuable contribution to the discussion from which I now beg to retire.—I am, yours, &c.,

ANDREW PRINGLE.

To the EDITOR.

SIR,—In this very interesting discussion one vital point is, it seems to me, quite overlooked, one, moreover, that must, I think, be an essential factor in any authoritative decision, that point is the relative quality or strength of vision of the two eyes respectively. It is not as generally known as it should be that there are very few persons having eyes of the same strength of sight, one eye is very frequently found to be short-sighted, more or less short than the other eye; and I feel sure that it is only those very few possessing equal-sighted eyes who can really experience true stereoscopic vision. Those who do may doubtless be able to lay down the law as to *theory*, but its practical application for others must, of course, depend on whether they are in the initial state of enjoying equal-sighted eyes.

Mr. Heywood's remarks on his power of making the axes of his eyes parallel at will seem to suggest that his eyes must be either *equally* normal, equally short, or *equally* long-sighted. It would be extremely interesting and valuable as a factor in deciding as to the relative qualifications these gentlemen have for discussing this subject judicially and authoritatively—as each does—to know how far the sight of their two eyes differs. Let each of the three gentlemen (or, indeed, all who write on this subject) tell us if their eyes are equal-sighted, or the degree of difference between them.

I suggest this because what is a rule for one in this matter may not be so for another. In my own case the use of either stereoscopes, opera glasses, or the binocular microscope, is, and always has been, impossible; my left eye is very short-sighted, and my right eye is all but normal, just a trifle short-sighted. Consequently, I am totally unable to direct the vision of both eyes simultaneously and get a combined image. If I look with my left eye alone all is a blur; but as in my ordinary looking about I see everything with perfect distinctness, I know I am not then looking with my left eye, it certainly then conveys no appreciable image to my brain, and *vice versâ*. The spectacles I habitually wear have a nearly plain glass for the right eye, and for the other eye one of sufficient strength to make reading and writing comfortable at a normal distance. Even with these I find it impossible to get a combined image. In my binocular microscope I had a concave glass fitted over the left eyepiece, but even then failed to get a combined image. See with either eye separately I always can, but never with both together.

I may, doubtless, be an abnormal case (I have heard that the late Robert Browning had one very short-sighted eye, and the other abnormally long-sighted), but I feel convinced that the condition of the sight in this way has an important bearing upon the facts of stereoscopic vision. The chief drawback of my condition of sight is the nervous headaches induced by the constant dislocation, if I may so term it, of the act of conscious vision from one eye to the other; its value has been in that without conscious effort I see with only one eye at a time, and thus realise that solidity which Mr. Heywood agrees with Mr. Pringle in accepting as thus possible. It was Sir David Brewster, I believe, who first advocated the shutting of one eye to realise the solidity or perspective of nature when viewing drawings or pictures; the tube suggested for this purpose is non-essential, its only use being to concentrate the attention.

What I would like to know is whether I lose or gain when looking at nature in thus using perforce only one eye? Do I increase the perspective or solidity, or do I lessen it? Is what is an advantage when looking at a plane representation of nature (a picture or photograph) a loss when looking at nature itself?—I am, yours, &c.,

FRED. H. EVANS.

March 8, 1890.

PIZZIGHELLI PLATINA PAPER IN THE TROPICS.

To the EDITOR.

SIR,—Though I have sent a somewhat similar communication to the *Journal of the Photographic Society of India*, I venture to send this to THE BRITISH JOURNAL OF PHOTOGRAPHY, in hopes that it may prove useful to those who use Pizzighelli direct printing platina paper.

In January I received some (by Drs. Hezekiel and Jacoby, of Berlin), from London. It was badly packed, and probably suffered from damp on the voyage. Since its arrival here it has been in an excessively dry, but not very hot climate. I imagine that this dryness, acting on deteriorated paper, has made it insensitive; for it prints so slowly that it is practically useless. I have tried steaming the paper before and after printing, and I have left it for twenty-four hours in a closed dark room, with a saucepan of water continuously on the boil, without much benefit.

Having a sheet which had been exposed to light, but which retained the lemon colour of unexposed sheets, I wetted it, and it immediately became black. This, coupled with the knowledge that steaming the paper before exposure increases its sensitiveness, and that, after exposure, breathing on insufficiently printed parts brings them out, led me to try the following:—I exposed for a short time in the printing frame till the image showed faintly, and then I flooded the paper with plain water; the picture flashed out at once, and was rapidly becoming too dark, when I instantly stopped further development by plunging it in the hydrochloric acid solution. The next picture was under-exposed; it flashed out, but remained too faint.

It will be seen that the process is thus changed from a printing-out process to printing by development, the developer being plain water.

It can be worked in bright lamp light, so, if one is quick, there is not much difficulty in stopping the development of over-exposed prints in time. With practice it is possible that one could judge by examination of the faint image, when in the printing frame, when the correct exposure had been given. At present I roughly time the exposure.

The paper was practically useless, for it took hours to print, and printed badly; but by this method of cold water development I can get it to print quickly, though it shows signs of deterioration by giving mealy prints.

It should always be sent out in calcium tubes, soldered, not closed with gummed paper, for I have known damp work through the paper and melt the calcium.—I am, yours, &c.,

S. L. DOBIE.

Secunderabad, India, February 19, 1890.

THE LANTERN SOCIETY.

To the EDITOR.

SIR,—The adjourned meeting of the above Society will be held in the Regent-street Saloon of the St. James's Hall, on Wednesday, March 19, at 7.30 p.m., for the purpose of considering the rules drawn up by the Provisional Committee.—I am, yours, &c.,

T. H. HOLDING, *Secretary pro tem.*

46, *Chesilton-road, Munster Park.*

DEPOSIT ON GLASS.

To the EDITOR.

SIR,—At the February meeting of the Photographic Society of Philadelphia the subject of a deposit on the cover glasses of lantern slides was referred to, but no definite conclusion appears to have been arrived at. Mr. Carbutt and Dr. Mitchell suggested the chemical composition of the glass as the cause of the defect. The glass is spoken of as French. Every photographer who has had a few years' experience must have noticed the defect referred to in some kinds of glass. If held over a sheet of white paper the colour of most glass can be seen, but if looked at through the edge turned towards the light, a distinct green tint will be visible in almost all English glass, but some foreign glass if viewed in the same way shows very little colour. It will be found, I think, that the deposit was on colourless glass. By touching it with the tongue it will be detected at once that a decomposition of the glass has caused the defect. A salt of lead could, no doubt, be found by chemical means, but the tongue settles the matter as to the presence of *a salt* at once.

In the days of glass positives I ordered a quantity of glass from Germany but it was not possible to use it—it was very white, and in every other respect was good, but it had the habit of "sweating," and that was fatal for photographic use. I do not remember ever seeing the deposit on the ordinary English green glass.—I am, yours, &c.,

Manchester, March 8, 1890. A. BROTHERS, F.R.A.S.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange whole-plate Sands & Hunter three-fold stand for a half-plate Ashford's two-fold stand.—Address, WATERS, 21, Westbourne Park-road, Bayswater, W.

Wanted, carved oak table, or studio chair, or other accessory, in exchange for rolling machine, fifteen-inch silver-plated rollers.—Address, W. WALKER, Noel-street, Nottingham.

Tall folding ash tripod stand with brass triangle, nearly new; also quarter-plate portrait lens by Cox. Exchange for half "Meritoire" or background. Cash adjustment.—Address, C. VERNON, Maidstone.

Wanted, photographic apparatus complete, quarter, half, or whole-plate size; offer in exchange, gent's gold or silver watch, snake ring, two diamonds, gold or silver alberts, cornet, or clarionet.—Address, F. G. POTTER, 2, Peters-street, Norwich.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

E. J. BUGGS.—Better insert an advertisement in our outer columns.

A. G.—If the pyrogallic solution works all right what matters the discoloration? The old aphorism, "The proof of the pudding is in the eating," applies here.

G. S. GALLOWAY.—Evidently the carbonate of ammonia has deteriorated from having been kept in a badly stoppered bottle. It is no longer suitable for the purpose named. Better get a fresh supply.

J. W. BRADSHAW.—While the slides would have very small "chance of taking a prize" in a competition in which such men as Gale were contestants, still they are meritorious and superior to many that we see. They would be still better if toned to a warm purple.

BEDFORDSHIRE.—With a lens of the Petzval form—the ordinary portrait combination—greater rapidity will be obtained than with any other lens. Some of these are constructed with an aperture of *f*-2½. Those of the "rapid" type have an aperture of *f*-8 only, and the Euryscope type about *f*-6.

PUZZLED.—We fear there is no remedy. If the air is in the water it is almost sure to attach itself to the prints. The only plan is to keep the prints separated and in motion while they are in the water. If they are allowed to stick together with air between them they will not be properly washed.

T. HARDING.—Dry plates prepared ready for stripping the films from are not made, we believe, in this country, though in Germany, we are told, they are regularly supplied. If a large number were required possibly some of our manufacturers would prepare them to order. Apply to some of them.

STUDIO.—Evidently a misconception. No new Copyright Act was passed last year. A new Bill has been introduced in Parliament each year for several years, but at the end of each as suffered in the "slaughter of the innocents." The old Act, with all its inconveniences, is still in force, and, we fear, likely to be for some time to come.

GEO. ERAM.—The design for the studio is as good as you can make it under the circumstances, but it is certainly narrow for professional work. It will be desirable to have it as long as possible, though twenty-four feet will do. There is no advantage in having the glass down to the floor; two to three feet from it will answer quite as well.

W. BURROWS.—It is much better to use the starch freshly made than attempting to keep it by the aid of antiseptics. Dextrine, though convenient to use, is not to be recommended as a mountant for photographs. Most samples of dextrine are decidedly acid, and this would act injuriously on the pictures. The letter forwarded as desired.

J. CROSBY.—If the thing was made and sold publicly, or a description of it published before the date of the patent, the patent would be invalid. It does not matter how long before, even if it were fifty years or more, if a published description is forthcoming. If your facts are right, you can make and use the article, notwithstanding the threats of the patentee.

J. WHITE inquires: "Will you be good enough to inform me the best course to take to ascertain whether a particular photograph is copyright or not?"—The desired information can be obtained by searching the register at Stationers' Hall. There is no other means of learning. Perhaps, however, the one who took the picture will supply the information.

J. M.—You may make a roller-blind shutter, provided it is not an infringement of existing patents. Before proceeding with the manufacture you had better procure the specifications of patents relating to the subject. There was an article on the other subject. Consult the index of the volumes you have. Since the article appeared, however, several improvements have been made in the apparatus.

EXHIBITION.—We think you have been misinformed. Messrs. Negretti & Zambra have the sole right of taking photographs in the Crystal Palace and the grounds. But we have not heard that they have waived their rights during the Photographic Exhibition, and we do not think it at all likely that they would do so. We strongly suspect the pictures you have seen were taken surreptitiously.

D. MC.—The best artificial light for the studio is undoubtedly the electric light. But your small steam-engine would be quite inadequate to drive a dynamo that would produce a light suitable for the purpose. Better consult a practical electrician in your town. Possibly there may be a local supply of electricity in the neighbourhood, in which case it would be better to utilise it than to go to the expense of an installation on the premises.

PROGRESS.—Albumen and gelatine can be mixed together, provided the temperature of the latter be not raised to the coagulating point of the albumen. We have an idea that many others beside yourself would like to have a more sensitive paper which would print out like the albumenised, but by artificial light. We must demur to the statement that the paper named is uncertain in its results. Uncertainty means lack of care in the manipulations—exposure, development, &c.

R. S. A. says: "When in Italy a few years ago I bought a good number of photographic prints, unmounted, about ten inches by eight. These I have since kept in a portfolio, but a year or so back I noticed that most of them were beginning to fade. Thinking that, perhaps, they had not been properly washed, I rewashed a number of them, and, curious to relate, the rewashed ones have faded more quickly than the others. Has such a thing been noticed before?"—Yes, we have several times heard of such a circumstance as rewashing, after fading has set in, hastening the decay.

PYRO writes: "Will you please answer the following:—Suppose A is a 'Photographer to the Queen and Royal Family,' B is an assistant under A, and then leaves his employment. Can B, on leaving A, put over his (B's) studio, either with or without A's consent, the following: 'B, late with A, Photographer to the Queen,' &c.?"—It would be perfectly legal for B to put up his name in the way mentioned, provided that it would not be misleading—that is to say, that B's name and "late with" must be larger and more conspicuous than A's, so that the premises cannot be mistaken for those of the late employer.

NONPLUSSED writes: "From the heading of this letter, which is, of course, not for publication, you will see I am by no means a small photographer, and have been established many years; but my prints are anything but permanent, though the instructions to my people are to use every care, and I believe they do. My *modus operandi* is as follows:—Sensitise the paper on a fifty-grain bath, wash prints and salt, tone in the usual acetate bath, fix in strong hypo bath for twelve minutes, wash by hand in alternate hot and cold water for half an hour, and then wash all night in a print washer; prints are taken out in the morning and placed between thick, clean, white blotting-pads supplied for the purpose, then mounted whilst still damp with best white starch fresh-made daily, with a small piece of loaf-sugar added, placed on shelves of wood to dry, so that nothing shall touch them; when sufficiently dry, rolled with a cold roller, spotted, and then polished with encaustic cerate. When they leave my studio they look everything to be desired, but a few months, with some of them, puts another face on them; they often, I grieve to say, show very strong signs of fading. I forgot to say I use best-quality German mounts; I believe there are none better. I expect—in fact, know—that I am not alone in this great trouble, but at the same time I have prints twenty years old which show no real signs of fading. Wherein do I err? I have exhausted everthing I or my printers know. The great question is, where is the blame—in the printing, mounting-room, or material? I certainly do not believe it is the latter, and I honestly believe that my *employés* try to do their work as well as possible, and in neither place is cheap labour used. Trusting that you will kindly open your columns to try and drive this demon out of my place."—We gladly open our columns to any suggestion that our readers may make. From the method of working as detailed, it is difficult to say where the evil originates. However, our correspondent is not alone in his experience. Numbers of other photographers who take every possible care, so far as they know, find that their prints fade in quite as short a time as "Nonplussed's," while their older prints show no signs of fading. We have often commented on this fact.

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THE FADING OF PRINTS.

The letter given in our "Answers to Correspondents" last week, under the heading of "Nonplussed," indicates the existence of a state of things which, as we then stated, is not peculiar to our correspondent's establishment, and is sufficiently alarming to raise comment. The readiness of production in silver printing, combined with the beauty of its results, especially on a small scale, will always preserve for it a certain amount of popularity, till it is beaten on its own merits, apart from permanency; but, as any one accustomed to criticise the various photographic exhibitions knows, platinum runs it very hard, and there is an undoubted tendency among judges to award medals among pictures done by the latter process. It will therefore be very unfortunate if this disfavour is increased because, through some undiscovered cause, modern silver prints are less lasting than those of a decade or two ago. The question arises: Is this really the case, or may there be some other explanation for the faded prints so frequently seen of late years? The query published last week has elicited a very probable suggestion from one of our correspondents, who offers a theory, and, finally, endeavours to place the blame of all this modern fading upon the editorial shoulders.

Some years ago we made the suggestion that, as albums had almost had their day, and owners of photographs always took a pleasure in showing them to callers and others, some ready means of exhibiting photographs that would allow of frequent changing was undoubtedly a desideratum, and that for the fortunate designer of some such frame or holder as would carry out this idea there was a handsome profit to be gained. This suggestion was reprinted in an American contemporary, and within no long period of time the well-known "Mora" frames were introduced. The price at first was prohibitive, and not many were sold. It can now be had for as many pence as it formerly cost shillings, and being manufactured in a variety of patterns, some of them singularly pretty, from the plain glass sold for amateur painters to decorate to those surrounded or embellished by elaborate metal borders of chaste design, it has taken such hold on the public that we do not think there are many houses in the kingdom unprovided with one or more of them. Whether our original recommendation was, as our correspondent suggests, the cause of the introduction of this frame it is not worth while to discuss; we will rather hasten to show the connexion proposed to be shown to exist between faded prints and Mora frames.

Our correspondent had experienced this fading of prints, and he set himself to endeavour to find out its origin. For a long time no clue suggested itself. Taking, as he does, an active part in the working of his own business, he felt it difficult to imagine that any radical change of process or procedure could happen outside his cognisance; and being aware of no such change, he found himself face to face with a great difficulty. He uses a large number of the Mora frames, particularly for panel pictures, and he was struck with the fact that the greatest amount of fading took place in pictures placed behind glass, in the "Mora" fashion. There was then seen an obvious connexion. If there is one fact more than another thoroughly ascertained in regard to the fading of silver prints, it is that it takes place far more rapidly according as the air has freer access to them. This fact would appear to clear the Mora frame from suspicion; but a further survey of the subject puts the matter in a different light. First, this work of mounting, obviously, is less protective from air than the placing in a properly secured frame. Secondly, we may propose an hypothesis as to why air should injure the integrity of a silver print. Is it the oxygen? Is it moisture? Is it some impurity? It is hardly likely to be the first, for no mode of framing excludes oxygen. It may be the second of these three causes; but we incline to the belief that it is the third—some impurity in the air, which impurity, in all probability, is sulphuric acid, arising from the universal combustion of coal and coal gas in this country.

These frames, by reason of the picture not being in perfect contact with the glass, offer the greatest facilities for the retention of moisture. A warm day, with air saturated with moisture, following a cold day, will, as every one knows, cause most objects to "give," as it is popularly expressed; in other words, moisture from the saturated air will be precipitated upon the cold objects. This will happen with the frames we speak of, and the moisture once precipitated, will stay some considerable time before it is re-evaporated. Here, then, we have a damp surface which is a great aid to any latent cause for fading, and when it is remembered that the precipitated moisture will most probably contain some of the deleterious components of the atmosphere, we see there is at hand the most favourable possible conditions for the rapid destruction of the image.

We know that in lieu of always recommending this kind of temporary mounting for silver prints our correspondent has determined to order no more of these frames for sale to his clients, and he makes a point of stating to them that he will not be answerable for any print placed behind one. We in this condition leave the question; if others have had any such

experience with these frames, or can trace it after reading our remarks, and will send us word, we shall feel that we have done a great service in propounding this theory.

SCIENTIFIC APPLIANCES FOR THE LANTERN.

By request of a member of the Camera Club, who says that the information will, he believes, prove useful to many others, we give in synopsised form some remarks with which we followed Mr. Pringle's comprehensive discourse on the optical lantern at the Club in question.

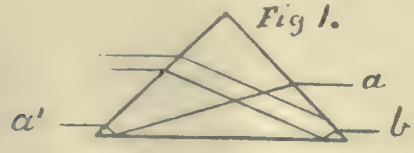
Two main points to which these remarks have reference are the non-inversion of an image on the screen, and a system by which the polariscope, when applied to the lantern, is made to project a much greater volume of light than is usual.

Let us suppose that one is showing on the screen that simple, beautiful, and effective tank experiment, the decomposition of water by electric agency, or even by the insertion of a piece of zinc or other wire into a tank of acidulated water, sufficiently strong to cause it to slowly dissolve. The gaseous bubbles will in either case arise to the surface of the liquid, but on the screen they will appear to fall downwards and convey an erroneous impression. In ordinary picture projection this is remedied by placing the slide in the lantern in an inverted position, an expedient that is obviously out of the question when dealing with a tank full of fluid. For this reason an optical expedient must be had recourse to in order to the complete reinversion being effected between the object and the screen.

A rectangular prism placed in front of the objective or projecting lens of the lantern, with its hypothenuse or reflecting surface just below but parallel to the axis of the lens, fulfils the required condition, the rays which are to form the image upon emerging from the lens are caught by the prism and quite inverted, forming on the screen a non-inverted picture of the original.

But there is an objection to a rectangular prism, inasmuch as a considerable portion of it is non-effective, owing to the whole of the rays which fall upon one surface not being refracted under such circumstances as permit them, after reflection from the hypothenuse, reaching the other surface. This was several years ago demonstrated by the late Mr. Zentmayer at the Franklin Institute, when he also showed by what means a remedy was provided by slightly altering the form of the prism, viz., from the rectangular to one of a more obtuse angle.

We here give two figures respectively of a right angle prism (Fig. 1) and the obtuse prism (Fig. 2) in question. In the





former of these two rays a and b enter the prism, and after undergoing refraction are reflected from the base and pass out, the former at a', and the latter opposite to a; but the whole of the upper portion, viz., that above a, is useless, as will be observed from tracing the highest ray on the left side back into the prism, whence it cannot reach the hypothenuse so as to undergo reflection.

Turn we now to Fig. 2, the Zentmayer form, in which the obtuse angle is 125° 30′, the two lower ones being 27° 15′ each, and it is observed that both c and d, the incident rays, are entirely reflected, and under such conditions that on emergence at c' and d' they have changed places; in short, the prism is utilisable up to its very apex. This, then, is the form of prism best adapted for erecting the inverted image of the lantern. It can be mounted so as to ship on the projecting lens and be instantly removed. We found that instead of being constructed of solid glass it could be made of three plates of glass cemented together at the edges and capped at the ends. When filled with fluid it answered quite well.

With respect to polarisation of light by the lantern, the method which we described at the Nottingham meeting of the British Association fulfils the requirements of giving, with the usual lantern, a much more intense volume of polarised light than is otherwise obtainable.

Without going into too great detail, it may suffice to say that when the cone of light from the condenser is made to fall upon the bundle of glass plates by which it is polarised, only a portion of the light is thus affected, for as the angle of polarisation is an exact one, none but the axial rays are polarised in a perfect manner, all the others impinging upon the plates at other than the polarising angle. The expedient we adopt is to receive the cone upon a concave lens, by which the cone is transformed into a cylindrical bundle of rays, every one of which becomes amenable to the polarising influence of the plates, and after undergoing the change, they are brought into a state of convergence by means of a convex lens.

This system applies equally to the analyser, or Nicol prism, as to the polariser; in either case a considerable gain in the light accrues.

A NEW FORM OF ALBUMEN.

The new form of "pure" albumen recently discovered by Professor Erich Harnack, of Halle, as reported in our "Foreign Notes and News" of last week, appears to resemble rather closely in its properties albumenate of potash—a substance we described minutely in these pages two or three years back, and which is prepared by precipitating pure egg albumen by means of a concentrated solution of potassium hydrate.

The new substance is stated to be prepared by a new method from the "copper-albumen compound," by which term we presume is meant albumenate of copper—a rather unlikely compound, it seems to us, from which to prepare an abnormally pure albumen.

The potassium albumenate is obtained by pouring strong potash solution into concentrated or undiluted white of egg, stirring well, and washing the resulting gelatinous mass until no further traces of alkali remain. From this substance the albumenates of copper, barium, and other metals, can be obtained by double decomposition.

The potassium salt is soluble in distilled water, and is not coagulated by boiling. It is precipitated from its aqueous solution by dilute acids, and by many simple salts, such as chloride of sodium, and under some conditions by dilute alkalies. Ether throws down a white precipitate; boiling alcohol dissolves it readily, and from the solution it is again thrown down by

ether. These properties appeared to offer a favourable means by which albumen might be introduced into gelatine, as well as collodion emulsions, without clotting or coagulating under the action of silver salts and of heat, as is the case with ordinary albumen, however used. But a rather extended series of experiments with both kinds of emulsion failed to establish any real advantage in this direction. When the gelatinous mass is once dried it loses its solubility both in water and in alcohol.

In gelatine emulsion, or rather in *solution* of gelatine, the potassium albumenate remains in solution, but boiling produces a slight opalescence, no doubt from slight decomposition of the gelatine, and the consequent formation of other substances which have an action on the albumen. The addition of the bromising salts at once throws it down in an extremely fine state of division, altogether different from the clots produced by the coagulation of ordinary albumen, and with this finely divided product the silver, no doubt, subsequently combines, but no special benefit appears to accrue. The alcoholic solution when added to plain collodion is in like manner precipitated by the ether present forming a smooth, milky emulsion, and here again the subsequent addition of silver nitrate would, no doubt, convert it into silver albumenate.

The new preparation of Professor Harnack differs from the above in not being precipitated by ether, and possibly, though it is not so stated, in resisting the action of neutral salts. If so, it is not unlikely that it may prove more useful than the potassium salt.

DENSITY IN NEGATIVES FOR ENLARGEMENT.

It has long been accepted as an axiom that negatives from which enlargements are to be made should be rather dense, rather inclining to "thinness," and full of detail, in order to produce the best results. At no period in the history of photography has the practice of enlarging from small negatives prevailed to such an extent as it does at present; and it is not unlikely, looking at the rapidly increasing popularity of the hand camera, that it will be still more generally practised in the future. The importance, then, of studying the means of regulating the density of our negatives in a somewhat different direction to that previously followed forces itself upon us.

In the early days of gelatine plates the cry was raised against them of want of "sparkle." In some isolated cases, perhaps, the fault really amounted to lack of density, a not uncommon failing with the plates of ten or eleven years ago; but in the great majority of instances the defect complained of arose rather from over-density—accompanied by more or less veil in the shadows—than the reverse. The plates of the period may no doubt have been partly at least to blame for the result, but it is scarcely to be doubted that the fault lay in great measure in the methods of development then in use.

It is true, alkaline development had been in vogue to a certain extent for twenty years, but it must be remembered that to the majority of photographers it was entirely new, and even old dry plate workers were only learning its application in a novel direction. With increased experience, both in the manufacture of plates and in their development, the earlier difficulties soon disappeared, and perhaps, at the present time, it would not be difficult to get up a cry of too much "sparkle." At any rate, there is no difficulty whatever in obtaining any degree of density combined with contrast, even to the extent required in negatives for "process work," while the question of how to produce delicate images suitable for enlarging from has been apparently neglected.

With a view of arriving at a methodical system of producing a uniform type of image of the character required, we have been for a long time experimenting. Commencing naturally with pyro as the basis of the developer, we found the results attainable in conjunction with ammonia not sufficiently reliable with *every* kind of plate. We are inclined to agree with an opinion that has been frequently expressed in one form or another, that a pyro-developed negative of the best kind surpasses in quality anything that can be obtained by any other means; but it is difficult to hit the uniformity of excellence, even when working only one kind of plate. With sodium carbonate in place of ammonia, matters are not greatly improved, but potassium carbonate comes nearer to perfection in regard to quality of image for the purpose we have in view than anything else we have yet tried. Unfortunately, however, the tendency to "frilling" and similar defects produced by this alkali entirely precludes its use with some kinds of plate.

Turning from pyro, ferrous oxalate was next tried, and, unquestionably, the quality of image obtainable under favourable conditions with this developer is all that could possibly be desired, so far as regards delicacy of gradation; but when the most favourable conditions are departed from, as in the case of under or over-exposure, the results are the very reverse, and ferrous oxalate proves, even when the solution itself is in its best condition for working, a very delicate agent to employ. When it is further taken into consideration how difficult it is to preserve this solution or its component parts in anything like a standard working condition, we may bid farewell to any idea of uniformity in general practice.

With hydroquinone we were at one time satisfied that we had secured what was needful, but our trials had been at that time made with one brand of plate only. Applied to different kinds of films, the action of this agent varies so considerably, requires, in fact, such constant modification to suit the particular circumstances, that for general work, where delicacy of image is a *sine qua non*, we had to revert to pyro; not that the quality of negative that may be obtained is inferior, but simply on the score of want of uniformity.

Since the introduction of eikonogen many different opinions have been expressed as to its value as compared with pyro and hydroquinone; but one and all of those who have written on the subject, we think, agree on one point—a point which has been put forward as a defect, but which for the purpose under review may be an actual advantage—we allude to the difficulty in obtaining density.

That such difficulty exists when normal proportions of eikonogen are employed is undoubted, and, as pointed out by Mr. W. K. Burton and others, it is only when the strength of solution is raised to five or six grains to the ounce, or a very liberal addition of restraining bromide is employed—rendering the action extremely slow—that anything like the density of pyro or hydroquinone is obtained.

Such being the case, eikonogen would seem to be the very developer for negatives for enlarging purposes, especially when these are made with the hand camera and rapid exposures, since the claim made in its favour of shortening the exposure may under these conditions be justified. By this we mean that so far as we have experienced its action, eikonogen will bring out more delicate detail in an under-exposed plate than either pyro or hydroquinone, but it will not give greater printing value for ordinary purposes.

Practically testing the matter, we have submitted ten different kinds of plates drawn from ordinary commercial sources to the action of eikonogen under, as nearly as can be obtained, precisely similar conditions of light, exposure, temperature, and strength of solution. As the result, we have obtained in every single instance delicate, fully detailed images, varying, it is true, to some extent between the different makes of plates, but all of a type admirably suited for enlarging or for printing on rapid bromide paper. The variations between the images given by the same plates under pyro or hydroquinone treatment, however modified, were infinitely greater, and to have produced a similarly uniform series of negatives would have been practically impossible.

The strength of solution employed was uniformly two grains of eikonogen and three grains of sodium sulphite to each ounce of developer. The proportion of alkali alone was varied in different experiments, sodium carbonate being employed, but with the only result of modifying the time occupied in development. No restraining bromide was employed, but if it should be deemed desirable, it must be used with the utmost caution, as its effect appears to become more powerful than in conjunction with hydroquinone.

Another sensation is going the round of the newspaper press. It is, once more, the discovery of a means of taking photographs in natural colours, and this time the invention or discovery claims Germany for its birth place. Herr Verescz claims to have solved the problem, but "up to the present only the shades between deep red and orange can be retained, and even these, if exposed to light, fade in from two to three days;" which means that the solver of the "problem" has not advanced, so far as we can perceive, beyond the position attained by Becquerel, Niépce de St. Victor, and others, at the comparatively remote period in which they conducted and published their experiments. Perhaps Herr Verescz has been studying our volumes of twenty-three years ago, and has been trying some of the methods there to be found described. These carry the problem up quite as far as he seems to have got towards its solution.

A discussion on the "silver printing bath" would bring out in this country very few speakers at the present time, since of those who have not gone over entirely to platinotype not one in a hundred—among amateurs, at least—has ever used anything but "ready sensitised" paper. In America, however, the subject still possesses an interest, as witness the very practical paper read before the Photographic Society of Philadelphia by Dr. C. L. Mitchell, and the instructive discussion that followed. With regard to the remarks of Mr. Browne and Dr. Wallace on the subject of the discoloration of the bath, or rather of its prevention, our experience is quite in accordance with theirs, so far, at any rate, as concerns the possibility of preventing the darkening, though whether the presence of alcohol has anything to do with the result we are unable to say.

Some years ago a professional friend having a very large series of prints to produce, a "Winchester" of sixty-grain bath was freshly made for the job. Although it was early spring, and the weather cold, at the end of a couple of days the bath had become so foul—not more than a dozen or fifteen sheets having been floated—that he was compelled to clear it by the carbonate of soda and "sunning" method. After filtering, neutralising, and strengthening, it was taken into use again, and though employed, with necessary additions, for months, or perhaps years, after, he never had the slightest sign of discoloration, and forgot there was such a trouble. The solution had, of course, to be filtered now and then, but passed through the filter as limpid and colourless as water.

Again, he has at the present time a printing bath that has been used at intervals since the early part of last summer without showing any of the ordinary signs of discoloration. If shaken up in the bottle it becomes black and muddy-looking from a sediment that has formed, but if left alone it settles clear and colourless. In this case the bath was made with an addition of ten per cent. of methylated spirit to prevent the solution running in "tears" on the sample of paper we were using.

Most photographers are familiar with the fact that the photographs of criminals are taken by the prison authorities in this country for purposes of identification; a large engraving in the *Graphic* a number of years ago gave a droll illustration of the process, which picture, to the eye of the expert, contained a decided departure from probable facts. It was done during the wet plate era, and the dark slide was represented upside down. On the Continent this process of photograph taking is carried on much more systematically than here, and the latest improvement, due to M. Bertillon, consists in the production of a series of large photographs of the hands of workmen engaged in various handicrafts and work, and also a set of smaller pictures giving the man actually at work, so that one may see at a glance the position of the body and which are the parts that undergo friction from the tools in use. Thus, from the hands of the navvy all secondary lines disappear, and a peculiar callosity is developed where the spade handle presses against the hand; the hands of tin-plate workers are covered with little cracks, owing to the acids used; and so on.

The photographic section of the London Chamber of Commerce is attempting a good work. It has taken up the question of copyright in photographs with a view of obtaining a more satisfactory state of things than now exists. There can be no divided opinion that the present law, as applied to photographic pictures, is in a most unsatisfactory condition, except perhaps to the pirates. It is satisfactory to know that some public body is moving in the matter, seeing that the "Parent Society," which professes, and ought, to be the leading photographic society of Great Britain, quite ignores the subject, though it is one which most people thought was well within its functions. All honour to the photographic section of the London Chamber of Commerce for their energy.

Papers which have recently been read before medical, as well as photographic societies, illustrated by the lantern, fully prove the value of photography to the medical profession. Photographs, if skilfully produced, are infinitely more valuable than drawings. But to obtain the full advantage of photography it will be necessary to secure the services of one familiar with both subjects—photography and medico-chirurgery. An ordinary photographer might quite fail even in an otherwise excellent negative to render that which was of the most importance. At present the greater portion of the work is done by amateur photographers in the medical profession. But we hope soon to see every hospital provided with a properly appointed studio and appliances, so that what is required may be obtained under the most advantageous conditions, and that, too, without causing unnecessary inconvenience to the unfortunate patient. Unless everything is ready at a moment's notice this is not always possible. We were recently told of a case that happened some few years ago. A man met with an accident and had some of his bones dislocated in a very unusual manner. After being taken to the hospital he was brought in a cab to a studio, a mile or more away, to be photographed, and then back again to be treated. Had the hospital possessed a studio, much time would have been saved and prolonged suffering avoided.

Apropos of the use of celluloid dishes in photography, for some purposes they are not so well adapted as ebonite or glass—drying negatives with spirits, for example. Alcohol is a powerful solvent of one of its principal constituents—camphor—hence it must not be used in these dishes. Acetic acid is also a ready solvent of celluloid. If the edges of two pieces of celluloid are moistened with acetic acid they may be cemented together.

The general interest now being taken in matters stereoscopic will no doubt in the end lead to the resuscitation of the stereoscope. From

what is from time to time written on the subject it seems pretty evident that many persons who look at a picture in this instrument do not see it properly, and have no clear idea of the true stereoscopic effect. This, in most instances, arises from the instrument not being adapted to the vision of the individual. Except in the original Brewster stereoscope, many of the older forms had no means of adjustment, either for the focus of the lenses or for their distance apart, and some of the modern ones are deficient in the latter arrangement which, with some persons, is really more important than the former. What would do more to once again popularise the stereoscope would be the reintroduction of a portable instrument that could be carried in one's pocket like spectacles or eye glasses. Here is an opportunity for inventors.

A well-known firm of dry plate makers a few months back had the misfortune to have their factory destroyed by fire. They have now re-established it, and are introducing a new plate under the title of the "Phœnix." By no means, under the circumstances, is this an inappropriate name. We wish the plate every success.

At the last meeting of the Photographic Society of France a novel method of producing contretype negatives was described. A dry plate is treated with a solution of bichromate of potassium of about the strength used for carbon tissue; it is then exposed under a negative in a printing frame; when printed it is immersed in a coloured aqueous solution. This is absorbed by those portions of the film which have been protected from light, while it is rejected by those upon which it has acted and rendered more or less non-absorbent. From the report, it appears that the colouring matter used for the example shown was a solution of China ink. But it is manifest that any colour or dye soluble in water can be employed, so that negatives of any tint may be obtained. Of course, a plate coated with plain gelatine would answer quite as well as a bromide plate, indeed better, unless the bromide of silver were first dissolved out. Here is one more method of reproducing negatives that may prove useful.

Notwithstanding it has been asserted that large direct pictures are no great success in a commercial sense, we are pleased to learn from manufacturers that there is a steadily increasing demand for apparatus of large dimensions. During the past few months we understand that many orders have been placed with the principal houses for studio apparatus of unusual sizes. It is more than probable that if the profession generally were to make a special feature of large direct portraits taken under the right conditions, they would prove highly remunerative.

It is a matter of comment amongst the votaries of our art science that the light we have had during the past month or more, has been, in actinic quality, far in excess of what is usual at this season of the year. Its immediate effect is most noticeable in negatives taken by amateurs with shutter exposure. For months past the majority of these pictures, we learn from those who develop large numbers of "amateurs'" negatives, have been little better than silhouettes through under-exposure. Now, however, similarly timed, they show a certain amount of detail even in the shadows. It is no unusual thing for inexperienced amateurs or beginners to use the shutter with the same rate of speed—generally the quickest—for all subjects, quite regardless as to whether the light is good, bad, or indifferent, with the result so frequently met with in amateurs' work of this class.

THE ART OF RETOUCHING.

Chapter II.—Mental Training.

There are many to whom *mental training* will not appear as a very necessary help in acquiring a thorough mastery over the art of retouching, but I can assure them it is a most essential point. One of the first objects to be attained when we start our studies is what may be termed "intellectual grip." Possessing this, we are able at a glance to estimate to a nicety the many requirements of the negative about to be retouched. One can *never* be too thoughtful in one's work, and we should treat every new subject as a fresh and independent study. Every human face differs, and as there are endless varieties of expression thereon, so there must be a special and intellectual treatment for each and every one of them. This we cannot do without thinking. A very considerable amount of the embarrassment that, as a retoucher, you will have to contend with in this direction will be vastly influenced by the degree of technical skill and artistic knowledge possessed by the operator upon whose negatives you may be called upon to work.

From a really first-rate operator a retoucher may fairly expect, not only a constant supply of good all-round negatives, but also such as will be interesting to work upon. They will possess a certain delicacy of light and shade, the natural result of his efforts to secure some flitting expression which would not only make his work more lifelike, but enhance its claims to be classed as *artistic*. A careful and intelligent retoucher should derive considerable pleasure from working upon such negatives, for they undoubtedly afford him splendid opportunities for the demonstration of his skill and artistic feeling.

I can thoroughly well sympathise with an operator of this class when it is his misfortune to be seconded by a retoucher who either cannot or will not think. A retoucher who works without thinking cannot produce artistic work. What results can be expected from a man who will simply place a negative on his retouching desk, look for the *high light* (if any) on the forehead, and start away "pencil-pushing" (for such it is) until he covers the entire face with what I will even allow to be a creditable "grain" or stipple? Where is the merit of such a portrait? There is no thought for effect, no consideration for the artistic balance of light and shade, and as a natural consequence, no effort whatever to second the operator in his endeavour to secure a pleasant expression. To such a retoucher (?) as this I beg, dear reader, to draw your extra-special and most particular attention. Not that I wish you to cultivate his intimate acquaintance, nor yet make him your "guide, philosopher, and friend," but rather that you may know him as a dangerous companion, and one whose counsels, or the study of whose works, will be certain to have the most damaging effects on your future efforts to master the art of retouching.

I have not the least doubt that there are many who will think that I lay a deal too much stress upon this point; but it is really not so. The fact is, it is impossible to lay too much stress upon it, and believe me, all the attention and study bestowed upon the cultivation of mental appreciation as to the requirements of a negative will be well repaid by a plentiful harvest of successful results in the future. Personally, I consider it of absolute importance to be able to retouch *mentally*—if I may be permitted the expression—before beginning to use the pencil. Think for a moment, and ask yourself how a student who fails to thoroughly realise the defects and requirements of a negative at first sight can possibly hope to carry out the necessary treatment when he takes up his pencil. He cannot carry out his work successfully. I therefore advise you to thoroughly habituate your mind to diagnose the requirements of the negative *before starting work* (this will soon become a second nature), and then the very first touch you place upon it with the pencil will have a telling value in obtaining that result already definitely fixed upon in your mind. Consider for a moment what a saving this will be in *time*. There will be no wandering over the negative purposelessly, and leaving to chance or good luck the issue of your work, but a constant and steady progress towards an artistic end. I have not the least hesitation in saying that a negative *thoughtlessly* retouched, no matter how pretty the style or method of manipulation may be, will never yield a result possessing real merit, or having any pretensions to be classed among works truly artistic. But in a subject treated *thoughtfully*, even if the said manipulation be somewhat poor in quality, the general effect possesses considerable artistic value.

The student must here make a note that there is a very vast difference at times between the *artistic* and the *marketable*. I regret to have to say so, but I suppose "truth must out." It is in this regard that many writers of known ability on all the *scientific* branches of photography seem to take delight in running down retouching and retouchers. Considered carefully, however, their writings only show ignorance of their subject and a blind bigotry to see no good in such

other branches as are beyond the reach of their own abilities. It often occurs that a retoucher is obliged to make the most absurd alterations and modifications in a face in order to make it suit the taste of his employer, or else to please the capriciousness of the customer. Notwithstanding that the practical retoucher is in many such cases obliged to do violence to his better judgment, the advantages of having acquired his art by means of a proper and artistic training will always assert themselves in his work and prove a strong recommendation. Indeed, there are some of our leading firms—firms, too, some of them which carry out the wildest ideas in their endeavour to please their customers—that will not employ any but the best procurable talent, refusing to have anything to do with the second-rate man, no matter how low his price may be.

Ladies are sometimes very exacting. They often require not only the most extravagant alterations to be made upon the face, but the hair must be reduced in *bulk* or lightened in *tone*, the waist must be reduced and brought to a proportion and shape it may not have had for the past twenty years. It is often suggested as a serious improvement to cut a slight piece off the nose; then a heavy jaw, too, must be reduced (if not altogether taken away); and, in a word, a nice *oval* appearance given to a face naturally more or less *square* before being put in the hands of the retoucher. I have had requests from people asking to have mouths closed which were distinctly open and showing the teeth. As if all this were not enough, it will be suggested that the eyebrows may be arched, and so on until scarcely a feature, and in many cases a vestige of a likeness, remains to be traced to the original. Nevertheless, the result of all this chopping and changing is a *marketable* photograph. The lady likes it, and the photographer, whose likes and dislikes are entirely governed by the extent of his customer's order, is of course highly satisfied. He knows the photograph to be *marketable;* he tries to make himself believe it is *artistic.*

Lest the ladies should think I have been unduly hard upon them, I will cite a little anecdote which will, I trust, prevent them from running away with the idea that they possess all the vanities and frivolities of human nature, and that we (noble animals that we are) are above such weaknesses. I can vouch for the truth of this, as it occurred to myself some years ago when I was engaged at one of the leading West-end houses. One afternoon I was called down to the reception room by my employer, and on my arrival he handed me a number of proofs. I then very naturally looked anxiously at the pictures to see what blunder I had made, for I could see there was trouble somewhere. The idea flashed across my mind that I had left a portion of a head-rest showing (a common oversight), or some such blemish; but no, I failed to find any cause for worry. I looked at my governor as much as to say, "What is the matter?" "The gentleman does not like them," he said to me in a low tone, and indicated a clergyman who stood close by. I replied by mildly suggesting that "they were very good photographs." The governor knew very well they were, but the trouble was that the customer did not like them, and a rather large order was dependent upon his thinking them satisfactory. I therefore took the matter in hand, and asked the gentleman if there were any alteration possible which could or might make them satisfactory.

Now this clergyman—no doubt a most estimable man, certainly a charming man to talk to—had quite a false idea as to his own personal appearance, and that fact alone can account for his not considering these photographs successful. Dame Nature had bounteously endowed him, as she does all great men, with a very large nose—one belonging to the family familiarly, if vulgarly, termed "soda-water bottle;" also a rather square and heavy jaw, but not so to any objectionable extent. Nevertheless, though not handsome, it was an honest and intelligent face, and one pleasant to look at. Now, *he* was of opinion, regarding these photographs, that if the nose had been *smaller* and of a different *shape*, and the chin rounded off instead of being square, they would have been very excellent *portraits* indeed. In this, too, his wife, who was with him, concurred.

I need not say I was quite ready to take the order—a new nose and a more delicate chin. The latter was settled easily enough, but some considerable discussion took place before deciding about the nose. Unfortunately, I happened to suggest that *any* shape could be supplied, hence creating a difficulty of selection; however, after considerable debate, in which we all four joined, it was decided that the more aristocratic *Roman* should take the place of the more homely *soda-water bottle.* I went upstairs to my room, taking all the negatives with me, and made the necessary alterations. In due course the fresh proofs were sent, and met with unqualified approval; he pronounced them perfect likenesses (we couldn't see it, but he did), and gave an order for nearly twenty pounds' worth of plain photography, and had a life-size oil painting painted from one. Most decidedly these pictures must be classed as *marketable;* I am afraid I cannot insist that they were artistic.

Hence you will see that at times, to be marketable, you will have to turn out work that cannot be styled artistic; nevertheless, the better your training, the more likely you are to secure success, even in a case like this, for it would have been very easy to have destroyed those pictures altogether. This is only one of many such cases, but it will suffice as an example of some of the many troubles that a professional retoucher must be prepared to encounter from time to time. Foolish as such alterations may seem to the beginner, they require very careful manipulation, backed up by sound judgment, and of these two the latter is really the more important. Of course, such work as this is greatly to be deprecated and only carried out where absolutely insisted upon. In cases where features are somewhat exaggerated in the negative, a wholesale change is often avoided by a *skilful softening* in the first instance, which will lessen the prominence of the objectionable features and make them more pleasing to the eye.

I will once more impress upon my readers the necessity of cultivating the habit of *always* thinking as the work progresses, and so hold a complete intellectual mastery over its requirements. Once we have thoroughly secured this quality, we are in a fit state to advance our studies without fear of failing in our efforts to turn out artistic work.

REDMOND BARRETT.

THE CRYSTAL PALACE EXHIBITION.

SINCE we wrote last week one more exhibitor of apparatus, at least, has been added to the list we gave. It is Mr. Henry Crouch, who contributes a large display of lenses of various sizes, together with cameras.

Space will not permit us this week to refer to the photographs exhibited, but we may say that they form a large and most interesting collection. Medals and other awards have been made in this department as follows:—

Gold Medal for Best Alcove.—Lafayette, Dublin.

Club Challenge Cup.—The Birmingham Photographic Society.

PROFESSIONAL PHOTOGRAPHERS.

Silver Medal.—Class A, Sec. 1, Green Bros., Grasmere.

Bronze Medals.—Auty and Ruddock, Tynemouth; Lyd. Sawyer, Newcastle; Richard Keene, Derby; Henry W. Reeve; James E. Goold, Newcastle-on-Tyne; Symonds and Co., Portsmouth; Gambier Bolton, Camera Club; J. Pattison Gibson, Hexham; W. W. Winter, Derby; R. Faulkner, Baker-street, W.; B. Scott & Co., Carlisle; T. F Goodwin, 63, Anerley-road, S.E.; W. J. Byrne, Richmond; F. W. Edwards, Peckham-rye, S.E.; Frank Sutcliffe, Whitby; R. H. Lord, Cambridge; Arthur H. Carnell, Plymouth; Walter L. Colls, Barnes Thomas Scotton, Derby; H. J. Godbold, St. Leonards-on-Sea; George Thompson, Liverpool.

AMATEUR PHOTOGRAPHERS.

Silver Medal.—Miss Clarisse Miles, Malmesbury.

Bronze Medals.—G. H. Catt, Spettisbury, Dorset; Court Cole, Folly Bridge, Oxford; Rev. W. Mann, M.A., Bristol; Martin J. Harding, Shrewsbury; T. J. Bright, Gipsy Hill; Surgeon A. G. Newland, I.M.S.; J. L. Mackrell, Fairfield, Liverpool; J. E. Austin, West Court, Detling, Maidstone; E. C. Middleton, Birmingham; W. Jerome Harrison, Birmingham.

The Judges also recommend that a complimentary medal be awarded to Mrs. Rejlander for the exhibit of her late husband's art studies.

Owing to the large number of lantern slides in competition, awards in lantern division cannot be published this week.

THE AMERICAN ECLIPSE EXPEDITION AT THE CAPE.

Before continuing my last article I must refer to an item, a sorrowful item, of news that has just reached us in reference to the English Eclipse Expedition to South America. I refer to the death of Father Perry from dysentery, after the successful completion of the work he had been sent to carry out. A long career of useful work in astronomy has made his name a familiar one in scientific circles throughout the world; he was one of those enterprising men that astronomical circles can ill afford to lose. Blended, however, with the great regret we all feel at his sudden decease, there is the thought that since peace has its triumphs as well as war, his dying in harness, as it were, like a successful soldier at the close of a well-fought battle, is not an unenviable lot. The end was in fitting accordance with the life, and though it was to be expected that there were yet many years of useful life before him, better to be taken thus suddenly than live till his name and labours were a story of the past.

I must make a slight correction to my last letter. Messrs. Carbutt and Wright were the chief assistants to Professor Todd at the great totality battery. Mr. Jacoby, in addition to his station at the seventy-five feet reflector, took charge of the transit work throughout the stay of the party at Cape Lodo; and Mr. Davis was not at the totality battery, but assisting Professor Bigelow at the forty-foot telescope. I do not know whether I made it clear why three hundred plates should have been exposed during an eclipse obscured by clouds. Apart from the chances of a rift in the clouds occurring, it was necessary to go through every operation in order to test the reliability of the instruments, &c., employed; in fact, it is a recognised rule in all observations of a fleeting phenomenon to go on serenely in event of anything turning up, so as not to be taken by surprise. Professor Todd reports complete success to a certain extent, viz., that with automatic apparatus much may be done by a very few skilled men. I was lately reading the account given by Dr. Hermann Vogel of his labours in conjunction with Drs. Fritzch, Zencker, and Tiele, at Aden, during the eclipse of 1868—less than a generation ago. Dr. Fritzch prepared the plates in the first tent, Dr. Zencker pushed the slides into the telescope, Dr. Tiele exposed them, and Dr. Vogel himself developed them in the second tent. Says Dr. Vogel, "We had ascertained that it was possible in this manner to take six views in three minutes." Two of them shut up in their tents, unable to catch one glimpse of the corona, their faces running with perspiration, preparing and developing plates with difficulty in a tropical heat—and six plates in three minutes! *Nous avons changé tout cela.* It is now fifty times six plates in three minutes, the observers with plenty of opportunity to see the corona, and able to pack up their plates and smoke their pipes serenely, in confidence that their results will be none the worse for a few weeks waiting to be developed leisurely in their own comfortable dark rooms.

Amongst other lenses which the party brought with them was one not on the list I gave in my last, as there was no time to fit it up. It was an orthoscopic lens of four inches diameter and thirty inches equivalent focus, made by Gundlach from the new Jena glass. By the kind favour of Professor Todd I was enabled to test this lens on a group of stars. Made especially for astronomical purposes, its angle was small for full aperture as compared with ordinary lenses, and the two parts of the doublet were set so far apart as to give the combination a lean and scarecrow appearance. The brasswork was fair, but not quite up to the English finish. "Handsome is that handsome does," however, and my report was in every way favourable. Good, clean, white glass with a good polish, a fairly large field compared with other lenses I have tried on the stars—the severest test that a lens can be put to—good definition with a well-defined focus (we do not want depth of focus, *i.e.*, no focus at all), and great rapidity. One can hardly wish for a better tool, but I am curious to see what our English lens makers will turn out with the new glass. That they will not let themselves be outdone by foreign firms I fully believe, but I consider that the Gundlach I examined will take a lot of beating.

I have also had an opportunity of testing Carbutt's orthochromatic plates alongside of our usual Wratten's special. The result was disappointing in one respect, but I found on reference to the circular issued with them that an orthochromatised plate is only half as fast as an ordinary plate of the same (labelled) sensitometer number. Mr. Carbutt, pro., also suggested from experience of his own that the orthochromatised plates had deteriorated in rapidity somewhat since he left America. In other respects I found the plates as good as when they left the factory, developing clean, and perfectly fit for the purposes to which orthochromatised plates are usually applied. But I am afraid that for the present we must use ordinary plates on the stars, for rapidity is the most essential point.

I know that at home you are all in the thick of celluloid film trying. I must say, from the many developed in my presence by several of the Eclipse amateurs, that they are by far the best substitute for glass yet brought out. Sundry spots appeared, it is true, but they were due to exposure to sea air, for some that I used gave no such defects, and I experienced considerable relief when taking my camera up Table Mountain, where every extra pound tells. On a long trip the convenience must be very great of carrying films instead of glass, and we are nearing the solution of the problem of portability. Mr. Carbutt gives me to understand that they have not yet surmounted the difficulties in the way of supplying roller slides, a thin film of celluloid being too liable to tear; all in good time. I have not got a roller slide yet, and think I am quite justified in waiting yet a little longer. The same gentleman told me an amusing anecdote concerning the celluloid films. Soon after his father had begun the manufacture of the opaque films for positive work of the opal character, a gentleman came to the factory complaining that he was utterly unable to fix out some of the negative films sent to him. And no wonder!—some of the positive films had inadvertantly got mixed with the others, and he might have fixed all his picture away without lessening the opacity of the support.

The *Pensacola* must have had an interesting voyage out here. Stoppages were made at Horta in the Azores, St. Vincent in the Cape Verd Islands, St. George's Pariah, Sierra Leone, and Elmina on the Gold Coast. The photographers—amateur and professional—took their cameras on shore; the naturalists went hunting after curiosities or employed themselves in measuring the thick heads of the natives; parties were made up for taking meteorogical observations, and many interesting results were got. No fevers were caught, happily, but natives were, and huts, palm trees, and other animal and vegetable curios of tropical life were impressed on the sensitive film. Scarcely a day has passed since the *Pensacola* has been at Cape Town when I have not had one or more visitors in my dark room, and I have been called upon to admire some successful negative, or with the less experienced amateurs to solve some knotty problem in development. Canoes at Elmina or instruments at Cape Lodo—nothing seems to have escaped these enthusiastic negative hunters, and I have not been able myself to dodge the rascally detective camera in my own special quarter of the Observatory precincts.

Of course we had a trip up the mountain. One of the scientific visitors contemptuously called Table Mountain a molehill compared with some heights he had ascended. Unfortunately he did not accompany the party, as he originally had intended, or he might now be regarding the molehill with fitting respect. No mountain is to be despised on which experienced Alpine mountaineers (perhaps of the sacked-up-between-two-guides class) have come to grief. The large party that went up on the first occasion enjoyed themselves hugely when on the summit or seated round the camp fire. The day, which began with cloud, cleared beautifully, and the grand, unique view from the precipitous face overhanging the town amply repays exertion. We brought the party down through wooded glens where ferns, mosses, and disas made up, with the massive rockwork, pictures of beauty equal to any the world can show. Of course the camera was there. Mr. Carbutt took a group as a memento of our visit. The second trip was made a week later by Mr. Fry, our departing Meteorological Secretary, Professor Abbe, and your humble servant, who has just undertaken to relieve the new Secretary of the Table Mountain portion of his duties as a task best fitted for young limbs. We started by moonlight, visited the various rain-guages and thermometer stations, and completed our work—photographic and all—to meteorological matters. Professor Abbe, it need scarcely be said, is an important unit in the United States Weather Bureau and Signal Service. He delivered a lecture on his department at the South African Philosophical Society a few evenings since, during which he described Table Mountain as the prettiest place in the world for studying the formation of clouds. A chapter on clouds by the Professor is likely to be one of the best parts of the *American Eclipse Report*, and it will be largely illustrated by reproductions of cloud negatives.

The *Pensacola* leaves Cape Town to-morrow, February 5th, or the day after. A dance on and between her decks this afternoon heralds her departure, and our friends will soon be leaving us. She will sail home, and does not expect to reach America until May, her calling places being Ascension, St. Helena, and Barbadoes. At Ascension the ship will have to stay for a month in order to allow Mr. Preston to swing his pendulum. Need it be said that the others are looking forward to that stay with feelings somewhat akin to horror. True, Dr. Gill had to stay there six months when he made his celebrated observations on Mars, and Mrs. Gill found the stay interesting enough to furnish that delightful little book of hers, *An Unscientific Account of a Scientific Expedition*, but the place is little better than a barren rock. Professor Abbe may be able to turn the visit to some account in meteorology, other scientists may profitably study rocks and volcanic action, but the gallant and *gallant* officers of the ship will sadly miss, so they say, the gaieties of Cape Town and

the pleasant wiles and seductive smiles of her fair daughters, for Cape Town has fair daughters as well as dark and parti-coloured ones.

One of the astronomers is to stay at the Observatory for a while. Mr. Jacoby could not get back to Columbia College before the end of the session, and so he hopes to improve himself by practice at the superior instruments we have here. Mr. Brown, the naturalist of the party, and Mr. Orr, the ethnologist and amateur photographer, also propose to remain in South Africa for awhile, and take advantage of the British East Africa Company's approaching expedition to Zambesia. They will probably find enough to do in the new regions about to be opened up to civilisation, with its accompanying mining, agriculture, and commerce; and Mr. Orr will doubtless find enough work to do for his camera without encroaching on the rights of the photographer to the expedition. *Apropos* of the latter gentleman, and this expedition generally, let me say a word or two.

Before Mr. Rhodes, "the Diamond King," and his large party go up to occupy the land conceded to the Company for a consideration by Lobengula, whose only right to Mashonaland and Zambesia is based on conquest, rapine, and devastation, a pioneer party numbering some hundreds goes up within a month under the leadership of Mr. Selons, the well-known African hunter and traveller. One of the objects of this pioneer expedition is to clear the way, make a road, and prepare the land for settlement. Its members form a small, select, but formidable band, comprising men used to the country, able to do the necessary work, and familiar with the natives and their little ways—peaceable and warlike. Amongst the men eagerly picked up, Mr. Fry, late Secretary of the Meteorological Commission, goes up to assist in the survey work and take photographs, in addition to making himself generally useful, as do all the band. The service is dangerous, and the remuneration correspondingly large, for Lobengula is, unlike Khama (a chief who has done much for the improvement and well-being of his people), nothing but a crafty, bloodthirsty warrior, whose word is unreliable, and whose life has been spent massacring peaceful tribes, seizing their territory, and enslaving their women and children. To introduce politics here is, perhaps, out of place, but it is as well to warn the British public beforehand, that should "ructions" occur shortly, they must not pay too much attention to Exeter Hall agitators crying out on behalf of the poor natives. We all wish Mr. Fry a safe return, and I am in hopes that I may in future be able to give some account of his adventures photographic.

C. Ray Woods.

STEREOSCOPIC MATTERS.

"Do you believe in the resuscitation of the stereoscope?" asked a prominent member of one of our prominent photographic societies of me the other evening. I replied, "No." I take it that resuscitation means a demand and ready purchase by the million; but the million like more to look at for their money—witness the glaringly coloured "club picture" in German frame, with which nearly every house in the country is decorated.

Again, the unscientific million object to spy at the pictures through that "box thing," and often query, "Why is there two pictures? would not one do as well?" and further exclaim, with the instrument against their nose, "Oh, I can see so much better with one eye!" thus proving, as scientists well know, that the stereoscope needs almost as much eye training as the telescope. Thus you have to educate the people up to it; but the million will not take the trouble to learn, and so the matter is left to a few enthusiastic, appreciative minds. I do not wish in the least to write anything derogatory of Sir David Brewster's charming little instrument, but we must deal with facts, for I have had the above absurd remarks made in my ears by persons who were in most matters credited with enlightened minds, much to my annoyance, and causing me to peremptorily shelve the instrument, as there is a limit to my patience, and any instruction in its use would perhaps be deemed pedantry, and I a bore; thus I think that the stereoscope has gravitated to its place in the usages of the world, and that is, a scientific toy of no practical use, and reposes on the shelf side by side with the kaleidoscope (which emanated from the same master mind), the thaumatrope, and other species of conjuring. It is to be regretted, but it is no use kicking against the pricks of evolution. No doubt just now it will meet with some measure of success as a partial revival, for among the large army of amateur photographers there will be some appreciative minds charmed with its beauty and, to them, novelty; but commercially it will not move a jot, for it will still remain "*caviare* to the general."

Allow me a few remarks on the question of stereoscopic vision. Now, any one that can assert that stereoscopic effect can be seen by examining two duplicate prints mounted side by side from one negative betrays complete ignorance of the principle of the whole thing, for in order to secure a representation in a photograph of the solidity and distance as seen by the human eye—perhaps I had better write a pair of eyes—there must be two pictures, one for each eye, that is, a right-eye picture and a left-eye picture, which are dissimilar from each other by the distance between the eyes. Thus two pictures must be photographed, one from each point of view, from two and a half to three inches asunder. There are three ways of achieving this end: first, by a pair of lenses and a simultaneous exposure, the camera being fitted with a partition dividing it into two chambers; secondly, using the same camera and one lens fitted on a horizontally sliding front, with succesive exposures, sliding the lens after the first exposure to the right or left, bringing the lens *in situ* in the second chamber for the second exposure; thirdly, using the same camera with a repeating back and one fixed lens, moving the camera bodily after the first exposure to the right or left three inches for the second exposure; this is readily and surely accomplished by the aid of trammels similar to the parallel ruler. The dissimilarity of the pairs of photographs taken by any of these three methods is very palpable to any one that knows what he is looking for, as objects in the immediate foreground will impinge a considerable degree right or left on objects in the middle distance; the nearer the foreground objects are to the lens the greater will be their displacement. I am one of those gifted individuals that can form stereoscopic vision without the aid of the instrument, which I attribute to the frequent use of it trammelling my eyes, so to speak, into stereoscopic conditions, thus fulfilling the training I wrote of at first. I think this vision is correctly described when we state the right eye looks at the right-hand picture, and the left eye at the left-hand picture. It must be so, for in the stereoscope there is an opaque partition fixed in the centre, so it is impossible for the right eye to look at the left-hand picture, or the left eye at the right-hand picture. Thus I think it is conclusive that with the stereoscope or without it, when stereoscopic effect is seen, the axes of vision are parallel.

The expression pseudoscopicity is new to me, but from Mr. Heywood's article I gather that the effect is seen by crossing the axis of vision, but as I have no proof that I can do so, I cut a slide in two and transposed the pictures, and on looking at them with parallel axes I found stereoscopic effect, but with this peculiarity, the stereoscopic distance was towards me, that is, the far objects stood forward in stereoscopic effect in front of the objects in the proper foreground, and had it not been for the perspective lines being in error, the illusion was perfect, but with the incongruity of the figures standing in relief in front being smaller than those in the distance, presenting the whole view in a state of topsy turveydom. I do not remember ever seeing this effect noted in any work on the instrument, or yet verbally is this the pseudoscopicity referred to. I do not think Mr. Heywood gives the right reason for the apparent life-size of objects when seen in the stereoscope. I opine that all size, little or big, is relative to other objects in juxtaposition to that which is judged, so if all surroundings are removed, and the object viewed in vain, as it were, which condition is fulfilled in the stereoscope, all guage as to size is lost, with the result that the mind led by its preconceived notion instinctively fixes the view as life-size.

Now if any one can devise an enlarging apparatus to make enlargements on bromide paper from an ordinary negative or a pair of negatives possessing the stereoscopic effect, or devise a lantern to give the stereoscopic effect on the screen, then a glorious future is assured for stereoscopic work; but this "consummation devoutly to be wished" is impossible, and Mr. Heywood strikes the keystone of the impossibility when he writes, the pictures combine in the brain; this is so, and in no other place or surface can they combine.

W. Barry.

REDUCING AGENTS.

It is plain that so long as it is a necessity that the impression taken in the camera only appears to cognisance after undergoing treatment with certain chemical compounds, a general agreement as to which combination of reagents is to be preferred for effecting the object is not to be looked for. Thus at the present moment there are, at least, three bodies contesting for supremacy as the most popular reducer for negative work; while there is a remarkable diversity of opinion in regard to the alkaline accelerators most advantageously to be employed with them. The battle of the developers, in fact, provides photographers with an amount of interest that appears to retain a perennial freshness, and yields them as much material for discussion as any other half-dozen photographic subjects.

Besides the three bodies referred to—pyrogallol, hydroquinone, eikonogen—there are others which have long occupied attention, although they cannot yet be said to have passed beyond the stage of experiment. The general formula, $C_6H_6O_2$, includes, it is well-known, besides pyrogallol, two cognate substances, phloroglucin and frangulin. The latter, being insoluble in water, may be dismissed from consideration. Hydroquinone and its two congeners, resorcin and pyrocatechin, are thus generally represented: $C_6H_4O_2$. Phloroglucin has been found to possess but a feeble reducing action. The remarks of that able experimentalist, Dr. Eder, when dealing with hydroquinone upon its first introduction, have been so amply sustained in later years, that we cannot but attach importance to his experiences of its homologues, recorded in the same place (*Modern Dry Plates*, translated in 1881). He found that ammoniacal pyrocatechin necessitated longer exposures than pyrogallol; that resorcin was still less inferior in energy, and required the use of a relatively large proportion of alkali, and two or three times the exposure. I deduce from a perusal of some recently published details anent these developing substances that an interval of several years has not served to remove their comparative drawbacks. The epithet "new," lately applied to resorcin and pyrocatechin, is hardly permissible.

The precipitation of metallic silver from an aqueous solution of the nitrate is effected in the presence of a soluble oxidisable substance. The characteristic of attracting oxygen is one which invests a body with primary claims to recognition as susceptible of being employed as a developing agent, and has governed the introduction of the various reducing compounds previously mentioned. Starting from this principle of reduction by deoxidation, it is a reasonable inference that there is known to chemical science a variety of substances having the primary property mentioned in addition to those named, and such is, in fact, the case. In the belief that a knowledge of the wide limits within which the chief constituent of the developing solution is to be sought will have some interest for the student of photography, I will briefly notice one or two comparatively obscure bodies which would possibly repay for a little experimental examination.

Dealing first with inorganic compounds, uranous chloride, $U''Cl_2$, is stated by authorities to be a most powerful deoxidising agent, reducing gold and silver, and converting ferric into ferrous salts. Whether it could be successfully taken to develop the sub-chloride is, of course, open to question from many aspects. Both the uranous and uranic compounds form with caustic alkalies insoluble precipitates which would preclude the use of ammonia and the hydrates of soda and potash as accelerators; with carbonates, however, soluble double salts are formed. Both uranous chloride and the product of its oxidation are freely soluble in water.

Two of the combinations of phosphorous with oxygen are easily oxidised. Hypophosphorous acid, H_3PO_2, is thereby converted to phosphorous acid, H_3PO_3; I am unable to say whether in the process of conversion it acts by reduction. Phosphorus acid, the product of the oxidation, is, however, known to act as a reducing agent, precipitating gold, silver, and mercury from their solutions; it is presumably charged to phosphoric acid, H_3PO_4. An oxidisable alkaline phosphite that reduced by reason of its attraction for oxygen, and accelerated as phosphate, would be a valuable ingredient in the photographic laboratory, as indeed any one substance having this dual property would be.

Among strictly organic compounds the greater number of possible reducing agents are met with. Indiglucin, $C_6H_{10}O_6$, one of the glucosides, is a light yellow syrup, easily soluble in water. It is said to throw down metallic silver from an ammoniacal solution of the nitrate and gold from its tri-chloride. A derivative of common camphor, obtained by heating it with alcoholic soda solution, and forming alkaline camphate, is said to exert a similar influence over the silver nitrate. The formula for camphor is given as $C_{10}H_{16}O$.

Cane sugar is easily oxidised, and when heated with silver salts reduces them; it enters into combination with alkalies, forming sucrates. This familiar object of the breakfast table is often mentioned in the chemical text-books as affording an example of the changes of form and substance wrought by sulphuric acid in its eager avidity for subtracting the elements of water from other compounds. To the photographer its claims as a possible constituent of his developer must be of peculiar interest. Entertaining an angel unawares would be as nothing to the discovery that this cheap and useful article of domestic consumption had all along been an unexploited and formidable rival of substances costing many shillings per pound.

It may illustrate the extent to which many other cardinal photochemical reactions may possibly be multiplied if it is noted, in passing, that ethyl-ammonia $NH_2C_2H_5$, or ethylamine, one of the compounds derived by substitution of alcohol-radicals for hydrogen in NH_3 is said to be a solvent of silver chloride. Furthermore, and as pertaining to other important principles, among the less known organic salts of silver sensitive to light, is to be included the benzoate, the crystals of which in appearance strongly resemble those of the nitrate, while they blacken on exposure.

Doubtless there are innumerable other less known substances that have photographic properties of value or interest; but the few above cited, which, although not unknown to a few experimentalists, are by no means generally comprehended, will probably suffice to indicate how wide is the field from which the active principles of photographic chemistry may be drawn.

THOMAS BEDDING.

THE ANNUAL CAMERA CLUB CONFERENCE.

By the time this meets the reader's eye the Conference will have commenced. Opening in the afternoon of the 20th in the theatre of the Society of Arts, its proceedings will occupy two days. The papers on the programme are of much scientific and practical interest, and are as follows: First day.—Captain Abney, F.R.S.: *Presidential Address*. Mr. A. M. Rossi: *The Art of Drawing and Photography*. Mr. T. R. Dallmeyer: *Limitations in the Treatment of Subjects by Focus*. Mr. Lyonel Clark: *The Influence of Stops on Exposure*. Mr. A. A. Common, F.R.S.: *Eclipse Photography*. Mr. W. T. Wilkinson: *Collotype Practically Illustrated*.

The proceedings of the second day (Friday) are—Official Communication upon the Subject of Regulations for Photographic Exhibitions.—Lord Rayleigh: *Photography by the Light of the Electric Spark*. Captain Abney: *A Photographic Untruth*. Mr. C. H. Bothamley: *The Latent Image*. Mr. W. T. Wilkinson: *Photogravure Practically Illustrated*.

The reading of papers commences each day at 2 p.m., and are in the order above given. At 7.30 on Friday will be given the annual Club dinner for members and friends at the Frascati Restaurant, Oxford-street, (near Tottenham-court-road). On this day also, from 10 a.m., there will be apparatus on view at the Society of Arts and exhibition of photographs by members at the Club room, 21, Bedford street, Covent Garden.

All photographers are invited to Conference and Exhibitions.

Foreign Notes and News.

THE general programme of the exhibition of the *Société Nationale des Sciences et des Arts Industriels*, which will be held in the Palais de l'Industrie from July to November next, has already been published. Class 10 will be devoted to photography, and will comprise negatives and prints on paper, glass, wood, silk, linen, enamel, &c. All kinds of methods of reproduction for artistic or industrial purposes, together with apparatus, instruments, and photographic materials, will be included in this section of the exhibition. Those desirous of becoming exhibitors should address themselves to the President of the Society, No. 1, Passage de Petits-Pères, Paris.

DEATH has again robbed the ranks of the profession of another prominent member, M. Michaud, the inventor of some photo-engraving processes that have become important on account of their applicability to the printing of textile fabrics, and which have been employed in industry with great success.

AN interesting proof of what may be made out of the manufacture of photographic printing paper is afforded by the published report for 1889 of the Dresden United Factories, for which year they have declared a dividend of nineteen per cent., in addition to which they have been able to form a special reserve fund of 75,000 marks, after completing the ordinary reserve fund.

LIESEGANG gives some interesting facts in the *Photographisches Archiv*, tending to show the close connexion existing between light and chemical energy. "If a copper and zinc plate," he writes, "be brought close to one

another in a large vessel of acidulated water, and connected by wires with a galvanometer, the needle of this latter will display, as is well known, a certain deflection. If the plates be moved further apart the deflection of the needle becomes smaller, and decreases as the distance between the plates increases. If, however, two concave mirrors be introduced behind the plates the deflection is very much increased." This Liesegang explains by supposing that the energy arising from the interaction of the water and the zinc is reflected by the concave mirrors like a ray of light.

Another instance of a somewhat similar kind, or at any rate of chemical affinity acting at a distance, is the following:—If a tube be filled with half solid gelatine, and some chloride or bromide of sodium added at one end, and nitrate of silver at the other, somewhere about the middle of the tube will be formed by diffusion a zone of chloride or bromide of silver (Monckhoven). If, however, only one of the salts be present at either end of the tube diffusion takes place much more slowly, and it is an interesting fact that even when both salts are present the insertion of concave mirrors at opposite ends of the tube very much hastens the rate of diffusion.

A matter of some piquancy has recently been before the Courts of Vienna, where the judgment finally given will probably be received with satisfaction by the photographers of that city. A portrait photographer, or rather photographer's assistant, succeeded in inducing a very pretty girl to let him photograph her in the costume of a Rhine nymph, which, as might be expected from the name, consisted solely of her flowing golden hair. The resulting photographs were not made public, as the friends of the young lady made objections to this being done. The local police, however, getting wind of the matter, brought an action against the photographer for offending against public morality. The defence set up by the defendant was that similar photographs to that which he had taken were constantly exhibited in the shops without any objections being raised by the police; that no offence could have been given to public morality, as he had been alone with his model in the studio; and, finally, that there was no ground for treating his case differently from that of any other artist who painted from a model in a deficiency of costume. It is pleasant to know that the Court found this defence satisfactory, and acquitted the artistic photographer's assistant fully and completely. It seems rather absurd that, considering the circumstances, any action at all should have been taken by the police, but we must remember that the Austrian police authorities have peculiarly strict ideas of propriety, and some time ago prosecuted a lady for appearing at a window in a low dress.

The Tenth International Medical Congress will take place this year in Berlin, from August 4 to August 9. In connexion with it will be held a medico-scientific exhibition, under the management of Professors Virchow, V. Bergmann, Leyden, Waldeyer, and Lassar. This exhibition will comprise instruments and apparatus for biological and particularly medical investigation and research; and, what is of most importance for us, photographic and spectroscopic instruments will also be admitted in so far as they are designed to be of assistance to medical science. Detailed information may be obtained by intending exhibitors from Dr. Lassar, 19, Carlstrasse, Berlin.

In his last communications from the Photographic Research Laboratory of Vienna, Dr. Eder furnishes some interesting notes relative to the employment of oxymethyl sulphonic acid as an addition to emulsions. This substance was employed as oxymethyl sulphonates of ammonia and soda, and used in combination with formic aldehyde as an addition to the emulsion shortly before the emulsification was completed. The addition did not appear to shorten the time of preparation required very appreciably, but it appeared that it acted excellently as a preventative of clouding.

Professor Eder also gives the results of adding formic aldehyde to the developer, which it appears, in the case of hydroquinone and pyrogallol, permits of the required amount of developer being reduced to about a quarter of that otherwise necessary, and confers great stability on the solutions. The degree of sensibility of plates thus developed, as compared with similar plates developed by ordinary pyro solution, increased about two degrees on the Warnerke sensitometer scale, and the resulting freedom from clouding appeared very satisfactory.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 3742.—"Improvements in and connected with Photographic Cameras, Dark Slides, and Tripod Stands." W. Scorer.—*Dated March* 10, 1890.

No. 3765.—"Improvements in and connected with Telescopic Stands for Photographic Cameras." A. P. Riley.—*Dated March* 10, 1890.

No. 3775.—"An Apparatus for the Development of Photographic Plates without the Use of an Ordinary Dark Room." W. Langdon-Davies.—*Dated March* 10, 1890.

No. 3833.—"Improvements in Portable and Adjustable Stands for Flash Lamps, Photographic Backgrounds, Optical Lantern and other Screens." F. W. Hart.—*Dated March* 11, 1890.

No. 3880.—"An Improved Material for the Production of Light for Photographic and other Purposes." A. Watt and C. Symes.—*Dated March* 12, 1890.

No. 3898.—"An Improved Stand for Cameras or other Uses." L. G. Strangman.—*Dated March* 12, 1890.

No. 3958.—"A New or Improved Process for the Reproduction of Photographs or other Devices or Purposes, and in readily Reproducing same." J. W. Clarke.—*Dated March* 13, 1890.

No. 3968.—"Facsimile Autograph 'Keys' for Portrait Groups, Photographic or otherwise." T. W. Snagge.—*Dated March* 13, 1890.

PATENTS COMPLETED.

Improvements relating to Photographic Cameras and Lenses.

No. 6686. Thomas Rudolph Dallmeyer, 25, Newman-street, Oxford-street, Middlesex, and Francis Beauchamp, Hope Cottage, Whalebone-lane, Chadwell Heath, Essex.—*February* 22, 1890.

Our invention relates to photographic cameras and lenses.

Heretofore, in applying a lens to a camera for which it has not been specially fitted, it has frequently happened that the diaphragm slot does not occupy its proper position, owing to the fact that the lens when screwed up has not been turned quite far enough or has been turned too far, and in order to remedy this defect it has been necessary to alter the lens mount to adapt it for the camera. The same difficulty has also existed when applying a shutter to a lens.

The object of our invention is to provide means whereby a lens or shutter can always be caused to assume its proper position without the necessity for special adjustment, and to this end it comprises the improvements hereinafter described.

According to our invention the flange on the camera into which the lens is screwed is provided with an adjustable ring or collar having a slight longitudinal movement upon the said flange, so that it can be adjusted to the proper position to cause the diaphragm slot of the lens to occupy its proper position when screwed up.

In practice we prefer to adjust the ring or collar upon the exterior of the flange by means of screw threads, but it may be provided with a series of inclined teeth or arranged in any other suitable manner.

In cases where a shutter is to be screwed into the front cell of a lens, the latter can be provided with a ring or collar of similar construction.

The claims are:—1. The combination with a photographic camera or lens of an adjustable ring, substantially in the manner and for the purpose set forth. 2. A photographic camera, the lens-carrying flange of which is provided with an adjustable ring, substantially as described and illustrated in an accompanying drawing. 3. A lens having an adjustable ring or rings thereon, substantially as described with reference to the accompanying drawing for the purpose specified.

Improvements in Magic Lanterns.

No. 6999. Charles Gray, 11, Crooked-lane, King William-street, and Henry Kemp, 7 and 8, Thavies-inn, London.—*February* 22, 1890.

Our invention relates to magic lanterns for producing dissolving view effects.

In dissolving view lanterns as heretofore constructed it has been usual to provide each set of lenses with independent illuminating apparatus, which arrangement, when oil lamps are used for effecting the illumination, renders it necessary to place the lenses side by side.

According to our invention we employ one set of illuminating apparatus in connexion with two or more sets of lenses, whereby we are enabled to place the said lenses one over the other and thus produce an oil illuminated lantern which is more compact than those heretofore constructed.

In carrying out our invention we advantageously place the lamp or other illuminating apparatus upon a moveable platform or stage by means of which the said illuminating apparatus can be placed in connexion with either set of lenses. The said platform is advantageously moved by means of a rack and pinion, but any other suitable mechanism may be employed for the purpose.

In some cases we use only a single condenser which is placed on the platform with the illuminating apparatus, and is moved therewith so as to operate in conjunction with either set of magnifying lenses.

Although we prefer to arrange our improvements in a lantern in which the several sets of lenses are arranged in a vertical line, it is to be understood that our said improvements are equally applicable to lanterns the lenses of which are placed in a horizontal line.

What is claimed is:—1. A magic lantern having two or more lenses, and a single lamp or illuminating apparatus, the said illuminating apparatus being mounted upon a platform adapted to be moved so as to bring it opposite to either lens, substantially as described. 2. In a magic lantern, the illuminating apparatus of which is adapted to be moved to bring it opposite to either lens, mounting the condenser so that it will move with the said illuminating apparatus substantially as described. 3. In a magic lantern, mounting the lamp or other illuminating apparatus upon a platform adapted to be moved vertically in guides by means of a rack and pinion, so that the said illuminating apparatus can be placed opposite either lens, substantially as described.

Photographic Society of Great Britain.—Technical Meeting, Tuesday, March 25, at eight p.m., at the Gallery, 5A, Pall Mall East.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
March 24	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 25	Great Britain (Technical)	5a, Pall Mall East.
,, 25	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 26	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 26	Barnsley	Bank Chambers, Hargreaves-street.
,, 27	Burton-on-Trent	The Institute, Union-street.
,, 27	Halifax Photographic Club	Mechanics' Hall.
,, 27	Liverpool Amateur	St. George's-crescent North.
,, 27	Oldham	The Lyceum, Union-st., Oldham.
,, 27	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

March 6.—Mr. L. Medhurst in the chair.

The evening was entirely occupied with the decision of the lantern slide competition that had been arranged a few weeks previously. Negatives of three subjects had been furnished to the fourteen members competing, each retaining them for a day or two and forwarding them to the next in rotation. The competitors were allowed to choose their own process, or print by several processes if they so desired. Printed-in clouds were also permitted. Mr. Freshwater provided a pair of oxy-hydrogen lanterns, and the first two slides of a subject being introduced and the images thrown side by side on the screen, the members were invited to select the right or the left-hand one as the better of the two. When there seemed any room for doubt as to the consensus of opinion a vote was taken. The one chosen as best was kept in place until one shown in the other lantern was considered good enough to take the lead, and so the number of each subject was run through. Those which had been thought to most nearly approach the best were then put through the lanterns until a selection of second best had been made. On the conclusion of the exhibition it was found that the slide selected as best from each of three negatives had been made by Mr. J. B. B. Wellington on collodio-bromide plates. Two of these gelatinised in seconds were by the same competitor, printed on Pall Mall plates, whilst the remaining second was found to be by Mr. D. W. Atkins, printed on a Mawson & Swan's plate, and developed with meta-bisulphite of potash. The competition was a very good one, the larger number of exhibits being of high quality, and the rivalry was very close.

CAMERA CLUB.

On Thursday, March 13 lantern slides were shown at the above Club. Mr. S. B. Waldby occupied the chair.

Before the exhibition took place the Hon. Secretary handed round some [illegible] prints on Japanese paper and mats by Mr. W. K. Burton. Some [illegible] papers intended for experiment were distributed to those desiring them.

The Chairman then called on Professor Stebbing, who was present, to say a few words to the meeting.

In response, Professor Stebbing exhibited some collotype prints brought over by him from Paris which had been produced by M. Rebaudy. Some of these were on rough-surfaced paper. Reference was made to the rapidity with which the prints had been obtained, Professor Stebbing stating that within three-quarters of an hour of giving a negative to M. Rebaudy about twenty prints were given to him. He thought that M. Rebaudy would introduce his method in England, and he saw no reason why the amateur should not have his own machine, at a cost of about £5, and make his own collotype reproductions.

An excellent show of lantern slides was then given, altogether about two hundred slides being brought in and shown by Messrs. W. M. Robertson, Lane, Elliot Smith, Ellis Lawrie, Ellis Perrin, Hinchley, and Grimshaw.

The next meeting on Thursday, March 27, will be *Pleasant Impossibilities*, when Mr. W. Wilks will read a paper. Meeting at eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

March 14.—Mr. E. W. Parkes in the chair.

Mr. Henry Selby read a paper and gave a demonstration on *Eastman Stripping Films*. The lecturer said, although condemned to die a natural death owing to the introduction of collodion films, yet stripping films in the hands of careful workers presented few difficulties, and were undoubtedly superior to glass in the matter of portability, storage, and immunity from damage if damaged. He attributed his early failures to following a method advocated by Mr. Dresser rather than the instructions issued by the Company. He seldom dealt with more than two films at a time. The great point was not to leave the films more than ten minutes in washing water after development and fixing; after that time he placed them in an acid bath composed of acetic acid, ten ounces; water, ten ounces; in which they were left all night. Films so treated always stripped without trouble, and he thanked Mr. Carnell, to whom the method was due, for making it public. It was very essential to have clean glass, and the mixture of liquor potassæ and ammonia referred to by Mr. Hodges answered well. He did not use rubber solution, but polished the glass with French chalk, employing a thin collodion made by the Company. His mode of working differed from that recommended by the Company in the following particulars:—He did not keep the same evening's bath developed; he never used rubber solution; he did not place the film on glass support under water, it being easy to avoid bubbles without so doing; never used glycerine and alcohol; and did not varnish the gelatine skin. Mr. Selby then gave a practical demonstration of the process.

In the course of the discussion which ensued, Mr. T. S. Hazeus said he had developed only five films given him by a friend; he had used neither skins, collodion, or rubber solution, but he succeeded in stripping all of them without mishap.

Mr. Wilson, in developing Kodak films, used a weak solution of sulphuric acid and water. He sometimes left them several hours under pressure, not allowing them to dry, they then always stripped. He rather liked the operation of collodionising and coating with rubber, and therefore employed both solutions, although sometimes with the rubber there was a tendency of the film to stick locally.

Mr. Stein had found the film negative detach itself from its skin sometimes, and that when collodion had been used.

Mr. W. Rickford wished to know why hydroquinone rotted the film. It did not seem to do so in all cases, for although Major Nott had failed with it, another gentleman working in India had met with great success.

Mr. Wilson had found the films melt away in a hydroquinone developer which, however, contained caustic soda.

Mr. J. A. Hodges considered a roll holder and films far more convenient on tour than plates; the negatives, owing to the absence of halation, were fully equal, if not superior, to those on glass. They were also very suitable for enlarging, the matt surface backing producing a very soft effect. By copying a small transparency in the enlarging camera the film side out, and enlarging on transferotype paper or a stripping film, enlarged negatives could be readily and cheaply produced.

Mr. Roland Whiting wished to know whether the film would give a good bite to the retouching pencil; the collodion surface seemed to be very glossy.

Mr. Foxlee thought the collodion film a very valuable part of the process, and Mr. Hazeon ought to attribute his success to sheer good luck. The collodion not only protects the stripped film, but holds it together while upon the glass, and, to avoid risk, it was better to employ a preliminary coating of rubber solution. In very refractory cases he had used *boiling* water with success, which could not have been done without a rubber substratum. Damp sometimes caused the insoluble chromated emulsion to affect the soluble substratum of gelatine; difficulty in stripping then occurred; the weak acid solution, however, remedied this defect. He did not leave the films under pressure more than ten minutes. It was a mistake to leave them soaking after fixing, because the pyro exercised a tanning action on the soluble gelatine, and if the film were allowed to dry before stripping, the difficulty of stripping would be greater. He had never found the films become detached, and was at a loss to assign a reason.

Mr. Hodges thought it might be due to the presence of grease or to careless squeegeeing.

Several other members having spoken, the proceedings terminated.

Next meeting, March 28, lantern night. Friends invited.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

The annual dinner took place on Saturday last,—Mr. J. Humphries, F.S.A., President, in the chair.

Mr. J. W. Marchant proposed the toast of the evening, "The North Middlesex Photographic Club and its Officers," which was responded to by the Chairman, who briefly sketched the position of the Club, and alluded to the ability and energy displayed by the Council and Hon. Secretary (Mr. G. R. Martin) in the past year, and to the successful manner in which the arrangements in connexion with the recent exhibition of photographs and *soirée* had been carried out by them. The roll of membership had increased, as also had the finances of the Club. The lectures and demonstrations had been well attended.

Mr. Brocas (Holborn Camera Club) acknowledged the toast of "Kindred Societies."

Mr. G. R. Martin replied to the toast, "The Press," and said he was glad of the opportunity of stating how much the Club was indebted to the Press in reporting their meetings.

Mr. Davall, sen., responded for "The Visitors."

During the evening a varied series of vocal and instrumental music added to the entertainment.

The company separated at a late hour.

The *menu* card consisted of an original design by Mr. Savill, photographed and finished by Mr. Beckett, both members of the Club.

HOLBORN CAMERA CLUB.

March 14.—A lecture and demonstration on *Enlarging from Small Negatives* was given by Mr. Herbert S. Fry, who secured some very satisfactory results on 17 × 22 bromide paper manufactured by the firm, and using an ordinary Optimus lantern fitted with the oxygen light, and provided with a green baize curtain, three feet by four feet, with a small aperture in centre, through which the lens of the lantern was put. After making a large vignetted portrait, a landscape was exposed, the sky being masked; the print was then developed, the developer washed off, and the print exposed again for the clouds, which were developed by the local application of the developer with a tuft of cotton wool. For enlargements a lantern cap of yellow glass is a great help, as by its means you can see exactly where to place your paper.

Next Friday, beginners' night, instruction will be given in *Development of Gelatine Plates*, by Mr. J. E. Smith. *Silver Printing and Toning*, by Mr. E. H. Bayston; *Platinotype Printing*, by Mr. F. Brocas; and *Bromide Printing*, by Mr. T. O. Dear, will follow in succession.

LONDON UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

March 11,—Dr. R. T. Plimpton in the chair.

Dr. N. Collie, F.R.S.E., read a paper on *The Chemistry of Photographic Developers*. The simplest form of development was first noticed, where a ferric salt has been reduced by light to a ferrous salt, when the nearly invisible image can be made visible by washing with ferricyanide of potassium or treating with

a silver or gold salt, which metals are deposited where the iron has been reduced, thus developing the image. The development of the invisible image on the photographic plate was then noticed, and it was pointed out that in this case, as only an infinitesimal quantity of haloid salt of silver undergoes change during exposure to light, development has to be carried on in a different way from that already noticed. The alkaline developers—pyrogallic acid, hydroquinone, &c.—were next mentioned. These developers are characterised by their great affinity for oxygen, and differ from ferrous sulphate, the reaction of which with nitrate of silver was discussed, in being able to reduce the haloid salts of silver. The actual chemical change which takes place when a plate is developed by any of these substances was shown to be the same. It is a case of reduction of the silver salt by the developer, but, as the developer contains no silver, the only way in which the image can be built up is by the further reduction of the silver salt in the film. The question why silver is deposited on one part of the film and not on another, thus forming the image, is explained by the assumption that electro-chemical decomposition occurs. It was, finally, pointed out that in all ordinary cases of development a reducing substance was necessary, and usually the greater the reducing power the more powerful the developer; and, as there are numberless substances amongst organic compounds which possess this reducing power in a greater or less degree (phenyl hydrazine was shown as an example), the choice of new developers is, probably, by no means limited.

In the discussion which ensued, Mr. E. S. Worrall criticised eikonogen as being admirably adapted for certain kinds of work, but, to get a good negative, he preferred the yellow image obtained by using the old-fashioned pyro developer.

The next meeting will be held on Tuesday, March 25, which will be a lantern night, and the last meeting this term.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

March 12,—Mr. S. S. Partridge (President) in the chair.

The silver and bronze medals were presented to the successful competitors in the lantern slide competition—Messrs. Porritt and Joliffe respectively.

Mr. Thomas Scotton, Derby, was elected an honorary member.

The competition for silver and bronze medals for enlargements, offered by Mr. F. Pierpoint, was declared void in consequence of the number of entries not complying with the conditions. The competition was postponed until the October meeting, when silver and bronze medals will be offered by Mr. Pierpoint for the best enlargement, members to enter not more than three specimens for competition. The medals are offered on condition that not less than three compete for the silver and five for the silver and bronze medals.

DERBY PHOTOGRAPHIC SOCIETY.

March 13,—Mr. A. B. Hamilton in the chair.

Mr. George Bankart, of Leicester, gave a lecture on *Development*, and a discussion ensued.

BRADFORD PHOTOGRAPHIC SOCIETY.

March 11.—The President (Mr. Alexander Keighley) opened a discussion on *The Art Principles of Dr. P. H. Emerson*. This was taken part in by Messrs. D. G. Law, W. H. Scott, H. Forsyth, W. Wilkinson, W. Leach, and G. Firth.

The arrangements were made for the fifth annual exhibition of members' photographs, and several alterations made in the class lists.

At the next meeting of the Society, April 8, Mr. Walter Leach will read a paper on *Enlarging, Copying, and Reducing, with especial reference to Lantern Slide Making*.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

March 11,—Mr. J. P. Gibson in the chair.

Three new members were elected.

The Hon. Secretary (Mr. Edgar G. Lee) announced that arrangements had been made so that each member would receive a free pass to admit all the time to the photographic exhibition in the Art Gallery, Newcastle, which opens on the 18th inst. He also stated that there had been a number of applications for space, and most of the screens had been let. Some of the principal American and Canadian photographers had promised to send pictures to the exhibition. Three concerts, several lectures, and lantern demonstrations had been arranged, and others were in progress. The catalogue would be illustrated by a number of reproductions of exhibitors' pictures by one of the best processes. He also reminded them that the last day for receiving entries was April 1.

The evening was devoted to a discussion on *Stereoscopic Photography* and exhibition of slides.

Messrs. J. Downey, H. G. Ridgway, and J. Wilson lent stereoscopes and a number of choice slides, and a very enjoyable evening was spent.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

March 12,—Mr. W. S. Adamson in the chair.

This was a lantern exhibition. A hundred slides were the work of members, the others being received from the Pacific Coast, Paisley, Glasgow, and Montrose Associations.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

March 6,—Mr. William Lang, jun., F.C.S. (President), in the chair.

Several questions referring to the most rapid plate in the market were found in the question box, but nothing satisfactory was given by way of answer.

A paper on *The Sizes of Plates* by Mr. J. Craig Annan (Hon. Secretary), was then read. This will appear in a future number.

A discussion followed, the general outcome of which was that if an adjustment should be made it should be done on an international basis.

A picture taken by an automatic photographic apparatus was afterwards shown to the members. It had evidently been taken on a wet plate, but particulars of the apparatus itself had not been given in sufficient detail to explain the *modus operandi*.

Mr. Patrick Falconer followed with a communication—*A Neglected Dry-plate Process*, showing results obtained by the method, both transparencies and negatives. The process in question is one put forward by Mr. Hannaford in 1861, where the sensitised collodion plate, after being washed, is coated with a preservative of white of egg to which a certain amount of nitrate of silver has been added and the albuminate of silver formed dissolved in ammonia. Mr. Falconer has worked the process for twenty-five years. The speed of the plate would appear to be very rapid, Mr. Falconer and the President having made transparencies shown at the meeting on the screen by means of the Association's lantern, when the exposure behind a negative did not amount to more than a second or two in front of an ordinary batswing burner. The image was brought out by means of eikonogen, and afterwards strengthened by means of pyro, citric and glacial acetic acids, and silver.

Several photographic novelties were shown by Mr. James McGhie, including McKellen's rocking developing tray, Tylar's plate-washing apparatus, leather wrist protectors to prevent shirt and sleeves from being stained in photographic operations, &c.

An exhibition of transparencies by means of the Association's lantern concluded the evening's programme.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE ACTION OF LIGHT ON SILVER CHLORIDE.

To the Editor.

Sir,—The leading article upon this subject, published on pages 66-67 of the current volume of The British Journal of Photography, would not seem deserving of notice by me, since the results of my work are already before the public, were it not that editorial criticism often carries considerable weight even against the most obvious conclusions.

The only question of importance to the reader or to myself is whether my results have thrown any new light upon the subject under discussion. My worthy critic says they have not. I do not quite see what his array of theories and suppositions have to do with the matter. They are interesting enough, but as they do not affect my results, they are not to the point. As a student of science I have a right to object to criticism which has no more solid basis than opinion; not that it disturbs my own peace of mind, but because it is likely to prejudice others against results which I desire should receive fair consideration. Therefore, I object to such criticism as this:—"We cannot help expressing the opinion that the task is far too delicate to be satisfactorily approached in this manner." Pray, in what manner would the writer prefer that it should be approached? Again, he says: "Whether the question of loss of weight can be imported into the argument as proof or otherwise is open to very grave doubt, since the discrepancies are so great," &c. Well, this same question was "imported" into the argument some time ago, so I find myself in pretty good company.

It has seemed to others, as it still seems to me, that a very natural method to study the action of light upon the compound was to determine the loss in weight, and my critic's personal opinions apply as well to my predecessors as to me.

But it has been my good fortune to get more definite results than any hitherto given. I do not know, but perhaps these results endanger some pet notions of my critic. There must be some reason why he should try to damage my case by laying so much stress upon the discrepancies in my figures; or, perhaps not being a practical chemist, he fails to recognise their true value. Now, the discrepancies do not militate in any respect against the important general conclusion, never before reached, that there is a weighable, and a very considerable, loss of chlorine under the conditions of my experiments. The discrepancies are not, in truth, very great when we consider the uncertainty of all previous results, and the very small quantities operated upon. They are greater than they should be, however, for I have since learned why there is not a closer agreement among the figures of my first four experiments. But what has my critic to say of experiments with slips Nos. 3 and 8? These show a difference of 0·2 of one per cent. The difference in three of the other series is only 0·42 of one per cent.

When my critic comes to discrediting my results because "their mean shows a loss of weight which does not even approximately agree with either of the theories mentioned," of course, I can only say that I did not undertake to make my results agree with any theory. However, although they do differ by the enormous quantity of 0·4 of one per cent., they do not "show the futility of his (my) attempt" to determine what the course of decomposition is.

The most serious, the most unpardonable and unjust, charge of all is that "so far as these experiments have gone, they neither prove nor disprove anything."

In reply, I have only to say: (1) They prove that there is a considerable loss of chlorine when silver chloride is exposed to light, amounting in two parallel "discrepant" (?) experiments to, respectively, 6·0 and 6·2 per cent. of the weight of silver chloride—a fact not hitherto known. (2) They prove that the weight of chlorine set free is equal, within the limits of experimental error with the apparatus used, to the loss in weight of the slips—another fact not hitherto known. (3) They prove that there cannot be an oxychloride formed.

Does my critic still maintain that they "neither prove nor disprove anything?"

I have no wish to over-estimate the importance of my own work. Neither do I deem it incumbent upon me to be unduly modest when my results are unjustly condemned. I would gladly welcome any well-considered criticisms or suggestions which may aid me in working out a solution of the problem I have thus superficially attacked. The difficulties in chemical theory which my critic has indicated do not trouble me. When the ultimate effect of light is known it will be time enough to propose a theory. But the end is still far off. Many puzzling questions have already arisen, and I do not yet know how they are to be solved by analytic methods. This much I do know, however, that the action of light upon this compound is progressive through a long period of time, and that the loss of chlorine exceeds seven per cent., and may reach a considerably higher figure. Nevertheless, my critic fears "that such quantitative methods as" I have "already adopted will only lead to disappointment." Why does he think so?—I am, yours, &c.,

Washington, D.C., February 25, 1890. ROBYN HITCHCOCK.

[We deeply regret that our remarks should have caused so much perturbation in Professor Hitchcock's mind. We were far from wishing to upset the results of his experiments by any "pet theories," but simply intended to show that his figures did not agree with any of the said "pet theories" of many previous investigators. If, as we now judge, Mr. Hitchcock only aimed at proving that by liberating chlorine from chloride of silver a loss of weight occurs, and is satisfied he has proved it, we have no more to say. But we were under the impression that his intention was to settle the disputed question of the absolute composition of the dark-toned silver chloride. We may, after carefully comparing his letter with our previous remarks, return to the subject, but certainly in no unfriendly way.—ED.]

THE RECENT OXYGEN EXPLOSION.

To the EDITOR.

SIR,—I did not mean to comment at all upon this, feeling sure that it would be amply elucidated by others, but as I think the probably real cause has not been pointed out, I send the following few lines—all I can manage during present press of other things.

In some of the early works on chemistry, used when I was a boy, one of the proofs of the composition of water was to *compress* the proper volumes of oxygen and hydrogen in a strong vessel, with the result that they combined. I cannot remember the works in particular, but do recall the quoted experimental proof most distinctly.

Further, and coming to present date, it is a simple fact that if the same pressure gauge be used to test a cylinder of one gas, and then of the other in immediate succession (especially if the coal gas comes first), there is an extremely probable chance of a small explosion being produced in the gauge. It is within my personal knowledge that this has actually occurred *twice* in the experience of one firm dealing in compressed gas for lantern work, and has led to stringent orders being given that gauges shall never in future be so employed. Of course, these explosions were trifling, the quantity being very small. One peculiar feature was that in at least one case—it cannot now be remembered whether it was so in both or not—the explosion took place as the gauge was being *unscrewed*, and the pressure consequently taken off. The washers were charred in both instances.

To sum up: I believe there is ample evidence that no incandescent particle, or any exciting cause whatever, is needed to produce an explosion in gases kept mixed *under great pressure*, but that the pressure alone constantly and invariably produces, to say the very least, a condition of the greatest instability and danger, such as exists in nitro-glycerine, if not invariably an actual explosion. I think that the super-oxidation of the small quantity of hydrogen in the Glasgow bottle probably hastened the *liability* to explode, while lessening the violence of the explosion when it did occur. And I think the evidence shows that it was in truth a very mild explosion, for if the proper mixture had been exploded with all the force of the full contents of such a cylinder, the phenomena would have been quite different, and the fragments dispersed into the *ewigkeit*.

Fortunately, the moral of my conclusion is precisely the same as has already been drawn—the *absolute* prevention of any possibility of mixture under *any* circumstances. On that head, therefore, I need say nothing, except to relate that during the past season a *red* bottle was brought to a certain house with directions to be filled with oxygen, and the customer was quite offended when informed that such would not be done for any consideration whatever. He seemed to think he had a right to have it done if he liked!

LEWIS WRIGHT.

MR. MACDOUGALD ON STEREOSCOPIC VISION.

To the EDITOR.

SIR,—I thought I had done with Mr. Macdougald and his strange and novel theories, but as he seems to desire chapter and verse for my denials of his statements I am willing to humour him. There is no *call* on me to give specific quotations when stating facts to be found in every authoritative text-book, the *onus* of quotation clearly lies with him who promulgates opinions contrary to those held by the authorities. Still, as I say, I am willing to humour Mr. Macdougald. Let him begin with Huxley's *Elementary Lessons in Physiology*, pp. 241, *et seq.*; then he can look at *Photographic Chemistry*, by Hardwich & Taylor, pp. 426, *et seq.* The *Encyclopædia Britannica*, article, "Stereoscope" may be of service. But strangest of all, let him read, and in discussion let him quote the *whole* of the remarks in *Kirkes' Physiology*, tenth edition, pp. 606–7, and not stop short, as he does in your last issue, at the very part that knocks over the theories he appears to put forward. Kirkes' book was one of the books on which I laid some stress, and I was amazed to find it quoted by Mr. Macdougald. But Mr. Macdougald, while quoting theories mentioned by Kirkes as having existed, entirely omits to quote words almost immediately following, and used by Kirkes to demolish the theories. Mr. Macdougald's first theory as quoted is followed twenty-eight words later by these words: "But Muller shows the inadequateness of this theory to explain the phenomenon," &c.

Mr. Macdougald's second theory is followed without any interval by: "But in this theory no account is taken of the partial decussation of the fibres," &c.

And Kirkes disposes of *all* the theories stated in these words: "But, on the whole, it is more probable that the power of forming a single idea of an object from a double impression conveyed by it to the eyes is the result of a mental act." Mr. Macdougald's partial quotation was a most unfortunate one.

Mr. Macdougald complains of personalities having been used against him, but I admit he does not name me, and it is just as well, for with my letters of late issues before me I fail to see that I alluded to him personally at any part. If I were to make any personal remark about Mr. Macdougald it would certainly be of a laudatory nature, for I know the man, and his ability, and position. I don't think the paper he read at Dundee attacking me, absent and defenceless, in a bantering and, in fact, slightly offensive tone, was quite the right thing, and the editor of a reputable paper cut out parts of Mr. Macdougald's report as being "abusive;" but I am bound to own I did not take so serious a view of the matter as that, perhaps because I am accustomed to ill-treatment of that kind. Anyhow, I think I may fairly retire from the discussion till Mr. Macdougald gets abreast with the usually accepted theories or else refutes them.—I am, yours, &c.,

ANDREW PRINGLE.

To the EDITOR.

SIR,—In writing to a newspaper on a scientific subject, one must always be under a considerable disadvantage; we cannot have an unlimited number of columns at our disposal, and we cannot have (at least, I cannot have) an unlimited amount of time in which to write the columns. Thus, when I summarise human vision in a paragraph of a dozen lines, it is not to be wondered at that the mechanical and mental aids to vision, such as those pointed out by Mr. Pringle, should not be mentioned; indeed, it is an absolute necessity that they should not be so.

Mr. Pringle says he cannot continue the discussion, and on my part I am sorry to be obliged to say that I must abstain from further letter writing; but were I to endeavour to thrash out the subject with Mr. Macdougald, it would be necessary for us to agree as to what we mean by "stereoscopic vision." At present Mr. M. means one thing and I mean another. The word "stereoscopic" is a derivative from "stereoscope," and the original word means nothing more than "to see solid." But it is a word of recent creation, invented by Wheatstone, and he and Brewster in using the derived word spoke of something pertaining to the stereoscope, or actually shown by that instrument. It is often not so at the present time, and it is not so with Mr. Macdougald. He speaks, as we often speak, of stereoscopic vision when he or we mean our natural

binocular vision, and not what is shown (in a manner analogous to natural vision) by the stereoscope. With my notion of stereoscopic vision I cannot accept as correct Mr. Macdougald's words where he says he denies the exclusive use of the word "stereoscopic" to the perfect impression given by a perfect stereogram. He wishes to apply the term to something which is not the *one* startling and wonderful characteristic of the instrument. Stereoscopic vision must be, if the subject is to be argued, this one definite impression given of a properly prepared (or perfect if Mr. M. prefers it) stereogram. The imperfect stereogram such, as Mr. M. mentions, where the two pictures are identical, *does not* give a stereoscopic impression; it approaches it, but that is all.

The same laxity that I hold to be present in Mr. Macdougald's notions of stereoscopic vision are present when he comes to speak of the "pseudoscopy" which he omitted to mention in his lecture. He complains of the word, but I take it to be not a bad one, because it is pretty self-explanatory as "false seeing;" it is a sort of seeing which is unnatural, and may properly be called false. Mr. Macdougald says, "Pseudoscopic vision, so far as the purpose of my paper is concerned, is stereoscopic;" and without asking how "yes" may mean "no" also, I say that if that is so, such a manner of teaching must sadly muddle those who are regarding Mr. M. as a teacher. He tells them that they may produce stereoscopic effect by cross-eyed vision, when the fact is that they will obtain nothing of the kind, but the false and unnatural impression which I have called the converse of stereoscopicity, and which Mr. Pringle objects to my so calling.

Mr. Pringle says he has never said that by shutting one eye and looking at a picture or photograph we get an impression which approaches stereoscopicity. I beg his pardon, I thought he had done so sometime ago. At any rate, it is a fact that we do get such an impression. A picture or a photograph is a one-eyed production, which is best seen with one eye. Any one may try it on a well-painted picture, a photograph, or, best of all, on a photograph thrown on the lantern screen. The difference is often enormous, only inferior, indeed, to the difference between a flat photograph and the two seen as one in the stereoscope.

I do not think that the sentence quoted by Mr. Macdougald from *Kirkes' Physiology* throws much light on our subject; thank goodness I have not read that evidently learned work, but it is quite time we had a trustworthy manual on the stereoscope by some capable person who would not be led away by his theories as Brewster was, and who could present his views in language which would be more "understanded of the people" than it would appear from Mr. Macdougald's extract such works as Kirkes' are likely to be. An exhaustive book would settle such differences as are always cropping up, and would be a blessing to many people, as well as to —Yours, &c.,

ABEL HEYWOOD, JUN.

To the EDITOR.

SIR,—In the last issue Mr. Fred. H. Evans raises certain points connected with stereoscopic vision as affected by the having of dissimilar eyes, and asks one or two questions concerning his own power of seeing. I can make a few remarks that may be interesting to Mr. Evans, if not to others, because your correspondent's description of his eyes is exactly true of mine, except so far as the power he has over them. My left eye needs a concave lens of minus seven inches focus to enable it to work with the other; and my right eye, which is distinctly the weaker, has got its sight shortened a little during the last few years, so that now the concave spectacle glass of the longest focal length that I can get improves its vision.

I never had binocular vision until about fifteen years ago, when I wore my first pair of spectacles. Till then I had used my eyes single, as described by Mr. Evans, but with me this did not cause headache. Indeed, of all the more usual pains headache is probably the one I have had least experience of. Almost immediately after getting the spectacles I saw with true binocular effect, and the increased brilliancy of vision, and the way in which every speck of soot and every pebble in the road stood out from the ground it rested on, gave me exquisite pleasure. The improvement was so great that it was almost like an added sense. If my experience is applicable to Mr. Evans, I should reply to one of his questions that he loses almost half the pleasure of vision in seeing only as he describes. It is an enigma to me why with spectacles he fails to see binocularly.

Concerning the stereoscope. I can use the instrument perfectly with my spectacles, or a lens added to one eye to make it equal to the other. The lens may be used with either eye, of course a concave glass with the left, or a convex glass with the right. I can diverge the axes of my eyes *almost* sufficiently to properly view a stereoscopic slide without an instrument. I do not think it is necessary for the two eyes to be as nearly equal as Mr. Evans suggests for getting the stereoscopic effect, the more common discrepancy being probably amply compensated for by the accommodating power. My brother-in-law, who is very short-sighted, and whose eyes are very abnormal in several respects, can instantly diverge their axes, and quite easily view stereoscopic slides without an instrument, and has always when buying slides examined them so, rejecting those not giving a satisfactory effect.

As to the stereoscopic effect, if any, got by looking at two similar pictures in the stereoscope. Many years ago, the late Mr. Tisley, the well-known optician of Brompton-road, at the time when the pendulum apparatus for drawing curves was being exhibited as something novel, showed me that two similar curves viewed in the stereoscope gave apparently a solid figure. The appearance was solid to me as well as to him. He considered that the two curves of each pair tested were alike, and we were surprised at the result.—I am, yours, &c.,

CHAPMAN JONES.

To the EDITOR.

SIR,—Mr. Macdougald, in a letter to me, considers I have made a personal remark in my criticisms on his paper. It is obvious that I used the word "class" in connexion with its employment in the preceding paragraph, and not in a social sense, when only could it have a personally offensive character, which was as foreign to my intention as it would be regretted by me if hasty writing lent colour to such an interpretation.—I am, yours, &c.,

FREE LANCE.

THE NEW LIMELIGHT.

To the EDITOR.

SIR,—In last week's issue of this JOURNAL the Rev. T. F. Hardwich disputes the correctness of my theory that carbon burnt in oxygen produces a higher temperature than the oxyhydrogen flame, and quotes Sir Humphry Davy, Dalton, Dulong, and Despretz in support of his opinion.

I admit that if a given quantity of oxygen, combining with carbon, produces 1 unit of heat, then bicarburetted hydrogen gas may give 1·6, and hydrogen 4·3 units, also that the more carbon is consumed in a limelight flame the less is the *quantity* of heat evolved, and consequently the more carbon burnt the smaller is the area of incandescence on the lime. I do not, however, admit that oxycarbon flame is *less hot* than the oxyhydrogen flame.

The figures I quoted in support of my theory were taken from Bloxam's *Chemistry*, which is, I believe, a standard work. In it the heat of carbon burning in oxygen is set down at 10·178° C. The temperature of the oxyhydrogen flame was not given, but sufficient data were offered to make the calculation easy, and I reckoned it as 6844° C.

An illustration will make my meaning clear. In order to heat a certain quantity of water to 100° Fahr. we may have to burn four ounces of fuel, but if we take the same weight of oil and heat it to 150° Fahr. we should only require three ounces of fuel. Hence the water contains a greater *quantity* of heat than the oil, but it is not so hot. If we were to dip a hand into the oil it might be scalded; but the water, although containing more heat, would be only comfortably warm.

The oxybenzoline flame is like the oil; it contains less heat than the oxyhydrogen flame, but is, nevertheless, much hotter, and will give a brighter light on the lime. For heating water, or melting an iron rod, the oxyhydrogen flame would be the best to use; but if an attempt were made to melt a minute refractory substance—lime, for instance—the oxybenzole flame would doubtless be most effective.

A recent experiment with the oxygasoline flame, produced by the aid of a warm bath saturator, may be of interest:—Up till last week the largest bore of nipple I had tried with gasoline had been one-fourteenth of an inch. I then tried a nipple of one-twelfth inch bore; and, in order to secure a plentiful supply of hydro-carbon vapour, a candle was put temporarily into the lamp-box instead of the fairy-light, as the latter source of heat, although amply sufficient for ordinary occasions, was not so for this experiment. A rough block of lime, having an approximately flat surface of about three inches square, was put in front of the nipple. A cylinder of Brin's oxygen being connected, the gas was turned on and the light adjusted. During this process the flame passed back two or three times, but did not go further than the mixing chamber—a proof that, in spite of the heavy drain on the saturator, the oxygen which had passed through it was so densely loaded with vapour as to be non-explosive. I did not use a pumice-tube—the outcome, I believe, of the inventive genius of Dr. Broughton—but relied for safety from pops upon a high degree of saturation. When the light was fairly adjusted there was a gentle boiling noise, the heat was great, and the area of incandescence was an oval about two inches high and one and a half inches broad.

Looking at the lime gave one an impression similar to looking at the noonday sun, or into a white-hot furnace, and the glare produced a feeling of blindness for some minutes afterwards. The light was not measured, but it was not likely to have been less than 1000 candles. After a few minutes the gas was turned off and the lime examined—it presented an unusual appearance. A space about an inch in diameter in the centre of the lime seemed to have been fused on the surface, which was hard and smooth, and crossed with a few cracks; some of the finer cracks had apparently been filled up by the melted lime.

The experiment was repeated with a fourteenth nipple and a piece of lime from the same block, but only a slight glaze was produced and no filling up of cracks; the lime seemed to pit more rapidly with this nipple than with the one-twelfth. Hence it appears that, to get the full heat of

the oxygasoline or oxybenzoline flame, a large nipple and a large lime should be used.

I have tried a one-twelfth nipple with coal gas, but have never observed fine cracks in the lime to be closed by fusion when using it. Does not this prove that the oxygasoline flame is the hottest of the two?

Mr Hardwich calls attention to the dangers arising from the use of cylinders containing different gases. It is my conviction that the use of coal gas will gradually die out, and the more convenient, safe, and economical plan of using a liquid hydro-carbon will be adopted. Who would pay seven and sixpence for a twenty-foot bottle of coal gas, weighing a quarter-hundredweight, when he could buy at an oilshop twopennyworth of benzoline, and a penny candle or night-light; put them into a vessel of the size and weight of a coffee-pot, and with less trouble than is involved in lighting a paraffin lamp, he could obtain a perfect, brilliant, safe, and steady limelight of, if necessary, 1000 candle power?

I do not know what method Mr. Hardwich will adopt in his proposed attempt to burst my saturator—if he *does* burst it; I trust he will not blow himself up at the same time. However, I think he is safe, provided that he abstains from the use of gunpowder and nitro-glycerine.

Ashcombe-road, Weston-super-Mare. ALBERT W. SCOTT.

BENZOLINE SATURATORS.

To the EDITOR.

SIR,—Having read with much interest Mr. A. W. Scott's description of benzoline saturators, as applied to the lantern, I may say that I have had hot and cold saturators in constant use for ten years, and supplied them to others. Their use increases the light, lessens the consumption of hydrogen, involves no danger, and they can be applied to all kinds of lamps. From long practical experience, my advice to lanternists is, give them a trial. Enclosed are photographs of four different kinds, and all give good results. Should you consider a description of an efficient and cheap saturator of interest to your readers, I will be pleased to send it.—I am, yours &c.,

A. ANDERSON.

Scottish Street Studio, Portsoy, N.B.

[Send it.—ED.]

A SUBSTITUTE FOR SODIUM SULPHITE.

To the EDITOR.

SIR,—I wish to call your attention to a substance which I have used since the beginning of the year as a substitute for sodium sulphite, acids, &c., in the preparation of the pyro developer, which as a preservative of the stock solution is most excellent, and simplifies the matter greatly, as but a small quantity is required to accomplish what is desired—I refer to the [illegible] of [illegible] in their stead. Half a drachm of this to the ounce of stock pyro will defend it from any change of colour, the completed developer, after the addition of carbonate of soda and potash, assumes a straw colour, and after the print has happened to a brown tone, without turbidity. Some that I have used for a month is of the latter tone, and remains perfectly clear. As far as I have been able to observe, in the process of developing it is innocuous, but more careful experiment may determine that it is advantageous in other respects than as a preservative. The negatives that I have made by its use are the best I have obtained this winter. As regards detail and printing qualities I commend it to you for further experiment.—I am, yours, &c.,

A. H. [illegible] (formerly of New York City.)

McAlloy's, Pitt Co., N.C. (U.S.A.), February 24, 1890.

A GENEROUS GIFT.

To the EDITOR.

SIR,—May I beg you will insert enclosed correspondence in your next issue? The matter appears to me of sufficient interest to require public discussion as to what will be the best way to dispose of the gift in question. I trust and feel my own feeling is to offer the sum as a Scholarship, to be competed for by examination amongst the students of the Schools of Photography at the Polytechnic, South Kensington, &c., and that the earning of such scholarship should carry with it the necessity for a year's residence and study at one of the best schools of photography on the Continent. I venture to think this method would tend to elevate the art science, and place it on a level with other special subjects which are already endowed in a similar manner.—I am, yours, &c.,

Ilford, E., March 17, 1890. JOHN HOWSON.

[COPY.]

"MY DEAR SIR,—In looking over the programme of the Conference, I see amongst the Amateur's prizes, no plaque or Trade Medals of Exhibitions. Now though I could name one or two subjects supposed to possess that special feeling of interest to you, I am quite ready to admit that personal feeling is against me; and that being so, it is manifestly for the benefit of photography that my views should be put aside, and Trade Medals cannot disappear. Therefore the Britannia Works Co. will in future [illegible] offering any such medals; thus I hope will be some little help in clearing the way for a prompt and easy settlement of this question, as my firm is one of the principal offenders. I take this opportunity of recording my [illegible] that, however apt the time may be now for such a sweeping change, by the [illegible] of Trade Medals has served a good purpose by stimulating competition and bringing to enthusiastic good work, which, would have been a curse in many cases without such encouragement. I claim, moreover, to have credit given us for a real desire to further the art of photography, as well as our own ends, in what we have done in the past. To prove that we have been and are to a great extent disinterested in our motives, I am pleased to inform you that the Britannia Works Co. have generously placed at my disposal the sum of 100*l.* per annum for three years, as a scholarship, to be used as may best seem adapted to further the interests of either the art or science side of photography, with an expression of preference for the science side. To the Camera Club, as the leading spirit in all forward movements in the art, I desire to transfer this generous gift, and I trust the Conference will see their way to accept it, and that we may conjointly be able to dispose of it in a fitting way. "Yours faithfully, JOHN HOWSON.

"*Brookehurst, Ilford, March 10th*, 1890.

"G. DAVISON, Esq."

[COPY.]

"DEAR SIR,—The Committee of the Club discussed the subject of your kind offer at their last meeting on Thursday last, and requested me to thank you for your generous proposition. At the same time, it was thought that the best way of applying the gift, or rather the course to adopt, would be to place the fund entirely at the disposal of a Committee, or Trustees from, independently of any one society, but rather from the Photo. Soc. of Gt. Britain and other leading societies conjointly. A representative Committee formed in this way would probably be able to suggest a method of applying such a fund to advantage, either by offering inducement for research and experiment in certain directions, or for original work of value in any way bearing on the advancement of science or art of Photography. "I am, Dear Sir, yours faithfully,

"*Camera Club, March 14th*, 1890. "G. DAVISON.

"JOHN HOWSON, Esq."

THE FADING OF SILVER PRINTS.

To the EDITOR.

SIR,—It is very gratifying to know that your columns are to be open to the discussion of this very important subject. How many photographers are there that have not been troubled in this way? Not many I presume, and yet what effort has been made to tackle the subject and remedy the evil? It is a most important matter to professional photographers. I believe there is nothing that prejudices the public against photographs more than to see their albums filled with pictures that once looked beautiful but which are now simply caricatures of their friends through the disappearance of all half tone and the appearance of spots. I have one suggestion to make. Your correspondent gave in full his method of working; let us have the methods of others troubled in a similar way, and, more important still, the methods of those not troubled with the fading of prints, if any are to be found magnanimous enough to benefit their fellow-competitors.—I am, yours, &c., H. E.

To the EDITOR.

SIR,—Referring to "Nonplussed" in your last, I am of opinion his trouble arises from the nature of the mounts he uses. His "I forgot to say I use best quality German mounts" suggests that his suspicions are not turned in that direction. I myself at one time used "best quality German mounts," but those mounts were chocolate and green in colour, hence my trouble. Again, "Nonplussed" mounts his prints while "still damp;" let him mount one or two dry on the same mounts as an experiment, and maybe he will arrive at the root of his trouble without seeking further. I have recently had considerable trouble in toning, and for a time failed completely to discover the cause. I purchased a fresh brand of paper, new gold, borax, &c., but all to no purpose. Lastly, I boiled my water in a copper kettle instead of the usual iron pan, and the source of my trouble was at last laid bare. Admitting "Nonplussed's" quality and colour of mounts to be beyond suspicion, his grievance cannot but be local, and he would do well to examine his unlikely and hitherto unsuspected working utensils.—I am, yours, &c., J. HAIGH GREENWOOD.

Brighouse, March 15, 1890.

To the EDITOR.

SIR,—In reply to "Nonplussed:" If this writer will select a few fairly dense negatives, make prints from them, fix in hypo not stronger than three ounces to twenty of water for ten minutes, wash fairly for two hours only, then mount and dry off quickly, I will ensure him against such rapid fading as he complains of. But these factors must be taken into consideration; he must not use ready sensitised paper, he must not try to obtain brown tones, and he must use Bristol mounts. From thin negatives, the prints will fade from too much soddening and soaking in water, an incipient decomposition is started that will soon tell, and the use of the pads is an element of danger. No sugar is required in properly made starch, so that had better be omitted. In short, use freshly made paper, tone amply, and fix and wash no more than are absolutely necessary, then dry promptly. Use no gas in printing room, or as little as possible; never use it for drying paper.—I am, yours, &c.,

Kingston, S.W. J. D. COOPER.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, March 26, Monthly Lantern Night; April 2, *Standard Solutions, and the Expression of Photographic Formulæ*.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.—On Monday next, March 24, Mr. Smith will give a lecture on *Micro-photography*, and illustrate it by means o the optical lantern. Visitors invited to attend.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column: but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, studio accessories in exchange for books by Professor Tyndall.—Address, J. B., 4, Carlton-terrace, Harrow-road.

Wanted to exchange, two exterior backgrounds for two others, exterior or interior.—Address, A. C., 18, Belvidere-street, Mansfield, Notts.

Will exchange eight volumes *English Mechanic*, from 1884, for wide-angle lens.—Address, E. J. LESTER, 6, Jackson-avenue, Ilkeston.

Wanted, "Facile" or other good quarter-plate detective camera; will exchange whole-plate camera with landscape lens and three double slides.—Address, DAY, Photographer, Monmouth.

Luxograph apparatus for exchange; wanted, whole-plate apparatus or accessories. Also several backgrounds in exchange for others. Send photographs.—Address, STIRLING COYNE, Photographer, Leicester.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED:—

T. N. Langton, Sheffield.—*Photograph of the late Dr. M. A. Otley.*

F. Higgins, Chard.—*Photograph of old print of Lord Nelson.*

J. W. B.—The address is 5A, Pall Mall East, S.W.

OLD READER.—Refer to the ALMANAC for the formula.

P. P. P.—The same process, but worked under different names.

SULPHITE.—Not having used this developer, we therefore cannot say for whose plates it is well adapted.

DISAPPOINTED.—To make your balustrade more natural, paint it the colour you desire, then dust it over with coarse sand.

W. C. A.—We hope to have something to say on the subject shortly—as soon as we have completed the necessary experiments.

H. W. B.—If a mixture of ammonia and alcohol does not remove the varnish from the engraving better take it to a picture restorer.

D. THOMASON.—The spots are accidental, and are not a regular feature in such films. Communicate with the makers, and refer to your correspondence with us.

A. C. B.—Photographing the pictures in the National Gallery is allowed, but permission from the Trustees must first be obtained. Except in special cases the pictures have to be copied as they hang.

VIGILANS.—1. The details of the process are kept as a trade secret. From what has been published we should say a transferotype film would be best. 2. Copper or zinc would be the best metal. 3. The collotype process. 4. We hope so.

BEGINNER.—Of the prints sent, C and E are the best. The former is really a very fair picture. All the others suffer badly from under-exposure and over-development. The lens is not a very good one, but with a smaller stop the marginal definition may be much improved.

ABELARD asks: "Will you give me the quantity of recrystallised nitrate of silver requisite to make up a two-gallon strong negative bath for photo-lithographic purposes?"—In reply: We do not possess so much recrystallised nitrate, and if we did we should prefer keeping it.

HECTOR.—1. We do not know to what magazines you refer—probably the cuts are wood engravings. Better send us an example. 2. Photo-zincography will yield the best result, but the prints must be worked separately, not with type. Line etching is also well adapted for line work, and the blocks can be printed with the type.

YORES.—In this case the cause of the spots is due to bronze powder. So long as this is used on photographic mounts so long will there be a danger—and a very great one, too—of spotty pictures. If the price of real gold printing is objected to, then ordinary ink should be employed. At the best, bronze printing is but tawdry and vulgar.

G. H. A.—Supposing the bar of the burnisher has a good polish, the failure arises from insufficient pressure or not enough heat. Make the bar considerably hotter than the hand can conveniently bear, and then put on sufficient pressure to give the desired glaze. The prints may require passing through the machine several times to obtain this.

J. T. BARBER.—Your experiments are very interesting indeed, and show how highly electrical is celluloid under certain conditions, and the effect it may have on the bromide of silver. Your plan of dealing with the films in a damp cellar is good, as it avoids the difficulties. Thanks for the communication, which we shall retain for the present.

G. M. J. B.—In using the magnesium ribbon continuously some means must be adopted for carrying off or condensing the smoke. By either of the methods referred to even illumination may be obtained. When the condenser is used the exposure will be much shortened, and if the light be in the proper place the illumination will be perfect.

OLD HAND and S. J. complain that their experience, in the lack of permanance in prints upon which every care is bestowed in their production, quite coincides with that of a correspondent who wrote last week. S. J. says that a large proportion of the prints he has issued during the last three years show strong signs of fading. Some, he says, begin to go in five or six months, notwithstanding that the fixing and washing are always done by a thoroughly trustworthy old *employé*. Both correspondents are, of course, anxious for a remedy.

S. E. says: "I use the acetate bath for toning. After having used it a few times I find it has gone bad. Will you be kind enough to tell me what must be put in to keep it?"—The bath will not go bad unless it gets contaminated with something that brings about a precipitation of the gold. When this is the case the best thing is to make up a fresh solution.

F. B. G.—The exposure mentioned is out of all reason, unless the negative be extremely dense and the light exceedingly feeble. We strongly suspect you are not using the lantern properly. No ground glass should be necessary if the condenser is rightly placed with regard to the light and the objective. A portrait lens would be quicker than that you are employing.

JOHN SPENCE.—Almost all the print washers answer the purpose well. But we rather doubt if, with any of them, prints equal to five sheets of paper will be (automatically) properly washed in the space of two hours. Better send to the different makers for prospectuses, and then select the machine that seems best suited to your requirements. The one mentioned in your letter is good.

JAN.—We think not. Try the experiment yourself with the mirror pointed to a clear, blue, cloudless sky, and afterwards with a reflector made of white cardboard. When the sky is white then the mirror answers perfectly, as it reflects the white clouds. Of course there are white reflectors and white reflectors. Possibly in your previous experiment the reflector was not a good white.

E. R. G. writes: "Can you suggest any way of removing the hood of a lens that has become fast to the front combination? I have tried soaking with sweet oil, thinking that would loosen the screw, but it does not help it."—Having ascertained that the lens is not burnished into the hood, as some are, warm gently and apply paraffin oil. Allow to soak for a short time, then try to unscrew.

C. GILKER, replying to "Nonplussed," writes: "Too long washing will fade prints quite as quickly as insufficient washing, or insufficient toning will cause it. I have prints five years old, toned and fixed in the manner you describe, quite brilliant, no signs of fading, yet only received five minutes' washing under a tap. Again, it may arise from bad albumen in paper or dust between print and mount."

F. A. B. writes asking if competition is as keen in Australia as it is in England, and whether a young man who is a good photographer would stand a better chance of obtaining employment there than here?—From what we have heard, competition in some parts of Australia is very keen, while the work is quite equal to any produced at home. Perhaps some of our readers who have resided in the colonies will give the benefit of their experience.

A. REED sends us some flash-light pictures of a group of choristers in a large room. He asks the cause of some being fogged while others are clear, seeing that the whole of the negatives were exposed within a space of ten minutes, and developed under precisely the same conditions. The cause is not far to seek. The clearest pictures were those first taken, before the room got charged with smoke from the burning magnesium. As this occurred it became the same as working through a more or less thick fog. From the examples sent it is not difficult to pick out the picture which was taken first.

W. M. says: "I should esteem it a favour if you will kindly inform me in your next issue, if possible, how cold, grey tones are obtained, similar to those exhibited last year at the Crystal Palace by Mr. Lavender, of Bromley—is it owing to negative, or to toning bath used? Do you think platinum forms the basis? Is it possible to tone with platinum?"—The prints in question were made by the platinotype process. Cold tones are also obtained on bromide paper. Silver prints can be toned with platinum. See Mr. Lyonel Clark's article on the subject, which appeared in our columns a short time back.

GROUND GLASS writes: "I should be greatly obliged if you would kindly help me out of a difficulty I am in. I have been trying to enlarge on bromide paper by means of a paraffin lamp as sketched, but I cannot get the negative evenly lighted, the centre being well lit, but getting gradually dark towards the edges. I do not want to use condensers if I can do without."—Even illumination cannot be obtained without a condenser except by a special reflector or the intervention, between the light and the negative, of two or three pieces of ground glass. These should be placed a little distance—say, half an inch or more—apart. By this means tolerably even lighting can be secured. We have in type an article relative to this.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Relative to this, Mr. Edgar G. Lee says: "Since writing you last we have had a great number of applications for space, although exhibitors have till April 1 for sending in the above. Some of the leading American photographers have promised to send pictures to our exhibition. Three concerts, several lectures, and lantern demonstrations have been arranged, and others are in progress. The catalogue will be illustrated by a number of reproductions of exhibitors' pictures by one of the best processes. Local photographers will be well represented, and nearly all the screens have been let."

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RAPID EXPOSURES.

As the season for outdoor photography may now be said to be commencing, it may not be out of place to say something about the use and abuse of the so-called "instantaneous shutter." During the past year or two there appears to be quite a "craze" amongst a certain class of amateurs for the quickest shutter attainable, without any consideration whatever as to whether the sensitiveness of the plates in use would respond to the rapidity of the exposure. One of the most frequent questions put by amateurs is, Whose is the quickest shutter? Again, if one goes to purchase one, the vendor invariably sets it at its quickest, as a proof of its efficiency, as if rapidity alone were the acme of perfection. If one might judge from that most practical of all points—demand and supply—extreme rapidity with many is the chief desideratum in an exposing apparatus, and that regardless of all other considerations.

In this article it is not our purpose to discuss which is the best form of shutter, where it should be fitted—whether before, behind, or in the centre of the lens—or whether it should open from the top, bottom, or middle. Our remarks will be directed to its use, whatever may be its form, for general work.

We have on former occasions pointed out that for conveying the idea of actual motion a too rapid exposure may defeat the object in view. The term instantaneous, as applied to exposures, is, of course, a misnomer, however rapid it may be, for some time must necessarily be involved in the operation. But to the point. Let us imagine a photograph of a train going at full speed, taken broadside on, so rapidly that the spokes of the driving wheels are shown sharply defined. What would be the effect conveyed to the mind? Why, simply that the train was standing perfectly still, as if waiting for a signal. However, this is not the subject we intend to deal with here. Our object is to protest against the exceedingly brief exposures that are so frequently given, when much longer ones might be made, and, in every way, much better results secured. In doing this we do not gainsay the fact that at times the utmost rapidity is imperative, as, for example, when taking a flying shot from the window of a railway carriage while it is at full speed, or in taking a vessel from the deck of another going in the reverse direction, or similar work. But for general purposes we unhesitatingly say that, in nine instances out of ten, of "instantaneous" exposures, a much longer time might have been given without sacrificing sharpness through movement, and a far better negative obtained.

This important question should be kept in view when making shutter exposures. Is the object to perform a scientific feat or to take a good photograph? If it be the former, then by all means let the apparatus be set at its greatest possible speed; if the latter, let it be so timed as to give a fairly full exposure for the plate employed. This, for the general run of subjects, can, in the majority of cases, be well afforded, without sacrificing sharpness; indeed, the longer exposure may actually prove advantageous in securing the apparently sharpest picture. Take, for example, two pictures, the one a mere black-and-white silhouette, of the character so frequently met with in amateurs' rapid work, and another which we will assume to be fully exposed. The latter will appear, by reason of the extra detail, by far the sharper of the two, although it has received the longest exposure and therefore, presumably, should show the greatest amount of movement.

Some shutters are said to work in the two-hundredth part of a second, or less. Now, supposing they were capable of working at this speed—which, by the way, most of them are not—would any advantage accrue from their use at this speed for general purposes? We unhesitatingly answer in the negative. With many subjects no greater movement would be detected with an exposure of, say, the twentieth part of a second or longer, than with one of the hundredth of a second or less, while in the former case the plate would, of course, receive five times the exposure; this in most instances would make all the difference between a black-and-white negative devoid of detail and a fully timed one.

The most common fault with instantaneous work is not a visible movement, but under-exposure, which renders them worthless in a pictorial sense. If a negative be fully exposed, even if a slight movement is perceptible, it will be a far better picture than one with intensely black shadows devoid of all detail, such as results from considerable under-exposure. A very slight trace of blurring in the moving objects would, in a sense, be an advantage rather than otherwise, as indicating life which, as in the case of the railway train cited above, is not always consistent with the utmost sharpness.

It must not be understood that we for a moment decry rapid exposures. This we do not, except when it unnecessarily leads to indifferent photography. Extreme rapidity in a shutter is a power at command, but it is one that should always be employed with judgment, bearing in mind that the object to be attained is a satisfactory picture.

THE ACTION OF LIGHT ON SILVER CHLORIDE.

Since the appearance of Professor Hitchcock's letter last week we have had the opportunity of carefully reperusing his original article and our previous remarks thereon, and in the new light thrown upon the subject by Mr. Hitchcock's objection to our criticism, and our own reinvestigation of his experi-

ments, we are compelled to say that we more than adhere to what we have already said regarding the misdirection of his line of research.

Mr. Hitchcock has charged us with criticising him unjustly, and with making the serious and unpardonable charge that he has proved or disproved nothing. He further claims the right to object to criticism that "has no more solid basis than opinion." After all, what is the basis of all criticism if not opinion? However, the facts are these. Mr. Hitchcock embarks in a series of experiments, to which he attaches considerable importance, as having established facts not hitherto known; and we, in our undoubted right, point out in what respects we consider those experiments to fail in their attempt. Mr. Hitchcock thereupon with some asperity calls us to book, and challenges us to make good our case. This we hope to do in a more complete manner than perhaps our challenger anticipated.

In his letter last week Mr. Hitchcock says "I did not undertake to make my results agree with any theory," and blames us for introducing "pet theories" of our own. But referring back to his original article, we find he makes special allusion to the "conclusion" of Hodgkinson as to the formation of an oxychloride—a conclusion, by the way, very many years older than Hodgkinson's—and in summing up the results of his experiments last week, he claims to have proved the non-formation of any oxychloride. It would have been a truly miraculous occurrence if any such had been formed under his conditions.

The passing allusion to Hodgkinson and oxychloride, and to the improbability of the hypothesis, misled us into supposing that the object of the experiments was to either establish or "smash" that hypothesis. Having this idea in view, we were guilty of a piece of carelessness which caused us to overlook one of the, if not the most essential of the conditions under which Professor Hitchcock's experiments were made, and one which places him in the position of attempting to prove one thing by doing something altogether different. Of this, however, more anon.

Referring to the great discrepancies in the results of previous investigators, and taking the two instances mentioned in the original article, Von Bibra and Newberry, we imagine the veriest tyro amongst photo-chemists, as distinguished from pure chemists, would have little difficulty in accounting for the wide variance of results. For Mr. Hitchcock's benefit we may be excused making a brief explanation. Von Bibra exposed moist chloride of silver *in mass* to sunlight for several weeks with only occasional stirring, to expose fresh surfaces. Result, no loss of weight from evolution of chlorine, for the pretty plain reason that the latter recombined almost as rapidly as it was disengaged. Under such circumstances, only the thinnest possible surface layer of the chloride is acted on by light, and though the chlorine may be dissociated, it requires special means to remove it and prevent its recombination.

Newberry adopted such special means by suspending silver chloride in water through which a current of air was passed. In this manner, as the chlorine became dissociated, it was partially, at least, removed, and so, naturally, a loss of weight was recorded. The want of close agreement in the results of different experiments can only be set down to uncertainty as to the amount of work done.

These two chemists, it will be noted, dealt with pure chloride of silver in the presence of moisture, and, as has been shown, produced different results, owing to varying modes of treatment. Mr. Hitchcock now claims to have settled the question, and to have got "more definite results than any hitherto given." But we are compelled to say it, though we do so in all humility, after the lesson that has been already read to us, his experiments and results have no earthly connexion with anything that either Von Bibra or Newberry have done.

Professor Hitchcock's work has undoubtedly been carried out in a thoroughly careful and systematic manner. Of that we have not the slightest doubt, from his own description of his arrangements, even to the passing of a current of hydrogen through the apparatus in order that the chloride during exposure might be completely isolated from all atmospheric or oxidising influences. It was this detail that we were careless enough to overlook in the original description, though perhaps we may plead "extenuating circumstances," for how could it be possible to prove or disprove the oxychloride theory when every trace of oxygen was religiously kept apart from the chloride? Had the results shown the presence of an oxychloride we should, under the circumstances, have had very just reason to doubt the elementary character of some of the elements.

Mr. Hitchcock's care in thus eliminating all chance of extraneous oxidation was praiseworthy, and leads us the more to wonder at his selection of a current of hydrogen for the purpose. Nitrogen would have been better, or if he wished to give the oxychloride a chance, a current of dry air. In selecting hydrogen we can only assume that he did so in ignorance or forgetfulness that it is itself a powerful reducer of silver chloride, and the wonder is that this has not previously been pointed out to him. Who with the merest smattering of chemical knowledge is unaware of the fact that if hydrogen and chlorine be mixed in equivalent proportions in a glass vessel in the dark they form but a mechanical mixture, but if brought into sunshine they almost instantly combine with explosive violence, forming hydrochloric acid? Similarly, a current of hydrogen passing over chloride of silver in sunshine would rob it of its chlorine, the combination in this case being more gradual and regular in its character, and the hydrochloric acid gas so formed, carried on by the current, is "trapped," and reconverted into chloride of silver when it reaches the solution of silver nitrate.

What will Professor Hitchcock now say with regard to his claim of having got more definite results than previous experimentalists, notably Von Bibra and Newberry? His experiments bear as much relationship to theirs as does the production of an albumenised paper print to the development of a gelatine negative. While they were investigating the direct reducing action of light—and Professor Hitchcock no doubt thought he was doing so—he was really working a *developing* process, the results of which could never for a moment be in doubt.

The constitution of the darkened chloride of silver after exposure to light is undoubtedly a question that requires settlement, and is surrounded by such innumerable difficulties that it has puzzled a vast host of able investigators. But the result of acting upon silver chloride with a powerful reducing agent is an entirely different matter, and any youth who has passed the photographic classes at our Polytechnic schools would have easily predicted the result of the experiments in question.

Under the circumstances of this explanation it is scarcely needful or possible to further answer Mr. Hitchcock's letter and challenge. As we stated in our short "append" last week, we were under the impression that he started with the object of deciding between the subchloride and oxychloride theories, but that intention he has disavowed, satisfying himself with

proving loss of weight when chloride of silver is reduced to metal. We may, however, withdraw our expression of opinion that "the task is far too delicate to be approached in this manner," for that referred to experiments such as Von Bibra's and Newberry's, or rather to those with similar objects. Mr. Hitchcock's experiment, however, consisting in the reduction of a weighed quantity of silver chloride and the collection and estimation of the liberated chlorine, is one of the simplest of chemical exercises, and could be accurately performed "within the limits of experimental error" by a comparative novice.

If Mr. Hitchcock will repeat his experiments with the same care, using a current of nitrogen, or even of air, in place of hydrogen and moist silver chloride, he may be able to produce some valuable results; but he must not expect to effect single-handed what has baffled hundreds during half a century.

Among the various photographers who on Friday last listened to the lecture on *Western Norway*, given by Mr. E. Howard Jaques, Vice-President of the Birmingham Photographic Society, at the Crystal Palace, and studied the numerous fine lantern projections on a thirty-foot screen by which the lecture was illustrated, we imagine there were few, indeed, who did not cherish a slight *soupçon* of envy of the man who could select his itinerary with such effect, photograph the leading features of the Norwegian fjords and mountains so well, and tell the tales connected with each in such pleasant style. That Norway, when—so to speak—opened out to the photographer, may prove to be one of the happiest hunting grounds to those of Great Britain we have been of opinion ever since reading Mark Oute's racy *Jack and I in Norway*, and this opinion has been intensified by the examination of over one hundred of Mr. Jaques's singularly beautiful lantern slides. Of this latter we may have occasion to speak again soon.

A number of early examples of ceramic photography by Lafon de Camarsac and F. Joubert, in the possession of the Photographic Club, and which, from their historical as well as their intrinsic merit, are highly interesting, have been most admirably mounted in an album devised and constructed by the eminent bookbinder Mr. Zachnsdorf. This, which forms one of the choicest specimens of the art ever produced, has been presented by Mr. Zachnsdorf to the Club, of which he is a member. It will be well if other societies and clubs, as well as private individuals who possess artistic or historical works of a past epoch, would collate and preserve them for reference, and occasionally bring them under the notice of the photographers of the present day, who would thus realise the fact that there were men of might in the former times.

Among the very large number of formulæ for retouching mediums that are to be found scattered in the pages of various periodicals, there are few which do not contain as one ingredient a certain quantity of "Venice turpentine," from which we may conclude that a certain definite effect is expected to be produced by its aid. As a matter of fact, the various samples of this substance which we have seen have been purely artificial fabrications, evidently made by the solution of common resin in commercial turpentine. The advantage of buying this kind of material at pence per ounce, when the same effect could be had by dissolving a pinch of powdered resin in the mixture, needs no explaining.

As, however, it is useless to point out the prevalence of a sophistication without describing a method of detection, we may abstract from a foreign journal a mode of readily determining whether the true or an adulterated article is under examination. A small quantity of ordinary turpentine treated with strong ammonia gradually mixes to form a milk; with Venice turpentine the liquid remains clear. If a glass rod is used to stir up the mixture the Venice turpentine gradually becomes a semi-solid, colourless, opaque mass, whilst the liquid is only slightly turbid; ordinary turpentine, on the other hand, dissolves readily and forms a milky liquid, which, after a short time, sets to a jelly, especially when five parts of ammonia are added to one of turpentine. Venice turpentine containing fifty per cent. of ordinary turpentine is readily disseminated through ammonia; the mixture sets after five minutes, and when placed in boiling water becomes clear. With thirty per cent. it behaves the same, clearing in ten minutes. With twenty per cent. the mixture readily becomes milky, and does not set, but becomes clear in the water bath. Below twenty per cent. the addition can only be discovered by comparing the suspected with a genuine sample.

The differences in the colour of the light emitted by various phosphorescent sulphides have been supposed to be caused by differences in physical structure consequent upon different methods of preparation, the well-known Balmain's paint, and also the luminous tablet of the Warnerke sensitometer being examples of these luminous substances; but according to Messrs. V. Klatt and P. Lenard, the true explanation is different from this. They state that the difference is a chemical one, as they have found that the substance, when chemically pure, exhibits practically no phosphorescence at all. There must, for the effect to be produced, be present traces of sulphide of copper, bismuth, manganese, or some fourth metal not yet identified. The intensity of the phosphorescence increases with the amount of sulphide present up to a certain point; but when a maximum is reached any further addition causes a decrease, and ultimately extinction.

Many different modes of detecting the halogens have of late years been discovered, and our readers have been kept *au courant* with them; but perhaps the most novel mode of distinguishing between the chlorides and bromides and iodides of the alkalies yet discovered has recently been published. If a little of a solution containing a chloride or bromide is evaporated to dryness, and one or two drops of concentrated sulphuric acid containing sulphate of copper in solution is added, a yellow colouration is indicative of the presence of a chloride, whereas bromides cause a deep violet, both colours being discharged upon the addition of water. If an iodide be experimented with, the mixture becomes black, and upon water being added a white precipitate is produced. Various other metals used instead of copper give results similar in kind, but of varying colours.

Celluloid has made for itself a firm position in photographic technics, from which it is not likely to be expelled; but a patent for a new kind of artificial ivory has been obtained, and the product may possibly be found useful as a basis for positive impressions, as it is said to bear a very strong resemblance to the real ivory. The material is made by mixing granulated or pulverised ivory (a waste product), eighty parts; isinglass, twenty parts; French chalk, five parts; water, forty parts; gin, two parts; cotton wool, two parts—according to weight. The substances are mixed, heated in a water bath at boiling point, mechanically stirred for about ten hours, kneaded, and rolled.

We are of opinion that sufficient attention is not given to the production of positives upon surfaces such as those resembling ivory. Mr. Burgess's Eburneum process many years ago gave very beautiful results, but entailed the trouble, mess, and risk of backing a collodion picture with a gelatinous paste and then stripping. Nowadays, with carbon printing or bromide films, the matter is reduced to the simplest proportions. We cannot but think that success would attend an earnest attempt to introduce these ivory prints.

The substitute for sulphite of soda proposed by Mr. A. H. Gilder last week certainly presents itself in a more convenient form than most of the other sulphites, but it can scarcely offer any further recommendation. The bisulphite of ammonia is very soluble in water, and in solution retains its preservative action longer than the neutral sulphites, while it seems to be milder in its action than the bisulphites of potash

or soda. It may thus be conveniently kept in solution to be added as required in making up *extempore* developers, though for general purposes in making up a quantity of stock pyro solution it seems quite as easy to dissolve the requisite quantity of sodium sulphite. The neutral ammonium sulphite is useless for the purpose, owing to its low degree of solubility. It is formed by passing the moist vapours of ammonia and sulphurous acid into alcohol, when they combine and separate in crystalline form. If sulphurous anhydride be passed into liquid ammonia until the smell of the latter disappears and alcohol be then added, a crystalline substance is obtained possessing alkaline properties, and having the composition $NH_4 2SO_3 + NH_3 + 1\frac{1}{2}$ atoms water.

Referring to the new "contretype" method of reproducing negatives mentioned in our last issue, a correspondent writes to remind us of the well-known plan for toning or intensifying carbon prints or transparencies by staining the carbon image with various solutions—nitrate of silver followed by pyro, or an iron salt similarly followed by tannin or gallic acid, for instance. If, he argues, this be possible, as it undoubtedly is, it does not promise well for the purity of the shadows of the "contretype" reproductions of negatives. We can only suppose that a good deal depends upon the colouring solution employed, as well as upon the precise condition of the insolated gelatine film. The toning or intensifying methods referred to were apt to be somewhat erratic in their results, succeeding well at times, and failing altogether at others for similar reasons.

It is refreshing to find in these thoroughly "gelatine" days an "old stager" bold enough to recommend and to demonstrate the merits of an almost forgotten, or, to a very large section of modern photographers, entirely unknown process, such as Hannaford's old-time collodio-albumen process. But enthusiasts in lantern matters might do much worse than follow Mr. Falconer's advice, and revert to one or other of the old processes in which albumen played a part, for undoubtedly therein lies the highest quality of result. The little extra trouble involved in preparing one's own plates would be amply repaid.

Apropos of lantern slides, it is interesting to note that at the competition in connexion therewith at the London and Provincial Association the other evening, the first honours went to collodio-bromide, the second to gelatine plates by the firm who have adopted as their watchword in connexion with lantern plates, "Collodio-bromide superseded." It is perhaps possible that the "personal equation" must be taken into consideration, and certainly we all know that Mr. Wellington is *facile princeps* in all that relates to the production of slides.

As one outcome of the discussion that is proceeding on matters stereoscopic, Mr. Chapman Jones's reference to the effect of solidity obtained by combining in the stereoscope two apparently identical tracings of pendulum curves is not without interest. If the curves were absolutely identical there would, of course, be no relief or solidity; but, as a matter of fact, it is almost a certainty that there would be sufficient deviations in the swing of the pendulum from absolute accuracy to render them dissimilar "pictures." This being so, it is not difficult to believe there would be an appearance of relief, though not truly stereoscopic. Every one who has used a stereoscope must have noticed that a spot or marking on one half only of the picture appears as if floating between the eye and the view, so little is required to convey the idea of *quasi* solidity.

But some few years ago we had the pleasure of carefully examining Mr. W. J. Wilson's ingenious machine by which he imitates the beautiful curves and tracings first produced by means of the double pendulum. Mr. Wilson showed us a large number of duplicate tracings mounted stereoscopically, and which undoubtedly showed *true* stereoscopic relief; but in these cases the result was not obtained by accidental variations in the tracings, but by special arrangement. One series of curves having been traced, the machine was placed out of gear, and the positions of the two sets of wheels slightly altered, and a second series traced, starting actually from a different point. The tracings produced by this machine are absolutely identical if repeated without altering the gearing, and two such placed in the stereoscope show no stereoscopic relief. But some of the instances in our possession of the properly prepared stereoscopic curves are really marvellous in the effect of solidity they give.

MINIATURE LANTERNS.

The keynote struck by Mr. A. Pringle in his description of and remarks upon the optical lantern before the Camera Club was the advisability of making lantern bodies small so as to be easily carried. There is no doubt a use for a miniature or portable lantern the same as there is for a small size or detective camera, but for many reasons it can only serve some of the purposes of the orthodox lantern, and will be an *auxiliary* to the lanternist's apparatus. It cannot supplant a biunial or triple lantern, or for the matter of that a single lantern of such proportions as shall secure the most stability and accuracy of adjustment, both for the optical part and for the illuminant. In the hands of a careful operator (who will take care the light does not flare) the body in which to screen the limelight may be quite small, in fact, if only dealing with one system of lenses, six inches deep and four inches from back to front would be sufficient to serve the purpose; but the moment a variety of lenses are to be used, or projection experiments conducted with the idea of illustrating the phenomena of light, some latitude must be allowed for. This could be managed by making the body like the old-fashioned (wooden body) wet plate cameras with the extension, but if the whole of the front, including stage and lens (objective) support, are to reverse, the body may just as well be long enough to receive the same, for after all, portability can only be considered as far as the apparatus is in its entirety.

As a *one*-focus lantern something quite small may be designed, for it is quite possible to work the limelight successfully in an ordinary bicycle lamp, as I have done for army signalling purposes, using a three-inch bull's-eye for concentrating the rays.

For lantern purposes the small lantern Mr. Pringle had constructed was exceedingly compact, and the part forming the base ingeniously utilised for protecting the condenser, &c., when packed up. It seemed, however, only to be suitable for one-focus objective (without increasing the size), and this, although useful in a private room or club for moderate size pictures, the operator would have no choice of position when placing his apparatus in a hall or large building. I take it that when an amateur gets a nice set of slides and writes or works up a descriptive reading to give with it, there are not many steps between a private or club meeting and one "to assist in raising some funds" for a charitable or other object, and then comes in the large disc and the necessity for studying the convenience of the audience.

With the lantern, as with the table microscope, a great deal of practical work can be done by a simple instrument, but as mechanical adjustments facilitate working in both instances, it is not long after learning the rudiments of the apparatus before some improvements are desired, either for the adjustment of the jet or the lenses, and then any cramped dimension will assert itself.

I had occasion to design for a gentleman going to South Africa a very portable first-class biunial, suitable for exhibiting in *all* sized rooms, and gave him a three-draw telescopic fronted lantern in brass, with stages of same material, and mounted the whole with the condensers on a supplemental front fastened to the ordinary front of body by four milled-head screws and sockets. This was perfectly successful as a lantern in every way, but was not of course lighter than an ordinary biunial, but was very readily carried about the country on pack mules, for the whole was contained in the size of the wooden lantern body, it being only necessary after use to unscrew the four screws and *reverse* the front in its entirety, the jets packing on pins at the side of the front when inside the lantern. The lenses were of the interchanging single achromatic order, and represented equivalent focus lenses of six, ten, and twelve inches, or thereabouts. This lantern travelled hundreds of miles and was very roughly handled, but stood the severe strain well.

The American makers of lanterns have for some time past given attention to miniature lanterns, and in some instances utilised the camera bellows for focussing. Mr. Milligan, the successor of Messrs.

McAllister & Co., has brought out a lantern in which the box forms the support for the stage and front, and the whole lantern packs away into a box eight and a half inches long by six inches wide and six and a half deep, and is stated to weigh eight pounds. The disadvantages (if it will be considered so) is the building up of the lantern after unpacking, whereas the "reversible front" plan makes a simple matter of converting the lantern as a working instrument into a travelling one.

Biunials and triple lanterns have been made in small sizes and of light material that pack into boxes much about the same size as the old-fashioned single oil lantern as regards area, but not so bulky. In fact, I know of a triple lantern made of tin, and in which the dissolving arrangement and connecting pipes are all secured to the *inside* of body, the whole apparatus measuring only twenty and a half inches high by seven and a half wide, and eighteen and a half inches from back to front, including the rack work of objectives. This lantern, with three and a half inch condensers, while being a practical apparatus for projecting good pictures of a satisfactory nature for large or small audiences with first-class illumination, has little or no appearance to commend it, and would certainly not impress an audience with the importance of the apparatus. If, however, it is made with mahogany body and brass front, the size must be slightly increased, and although a portable "Bridgman Triple" can be got into a body of only nineteen and a half inches high, when using four-inch condensers it is better to have it a few inches higher, so as to get the improved rolling curtain arrangements and centring and registering facilities for discs.

There is no question that the public are pleased with pictorial effect and lantern entertainments such as given by Mr. B. J. Malden, Mr. Snazelle, and Mr. Dyson, and these are some of the most successful given professionally, because photography is used as a basis wherever possible in the production of "pairs" of slides and effects. Those who have seen the "Eiffel" Tower, for instance, projected on the screen as a plain photograph and also as an "effect," first by day, then night, and afterwards with all the glow lamps illuminating the entire structure, will bear me out that when properly produced and carefully registered, photographic and other dissolving views will always have a prominent place in the lantern world, and the nearer the representations approach what is seen in nature the more effective they become. The things that have helped to make the lantern so much more popular during the last few years are to my mind:—

1. The simplification of photographic work by the introduction of dry plates.

2. The improvements in apparatus, by means of which perfect manipulation and "registration" can be secured.

3. The compressed gas system being all that can be desired since Beard's small automatic regulators have been invented.

On the last matter I should like to emphasise the advisability of keeping strictly to those lights that have proved themselves "safe and certain" when required for public exhibitions, and not wander after others that are troublesome and risky, and, as far as can be judged, without any material advantage for the regular run of entertainments. By this I mean that oxygen and hydrogen, each compressed in separate cylinders, and delivered by automatic regulators, give a light equal to any requirements up to thirty feet in diameter, and can be used with the utmost comfort and safety. Only last week a gentleman who had not touched the limelight for many years, and who remembered the paraphernalia of gas bags, boards, and weights, had a pair of cylinders and regulators for the limelight in a shadow pantomime, and was so delighted with its convenience and working that he could not refrain from expressing his favourable opinion of it almost in ecstasy, the "luxury" being so apparent to him. If lanternists would do all they can to make this method of producing the limelight known to their friends desirous of taking up the lantern as the *best*, I am sure they would be doing good to the cause, for considerable uncertainty at present prevails in some quarters with so many forms of "saturators" on the market as to which to take up. For experimental work, or where hydrogen cannot be obtained either from the main or compressed in cylinders, the ether and benzoline saturators are useful; but anywhere in the United Kingdom, I say unhesitatingly, send for a pair of cylinders and regulators, and you will find that it is not only the best but the cheapest. After the first outlay, which is about the same as bags, boards, oxygen-making apparatus, and saturators, the cost is really less, for there is practically no wear and tear, and supposing both gases are used condensed, the cost of an entertainment of two hours' duration could not be more than four shillings for both gases, and only two shillings if the hydrogen is used from the main.

On the differences of pressure and safety generally in using various limelights I will write about next time. G. R. Baker.

THE CAMERA CLUB CONFERENCE.

This, the third Annual Conference of the Camera Club took place on Thursday and Friday last week in the theatre of the Society of Arts, and was numerously attended by members and friends. Captain Abney, President of the Club, occupied the chair on both days. In his opening presidential address he said he and many others present well remembered the time when photography was fettered by difficulties, when amateurs were reckoned by tens instead of thousands, when the feat of producing an artistic photograph was something to be proud of, and when only very few studied photography in its scientific aspects. This was now all changed. He then instituted a comparison between physiological physics and photography; the same theory applied to the sentitive retina as to the sensitive plate. He concluded by alluding to an alleged discovery in Germany of a means of taking photographs in natural colours, and gave his reasons for believing that such could never be effected in a way that would be practicable.

Mr. A. M. Rossi then read his paper on *The Art of Drawing and Photography*. Previous to the advent of photography, the academical art student had to spend three-fourths of his time in learning drawing, the remaining fourth only was devoted to acquiring a knowledge of painting, and as nine-tenths of the students were the sons of artisans or countrymen, scarcely one in a hundred was able to devote his time to the requisite study and resist the necessity for settling down to the more mechanical pursuits of life. But by the perfection to which photography has attained, the long and tedious years of an art education have been so minimised that a youth with artistic proclivities could now accomplish in so many months what would formerly have taken as many years to learn. After citing an instance of the progress of two boys—one of them a mere student of the schools, with no special aptitude for or perception of art; the other a boy in poor circumstances, who is a house-decorator's apprentice, but imbued with a love of art—he expressed his belief that drawing, which is the only teachable part of art, is sinking with the rising of photography, and that the time is near when a youth having artistic instincts can, in a few months of mechanical instruction, be his own teacher, and photography will be his academy.

In course of Mr. T. R. Dallmeyer's paper on *Limitations in the Treatment of Subjects by Focus*, a photographic lens, he said, can only be made theoretically perfect when employed in depicting objects on one plane, as practically in micro-photography and stellar photography. When the planes are different and the corresponding points in the image are in consequence formed on sensibly different planes, then is the representation by receiving them on one plane neither truthful nor exact. Simple enough in theory, the construction of a lens to effect this is a practical impossibility. The artistic photographer, who has only an inanimate and unthinking machine with which to depict nature, must look for such phases of nature as will give that machine the greatest opportunity of utilising its limited powers, hence his transcript of nature will be possessed of an individuality arising from his subduing or emphasising, according to his own taste, and will thus impress others with the same feelings as actuated himself.

The various other communications specified in the programme published last week followed in order, and we hope in our next to commence the publication *in extenso*, both of those given above in synopsis and of the others.

The annual dinner took place on Friday evening, and was very numerously attended.

PRINTING BY ELECTRIC LIGHT.

Now that electric lighting is making such immense strides in our midst, it is more than probable that at an early date all first-class photographers will have connexion made with the mains with the primary idea of improving the artistic arrangements of their premises,

and taking portraits at night or on dull, foggy days, such days as we have almost forgotten in the long run of brilliant and warm weather we have been enioying lately. This being so, it may be well to point out one more way of making use of this latest addition to the photographer's ways and means of being independent of the ever-varying solar rays.

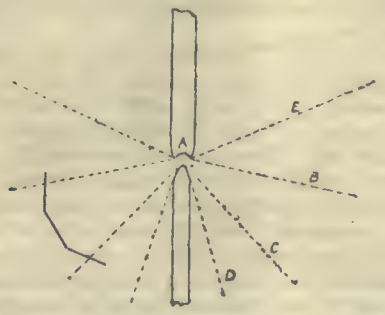
I refer to silver printing by the arc light. Although there are many ways of making most effective and artistic prints of portraits by artificial light, yet ordinary albumenised silver paper continues to hold its own, but I venture to predict that when the better class of customers has become familiar with the bromide, platinotype, and other soft unglazed papers, that the leading photographers will have one of their greatest difficulties in supplying their *clientèle* promptly and in a business-like manner done away with. However, we must consider matters as they now stand, and as the glazed prints are in favour we must make the best of our opportunities and avail ourselves of every method which is likely to help in getting work rapidly executed and delivered in such a manner as to do away with the complaint one so constantly hears about this time of the year of, "I wonder *when* my portraits are coming; I am sure Mr. So-and-so might have finished them before." And I would beg photographers to consider how many moments of rapture they lose to those two lovers who called (to be "taken") a fortnight ago by not sending off the prints as promptly as possible.

An arc lamp properly constructed will throw a light little intercepted by the support for the lower carbon holder. The lamp known in the market as the "Diamond" arc lamp is a convenient form, and requires little or no modification in being adapted to this purpose.

It is plain that we must make the utmost use of the light to be economical, so the supports must be as small as possible, and the light must be naked, *i.e.*, no globe used to diffuse the light, for an ordinary frosted or thin opal globe absorbs fifty per cent. of the light. Using the light naked, we find that there are parts of the rays that are more intense than others, so the distribution of the printing frames must be such that we get an evenly illuminated surface.

Now, if Mr. Editor will find room for this rough engraving, what I have to say will be much reduced in quantity, and I think that the arrangements will be made plainer to most readers, for I am a great believer in ocular demonstration.

In the lamp mentioned above, a large carbon is used in the upper holder, and a smaller one in the lower, so we get the rays distributed approximately in this manner:—



A represents the arc; BAC is the angle including the most intense portion of the rays; in CAD and BAE the light is not so bright, and falls off rapidly as the rays diverge, so between B and C we must expect to get the greater part of the work done.

As I am speaking of the use of this light more particularly for portrait printing, and as portrait negatives are almost invariably varnished, I must point out that with an arc of the power I shall specify shortly it is not safe to place the negatives nearer to the light than about eighteen inches, on account of the heat emitted, but if unvarnished negatives are used they may be placed as near as twelve inches without harm.

An arc lamp requires between fifty and sixty volts pressure, and the figures I am about to give were obtained with a lamp taking seven ampères. I dare say that these terms are as Hebrew to the majority of photographers, but if they wish to use the light they must become accustomed to them, and the best way to do so is to have a little practice in their use, which practice is only to be had by at once laying on the supply; at least, so the suppliers of the electricity would suggest.

In the light included in the angle BAC a good portrait negative should take about one hour to print at a distance of eighteen inches from the light, and a landscape negative, in which the contrasts are greater, will take about forty minutes at twelve inches. These times are for good negatives, not fogged or unduly yellow ones, which would, of course, take much longer.

There should be so little difference in the density of studio negatives that, knowing the time one takes to print, the times of all the rest are known, and thus, if a number of negatives are put to print at the same time, nothing is simpler than to get every print of the same depth, and all in the batch are ready to change at once. As the light does not vary, every copy from the same negative, if only exposed for a definite time, is of the same depth; so we see here is another advantage gained by the use of this light for printing.

In the upper and lower parts, EAB and CAD, the light is less uniform, and unless small negatives are used it is best to incline the printing frames so as to compensate for the falling off of the light, but I do not recommend doing so. I think it will be found best not to utilise these parts, as the rays should strike the picture perpendicularly to obtain the best results. In about the middle of EAB a negative takes twice as long printing as in BAC.

In printing with this light it is well to use frames consisting only of a back and side clips, as in Durnford's patent frames, and then the space occupied is only that required by the negative itself. At eighteen inches, taking in a small portion of the outer spaces, which may be done without noticeable results if the upper and lower frames are inclined slightly (see figure), we can place three half-plate negatives side to side on suitable support, and round the circle of eighteen inches radius we can arrange sixteen negatives lengthways, making a total of forty-eight negatives in such a position that one print from each can be obtained in an hour. At twelve inches, for landscape negatives, only two-thirds of the number can be printed at once.

If it is necessary to print a larger number, the distance may be increased, but then the light falls off in due proportion. The intensity of light varies inversely as the square of the distance, and the number of negatives it is possible to print varies directly as the square of the distance, so it does not matter how many negatives are being printed —all available space being taken up—the number of prints *finished* in a certain time is always the same. If the distance is doubled, a negative takes four times the time to print, but four times the number of negatives may be printed.

Now, I suppose most practical men will be looking for some figures relative to cost, for at present daylight is free to all and costs nothing, and the adoption of the new light means increased outlay; but although I am not a professional, I should consider that the advantages of a business-like promptitude of despatch, remarkable uniformity of result, and a minimum of trouble in looking after the printing, is worth some little extra expense.

A lamp taking 7 ampères, and, say, 60 volts, *i.e.*, 420 watts, *i.e.*, ·42 unit, will cost to run at 8*d.* per unit, which is the usual price charged by the London companies, 3·36*d.* per hour, or about 3*s.* 6*d.* for twelve hours, which will be sufficient to print 48 sets of 12 copies. I do not see why I should not introduce a new unit, as so many of my *confrères* are fond of doing. I will talk of a "negative hour!" it is at least intelligible. A negative hour, then, costs ·07*d.*, or twelve negative hours, which, I suppose, will be the figure most used by a photographer, cost ·84*d.* Ah! I have forgotten the cost of the carbons. A liberal estimate gives 10*d.* for twelve hours, so this modification brings the cost up to 1·04*d.*, or rather more than 1*d.* for twelve negative hours. This, I think, is not an excessive price to pay for that which is not merely a luxury, but a most useful addition to the photographer's outfit.

I have left the consideration of interest on, and depreciation of plant, as I do not care to complicate my abstruse calculations by carrying them into the fifth or sixth decimal place. A serviceable lamp should not cost more than 5*l.*

I would strongly advise photographers who adopt this light to warn the operator who has charge of the printing against working with unprotected eyes in the naked light. A pair of neutral tint

spectacles will certainly prevent a large amount of inconvenience and trouble resulting from weakened eyes and sight.

It may interest some of the many photographers who have admired the fine views of the Alps and Caucasus taken by Mr. W. F. Donkin to know that it was only last winter, before that gentleman's loss on the Caucasus, that he was experimenting with me on this subject.

W. P. Adams.

THE ART OF RETOUCHING.

Chapter III.—Materials and their Selection.

The efforts of the early retouchers were indeed primitive, both as regards the quality of their work as well as the manner of their accomplishing it. To hold the negative against the window, and so struggle on in pursuit of the artistic was an incident of every-day occurrence. Nowadays all that is altered; we live in better times. The retoucher not only has a *special* desk, but every other comfort to hand to help him through his day's troubles.

The requirements necessary for retouching are not numerous, and may be briefly enumerated as follows:—A retouching desk or frame; a supply of pencils of various grades; in some cases a magnifying glass, but this latter should be used very sparingly; some small brushes; some stumps, both paper and leather; a few cakes of water colour—namely, black, violet, carmine, and burnt sienna. A bottle of good, *hard*, matt varnish (one which dries quickly with an even surface, and upon which work may be done with either stump or pencil) is not an absolute necessity, but it is a very valuable adjunct to his stock-in-trade. A small quantity of glass paper, with the finest *tooth* for sharpening the leads; Oakey's No. 0 I have found highly satisfactory. It is useful at times to have a *very* sharp knife for the purpose of cutting out any imperfections that may happen to be in the films of the negatives, or to carry out alterations that cannot be carried out by the aid of pencil and brush. Though last, not least, a bottle of medium, which will, I think, complete our list of materials. Of course, when we use the ever-pointed pencils we must have a stock of leads for refilling.

We will take the pencils first. In the selection of pencils and leads the intending retoucher should spare no pains, as it is exceedingly difficult to procure leads of a uniform quality, so few makers produce them really good. Those used for retouching should be of the finest and closest manufacture, well moulded, and absolutely free from *grit*. Prejudice in these matters has much to do. For many years I used no other pencils but "Faber's," but some years back I was induced to try Hardtmuth's, and I was so pleased with them I discarded the former, and have used only Hardtmuth's since. I have always found them reliable, and I do not believe there are better pencils in existence for retouching than those they produce. If I thought there were I would adopt them. Nothing is so grateful to a hard-working retoucher as a good pencil, one with which he can make a firm, *velvety* touch, and which leaves a satisfactory deposit on the film. For these qualities you cannot select better, as far as I have experienced, than Hardtmuth's pencils. I do not wish to infer that the other makers are *inferior* (I only give a personal *preference*), for there are so many really good makers in the field that it would be a more difficult matter for me to decide upon their relative merits than I would care to undertake.

It is a disputed point among professional retouchers as to the fittest grades for general use. Some contend that HHHH, or even HHHHH, will be found the most suitable; others would not use them, preferring a much softer grade. I have used both, and must say I prefer the softer grade. I think a HB a good medium quality, but am always open to use a *harder*, such as F, or even H; or a *softer*, such as B. This point should be greatly influenced by the quality of the negative under treatment. It is not at all advisable to restrict the choice of pencils to either extreme, but having three or four grades always by you, use whichever in your judgment may seem the best suited to the negative you are about to retouch.

Having procured your pencils the next thing is to put a point on them, and this is done by rubbing the *exposed lead* upon the fine glass paper until we have secured the desired sharpness. I do not recommend the use of the *ordinary* pencils, but rather those known as the "*ever-pointed*." These are pencil cases, as it were, which can be refilled any number of times with fresh leads; they are comfortable to use, and the economy, compared with the ordinary pencils, is simply enormous. They possess the great advantage of always being the same length, and as you can use the leads to the very end they are necessarily not so expensive. In a word, one holder will last for years, and the leads, bought in boxes of half-a-dozen, can be changed whenever needed, and without waste. Perry's ink pencils, too, will be found useful at times when the ordinary ones fail to produce the necessary density. They will be found very useful when unpleasant markings in draperies and costumes have to be obliterated. In many cases an otherwise good picture may be rendered useless by the fact of a few nasty plaits showing across the figure, and which should therefore be taken away. This the ordinary leads often fail to accomplish, but by the use of the ink pencil success is gained.

As regards the magnifying glass I will say but little, as I am not an advocate of its use from a general point of view. There are many cases where its use is most desirable, but certainly not as a general help to the retoucher in his day's work. The injudicious use of the magnifying glass is sure to impair, if not more seriously damage, the eyesight of the one who contracts the habit of its daily use. Have it by all means—but use it seldom.

There are many forms of desks in use for retouching, but I really think the simpler they are the better. Those most generally employed are fitted with carriers or frames to hold the various sizes of plates used in photography. The desk itself may be described as consisting of three frames hinged together (on the principle of a folding screen), and a mirror fitted into the lowest frame to reflect light. The carriers are fitted into the middle frame, and the upper one is made solid so as not to allow any light to reach the retoucher's eyes. The middle and upper frames are supported in position by means of metal struts, which fit into notches at the lower ends, the struts in turn fitting into grooves which allow the desk to be closed when out of use.

A more compact form is also used answering the same purpose, in which the carriers are replaced by a sheet of plain glass, and which will permit of all the different sizes of negatives being worked up without the bother of removing the carriers. This sheet of glass should be covered with a piece of brown or black paper (the latter for preference), which will exclude the light, as a superabundance of same is calculated to fatigue, if not absolutely injure, the eyesight. In this paper a space should be cut large enough to allow of any ordinary size head being retouched, and which would thus render it serviceable, no matter what size the *plate* might be. To the amateur the question of shutting out the light is of little moment, nor is it of great importance to the professional who may only retouch a few negatives daily, but to the retoucher who is seated at his desk all day long, hard at it, and who well knows that not even the best eyesight can hope to retain its vigour after a few years of constant employment at this occupation, it becomes one of vital importance. Personally, I prefer a sheet of *white paper* for a reflector instead of the mirror, and generally place same over it. It reflects an even, matt light, which is just what we want; and even if the sun shine directly upon it there is not that glare which is a natural consequence from the use of the mirror, and which is impossible for work.

Redmond Barrett.

THE SIZES OF PHOTOGRAPHIC PLATES.

[A Communication to the Glasgow Photographic Association.]

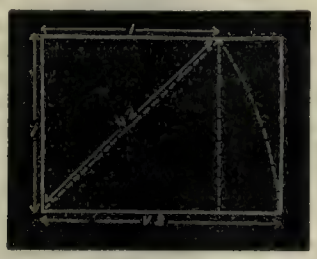
The question whether the sizes of plates and papers at present adopted by British manufacturers are the most economical that could be devised, is a subject worthy of careful consideration.

How the present sizes came to be fixed I do not precisely know. The terms, whole-plate, half-plate, and quarter-plate, have the ring of a convention about them, and may have been fixed by some photographic parliament in days long gone by. Plates $8\frac{1}{2} \times 6\frac{1}{2}$ were the largest size prepared for Daguerreotypes, and probably were then known as full plates, and this may be the origin of the term. Other sizes appear to have been designed by the makers of cameras in a haphazard way, as their fancy or expectancy of custom led them. What I wish to discuss to-night is, whether the proportions of length and breadth in the standard sizes of British plates are the most economical that could be devised? I think most certainly they are not, and I would like very much to see this subject taken up by the International Congress which is to meet this year in Brussels; for

the double reason, that an international series of sizes might be fixed, and that they should be arranged on some reasonable basis.

In a communication to this Society about five or six years ago, the late Mr. Norman Macbeth, R.S.A., laid down a rule to find the best proportions of length and breadth for a picture.

The following diagram explains the method, the resulting proportions being $\sqrt{2} \times 1$.



Now, while maintaining that the ultimate proportions of a print must depend entirely on the composition of the picture, I have become firmly convinced that this shape is the most useful and economical that could be found for general work.

Compare this size with those in use.

$\sqrt{2} \times 1 = 1{\cdot}41 \times 1$	$8\frac{1}{2} \times 6\frac{1}{2} = 1{\cdot}31 \times 1$
$15 \times 12 = 1{\cdot}25 \times 1$	$7\frac{1}{2} \times 5 = 1{\cdot}5 \times 1$
$12 \times 10 = 1{\cdot}2 \times 1$	$6\frac{1}{4} \times 4\frac{3}{4} = 1{\cdot}37 \times 1$
$10 \times 8 = 1{\cdot}25 \times 1$	$6\frac{1}{2} \times 4\frac{1}{4} = 1{\cdot}53 \times 1$

A glance at the list shows that nearly all the sizes are less oblong than the Macbeth proportions, the modified half-plate $6\frac{1}{2} \times 4\frac{3}{4}$ being nearer it than any other. Consider for a moment, and I think you will find that in nine cases out of ten in trimming a print from a 15×12, 12×10, or even whole-plate negative, you have to cut more off the breadth than the length to make the shape look pleasant, and that a half-plate oftener than any other size is a suitable shape as it stands.

Compare this size also with the artists' canvasses which have the largest sale.

$\sqrt{2} \times 1 = 1{\cdot}41 \times 1$	$10 \times 7 = 1{\cdot}43 \times 1$
$18 \times 12 = 1{\cdot}5 \times 1$	$20 \times 16 = 1{\cdot}25 \times 1$
$14 \times 10 = 1{\cdot}4 \times 1$	$18 \times 14 = 1{\cdot}28 \times 1$
$12 \times 8 = 1{\cdot}5 \times 1$	

These two last sizes are for portraits, head and shoulders, and are of course squarer than an average picture would be.

And now I wish to point out the most interesting and useful feature of this shape, which is, that when it is doubled the relative proportions are precisely maintained. $1 : \sqrt{2} :: \sqrt{2} : 2$.

You will at once see the manifold advantages of a series of plates based on a principle such as this, and as this paper is not intended to go fully into the subject, but is written more for the purpose of raising a discussion on what I consider a most important matter, I will conclude by giving a list of sizes on the lines which I would like to see carried out. Of course if an international series were fixed, they would be worked out in the metric system.

$4\frac{1}{4} \times 3$	$12 \times 8\frac{1}{2}$
$6 \times 4\frac{1}{4}$	17×12
$8\frac{1}{2} \times 6$	24×17

As the sizes become large the difference between them is too great, and intermediate sizes would be required.

7×5	20×14
10×7	28×20
14×10	

J. Craig Annan.

WHAT PHOTOGRAPHY WILL NOT DO.

The jubilee of photography is past, and we have had recounted in public journals, almost *ad nauseam*, what photography has already done, and there has been a little prophesying of what we may expect it to do in the next fifty years, but there has been no one bold enough to tell us what it cannot do. I am going to take upon myself the *rôle* of prophet, and mention one or two advances which photography cannot make, although it is popularly believed that these will become *faits accomplis* in the not too immediate future.

Photography in Natural Colours.

The question is often asked, "When will photography in natural colours be found out?" Had the question been put, "When will photography in natural colours be commercially practicable?" or, "When will portraits in natural colours be feasible?" the answer to be given is, "Not before the centenary." Photography in natural colours has been effected, but by a process so tedious and long in operation that it can never become of the least practical value. Becquerel, Niépce de St. Victor, and others have produced photographs on silver plates in the camera, approximating to the colours of objects, and the writer has produced the whole spectrum in its hues, though dim, on collodion plates, but all have been effected by means of what is known as the printing-out method, *i.e.*, by making light itself do the whole of the work on the plate, instead of merely imitating it and obtaining the final result by means of development. Such a process, when used in the camera, is necessarily extremely slow—so slow, indeed, that only in a very bright light illuminating the object, and by an exposure sometimes extending over days, any coloured image at all can be produced. This method is, therefore, completely out of court as a practical process for obtaining portraits, and is many times worse than the Daguerreotype process in its early days, when a sitter had to endure being screwed up in a head-rest for an hour or so in bright sunshine. From a theoretical point of view, what has been done is interesting, but at present, at all events, it remains only as a scientific curiosity. To enable it to be of any practical value, exposures must be short, and this entails the after-process of development. Light may so sift and shake the matter on which it falls that it aggregates or disintegrates into minute particles of such a size that the light reflected from them shall be of that particular colour which falls upon them; but it can scarcely be conceived, though a short exposure may so change some small portion of the matter on which it falls, that a subsequent action produced by purely chemical means, as is the case in development, can continue to produce the same necessary aggregations or disintegrations of the particles. Again, with the results that have been obtained, the permanency of the images is but short, as they will bear no subsequent exposure to white light, the colours vanishing rapidly. From what has been said, it is apparent that photography in natural colours is out of the range of practicability with the present known substances which are sensitive to light, and it is unlikely that any substance will be discovered sufficiently sensitive to enable it to be carried out by a printing-out process, and we have seen how unlikely it is that any developing process can succeed.

Transmitting the Photographic Image to a Distance.

The transmission of photographic images to a distance by electrical means is also popularly believed to be within the range of practicability. The transmission of sounds by a telephone, and their reproduction by the phonograph, has seemed to the lay mind, and even to minds which are not lay, to be akin to the transmission and reproduction of photographic images. Had a little more thought, however, been expended on the subject, it would have been seen that the conditions of the two were totally different. The phonograph enables sound to be reproduced by means of lines or points marked on a sheet of foil, the depth of sound being indicated by variations in depth and breadth of the furrowed line. In a photographic image one is not dealing with anything that can be represented by a line, but only by a surface. There are two systems which may be employed to produce the effect of light and shade lying on a surface, but even then the two systems blend together by the fact that the continuous surface at one end of a telegraph wire has to be represented at the other by lines more or less closely ruled parallel to each other. Bains's system of the transmission of handwriting by telegraph may be modified to reproduce a photographic image. In this system, the paper, with the writing to be transmitted, was placed beneath a pointer connected with the telegraph wire, and made or broke electrical contact, according as the blank paper or the writing came beneath it. The paper at one end moved at a fixed rate, and at the other the paper was made to pass beneath a pointer at a similar rate. At the other end, and when contact was made, or broken, at the one station, similar contacts were made at the other, marking the paper when contacts were made. By passing the sheet of paper on which the writing was made in parallel lines beneath the pointer evidently a sort of *facsimile* of the writing was produced. By a modification of this plan, a photographic print might be, in a measure, reproduced; for instance, by causing the lights and shades of a photograph to offer more or less resistance to the passage of the current. By this means greater or less blackening of a properly prepared paper might be caused, and produce lights and shades represented by parallel lines.

A Dream and Nothing More.

The use of selenium, which alters its resistance to the passage of a current, according to the intensity of light acting on its surface, has also been suggested as a sensitive surface. This sounds very nice, but unfortunately a telegraph wire will not discriminate between the currents transmitted from one part of a surface and another. Hence, its connexion with the telegraph wire for this purpose is useless. By acting somewhat

on the same plan as that adopted by Bains, an image thrown on such a surface might be roughly transmitted, but it would bear but little resemblance to a proper photograph, and it is doubtful whether it would be practically, or even scientifically, of any use. Othere plans based on the same principles might be suggested, but they all must fail, and until such a time arrives that one small wire will transmit an infinite number of small currents coming from different parts of a surface, and record them simultaneously on a surface at the other end of the wire, in proper order and magnitude, the idea of practical photography at a distance is a dream and nothing more.

LIGHT AND SHADE.

One more point is that photography can never be strictly truthful as regards light and shade. If the high lights in a photograph be accurately depicted on a paper print, the shades will be found wanting in correctness. This is an inherent defect in photography, even when black and white have only to be reproduced. But besides this we have another inherent defect, in the difficulty in portraying colours in proper relation to one another. A photographic plate is more sensitive to some colours than it is to others; and although modern improvements have lessened this defect, and may still further minimise it, yet the want of truth in rendering shades correctly must always remain. Perpetual motion will probably be a thing of the past when truth in photography is still non-existing.

W. DE W. ABNEY, CAPT., R.E., C.B., D.C.L., F.R.S.

—*Daily Graphic.*

IMPROVED BURNISHING ROLLER.

WE give below a cut of an improved hot burnisher constructed by Mr. Leutner, of Vienna. As will be seen, it consists of a pair of rollers, the



lower one of which is hollow, and is heated from the inside by a suitable gas burner, or by a spirit lamp, the products of combustion passing out through a small chimney. The pressure on the print is applied by two very strong spiral springs, one at each end of the roller, and both working simultaneously by means of a chain connecting them. This appears to us to be a burnisher of great excellence, and as it cannot scratch the prints, we hope to see it generally introduced in this country. Mr. C. A. Budowsky, of Guildhall Chambers, is the agent.

NOTES FROM NEWCASTLE.

THE late meeting of the local Society produced an interesting discussion on various processes of "printing"—silver-bromide, carbon, platinotype, aristotype, &c., being treated of by various speakers, the general taste being apparently in favour of platinotype. A question was asked relative to the pink colour occasionally seen in aristotypes; no one apparently could explain this. It occurs to me that this tint *may* be something of the nature of "fog," analogous to the "red fog" now rarely seen in bromide plates, and caused by a laudable (?), but mistaken, idea that the film should contain rather more silver than is actually necessary.

One of the most complete and commodious studios in the North is that belonging to the well-known firm of Armstrong, Mitchell, & Co., and at present presided over by Mr. J. E. Goold, whose name figures occasionally in "prize lists." It is now some time since I saw the inside of this studio, and I believe some improvements have been effected in recent months; but as I saw it during a brief business visit to the *late* Mr. Goold, I was impressed very much with the excellent and business-like character of the place; in fact, I believe the studio was designed by Mr. Goold, or, at any rate, to meet his requirements. The suite of rooms occupies the entire upper floor of the new offices of the Company—the draughtsmens' offices, managers' and directors' rooms being below—and is connected with the ordinance department of the works. We first enter a spacious room used for mounting, rolling, and finishing off prints. A 26 × 20 rolling press is a conspicuous object here, worked by hand; and at the time there was some idea of having steam power attached. Hundreds of 12 × 10 and 15 × 12 prints being required, we see a profusion of drying and blotting boards, but each print is rolled before delivery to the office.

The next portion of the studio is divided into three rooms—a small room devoted to retouching, and such work as "blocking out;" out of this opens the first dark room, leading to the second, where the ordinary developing work is done. Each is admirably fitted up, and the second one has all the necessary conveniences in the shape of dark closets, shelves, benches, and a good size sink. The rooms are all warmed with hot-air pipes—a luxury seldom met with.

We next arrive at the "glass house" proper, fitted with blinds, however, and having a good variety of printing frames, mostly swung on stands, from the modest half-plate, through the various sizes, to a leviathian eight feet by four, a splendidly made frame in mahogany, having its own tramway and a balcony. One side of the room is fitted with doors to allow this monster to pass out. I believe the cost of this Jumbo amongst frames was something like 100*l.*, and is so nicely made and balanced that it is as easy to work as a 12 × 10. This frame is used chiefly for "tracing," but as the back is what one may term "multiple hinged," 12 × 10, 15 × 12, and other size negatives can be printed here, all together if required; a thick felt backing is used, and of course thick plate glass.

The fourth room, lighted on one side from the glass house, is used for the various operations of toning, fixing, washing, &c. A series of porcelain sinks occupies one side, each sink measuring about 24 × 18 × 9, and is provided with its own tap and waste pipe. I noticed two of these sinks with an extra waste pipe, leading, I should imagine, to a tank for residues, an important item, no doubt. This room is easily converted into a semi-dark room for the purpose of developing the reproduced tracings, &c. At one end of this room are two tanks, end to end, each eight feet by four; one for developing and the other for washing these large prints, which are afterwards hung over rollers here to dry. I always thought the handling of plain salted paper when wet a ticklish matter, but this is child's play compared to the manipulation of, say, thin wet tissue paper. However, I was told the prints were seldom torn. During the last two years the demand has been largely for bromide prints printed with white margins and on thick paper for binding with pamphlets. To meet this, M. J. E. Goold devised a simple arrangement for easily and rapidly making the exposures, enabling him to execute quickly—generally the same day—an order for a few dozen of prints. In the door between the two dark rooms is fitted a sloping board, in the centre of this is an aperture, with rebate to hold the necessary negative, and provided, of course, with hinged pressure frame; underneath this is hinged a piece of millboard, which is weighted, and forms the exposure shutter. The operator seats himself at the desk, having a supply of paper on one side and a receptacle for the exposed pieces on the other; a ruby lamp gives light to the operations, and a clock showing seconds is also within sight; he opens the frame, adjusts a piece of paper, replaces pressure board, pulls a cord, which opens the shutter, gives the necessary exposure, releases the cord, thereby closing the shutter, changes the paper, and repeats the operation. Mr. Goold has on occasions printed thirty per hour (15 × 12), and rarely has any spoiled prints. Development is, of course, effected in the ordinary way: a dish of clean water contains the exposed prints face down; as they are developed they are handed to an assistant, who places them in the clearing bath and finishes them. An order received in the morning can thus be completed, if necessary, by the evening and post time, the artificially warmed rooms being a great help in drying the prints.

In his admirable manual of photography will be seen a reference to wide-angle lenses by the late Mr. Jabez Hughes, and advice given somewhat similar to that by the celebrated Mr. Punch to persons about to marry. Mr. Hughes's book was my first tutor, and consequently I have great respect for his opinions. The advice is to "avoid, if possible, the use of these lenses, as they are dangerous tools to use." This implying "distrust" of what I consider a very valuable instrument may account for the fact that I find this lens comparatively little used. I speak more particularly of the wide-angle rectilinear lens. I very rarely meet with this lens on the premises of my professional friends, and those who have it do not speak in terms of much respect; they complain of lack of illumination, a falling off at the corners, and other "high crimes," and to raise the front meant failure. I confess at first my experience was similar, until by some lucky chance I reversed the order of things, and screwed the lens (a 15 × 12 wide-angle rectilinear, back focus about seven and half inches) to the *inside* of camera instead of to the front; that is to say, with the back and small combination of lens to the subject, and the large front combination to the plate. The result was in every way admirable; the lens covered the plate, with something to spare, and with the front raised; the illumination was even, and I thought the unavoidable distortion, or rather exaggerated perspectives, not so marked. I have since used the 7 × 5 wide-angle of another make frequently on a whole-plate with equally good results. I am referring, of course, to interiors, and I always rig up a sunshade of some sort in front of camera to prevent "glare." This method I don't pretend to claim as original, but no one that I have met seems aware of this. I think I can safely recommend this way of using the wide-angle rectilinear to your readers.

The award (Crystal Palace Exhibition) in the challenge cup competition has caused great dissatisfaction here, from the fact that about two-thirds of the pictures sent by the Newcastle Society were not shown to the

Judges. The local Association sent over a hundred pictures, divided between ten exhibitors, who for the purpose of this competition had been selected in open meeting. These gentlemen are all medallists, and number amongst them nearly 150 awards; in fact, the majority of the exhibits were medal pictures. Of the ten four are amateurs, and six, including Mr. Pike—who, however, is by vocation a chemist—professionals. Six of the number competed in the open classes, and four have been awarded medals; the other two competed in classes not yet adjudged. It will be interesting to know what explanation is given in reply to the protest which I hear has been entered by the local men. D. D.

Foreign Notes and News.

Artistic and photographic circles in Düsseldorf have just experienced the loss of their most venerable and one of their best-known members—Herr Matthias Radermacher, who died recently at the ripe age of eighty-six. The deceased was educated as an artist in the well-known Düsseldorf school of art, under Wilhelm von Schadow. He subsequently devoted his attention to photography, and made a speciality of reproducing oil paintings. The productions of the so-called Düsseldorf school of thirty or forty years ago have been largely reproduced and sold by him. Herr Radermacher was born at Bonn in November, 1804.

The *Wochenblatt* mentions an article by Herr von Gothard as occurring in Eder's *Jahrbuch*, dealing with the subject of halation from the back of plates. Herr von Gothard, it appears, recommends the coating of the back of the plate with lampblack, a suggestion made a good while ago in the pages of this Journal by Professor Morize. The *Wochenblatt* further describes Herr von Gothard as attributing the halation to *total* reflection from the back of the plate. Surely this must be a printer's witticism! How total reflection can take place from the back of a plate under the angles of incidence usually occurring in photography, or, indeed, under any circumstances from the back of a plate with parallel sides, it is beyond the powers of unassisted human intelligence to say.

The same subject came on for discussion at the last meeting of the Berlin *Photographischer Verein*. The lampblack arrangement was not very incorrectly described by Dr. Meydenbauer as a "disgusting material, making everything dirty, and which one should be very careful not to touch." Herr Schüler recommended a mixture of collodion and castor oil.

The paragraph which appeared in the "Foreign" column of the Journal a short time ago concerning the unlucky German photographer who had the misfortune to suffer imprisonment and destruction of his camera for the sin of attempting to perpetuate the features of the Commander of the Faithful in Constantinople, has found its way into the pages of *Truth*, which paper seems also to have found the subject an amusing one. Altogether journalism takes a good deal of interest in photographic matters at the present day.

What is probably the first allegorical figure personifying photography has just been erected by Herr C. Baumann on the façade of his house in Dortmund. It consists of a well-designed terra-cotta female figure with one hand resting on a camera and holding a retouching pencil in the other.

The Parisian journal *La Nature* has recently published two instantaneous photographs of considerable interest. They represent the difference between the firing of two volleys—the one with ordinary powder, the other with smokeless powder. Both views were taken at the moment when the command to fire was given. The first shows a dense cloud of smoke completely shrouding the marksmen. On the second nothing but a thin gauze-like mist is visible, which will evidently disappear after a few moments completely, and could hardly be visible from a distance at all. The marksmen in the latter case do not appear to be hidden in the least.

Herr E. Valenta, of Vienna, has been examining the various kinds of commercial elemi. He finds that they are most frequently adulterated with turpentine and colophony. The best method of detecting this method of adulteration is by saponification. Thus, in order to saponify one part by weight of elemi-resin 26 to 27 parts of caustic potash are required, while to saponify one part by weight of colophon and turpentine 168 to 200 and 102 parts are necessary respectively. The East Indian elemi appears to be the most suitable, as it is fairly hard and has an agreeable smell; the American is not quite as good, but it has the advantage of making the coat of varnish pliable.

Liesegang has recently made the interesting discovery that a solution of chloride of magnesium may be employed for fixing prints on paper instead of hyposulphite of soda. The substitution is said to present the following advantages: first, the tone of the image is less altered than by the hyposulphite, so that less gold is required for toning; second, the chloride of magnesium is much more easily washed out than the hyposulphite—a very important point. According to Liesegang, washing is quite unnecessary, as the chloride of magnesium has no injurious effect. Dr. Miethe, who has made trial of the method, confirms Liesegang's statements. The bath he used was composed as follows:—

Water	100 c.c.
Chloride of magnesium	15 grammes.
Alum	2 ,,

The fixing was accomplished with considerable rapidity, and a chloride of silver collodion print received a brown colour in the bath, which, on drying, changed to brownish purple.

The last number of the *Wochenblatt* contains a valuable paper on the *Relationship of Photography to Painting*, by Dr. A. von Lima. In it the writer points out how valuable is the assistance that may be rendered by photography to both the painter and sculptor who desire to be really artistic, how the natural expression or pose of the model may be fixed by an instantaneous photograph and preserved for future use by the artist, and how the life-like character of such instantaneous views is of value in correcting artificiality and educating the perceptions to be on the alert for natural accuracy and truth. Those who have seen Frappé's *Tentation de St. Antoine*, which was grouped and photographed before being painted, will know what raciness and life this method may assist in producing.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 4134.—"Improvements in or pertaining to Photographic Cameras." A. D. Loman.—*Dated March* 17, 1890.

No. 4135.—"Improvements in Portable Photographic Cameras." A. D. Loman.—*Dated March* 17, 1890.

No. 4178.—"Improvements in or relating to Flexible Phototype Plates." G. Balagny.—*Dated March* 17, 1890.

No. 4269.—"Improvements in Photographic Printing." W. W. J. Nicol and J. Lewis.—*Dated March* 19, 1890.

PATENT COMPLETED.

Improvements in Apparatus for Holding and Exhibiting Photographs and other like Views.

No. 173.—Frederick Kitto, 3, Lower Union-street, Torquay, Devonshire.—*March* 1, 1890.

My invention relates to improvements in apparatus for holding and exhibiting photographs and other like views, and is intended for the purpose of using up photographers' waste plates by mounting photographs thereon by optical contact or otherwise.

The invention consists of a frame to receive a photograph, view, or any picture with the back portion glued to the frame to fix the aforesaid photograph or view in its desired position.

The frame is constructed of leather, cloth, linen, wood, metal, or of any other suitable material, with any degree of elaboration on the frame.

The object of my invention is to fix the photograph or view in the frame, or to fix a view or picture on the glass, after or before the glass is fixed in the aforesaid frame.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 1	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 1	North London	Myddelton Hall, Islington, N.
,, 1	Holmfirth	
,, 1	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 1	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 1	Paisley	Paisley Museum.
,, 1	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 2	Coventry and Midland	The Dispensary, Coventry.
,, 2	Edinburgh Photo. Society	Professional Hall,20, George-street.
,, 2	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 3	Bolton Photographic Society	The Baths, Bridgman-street.
,, 3	Leeds	Leeds Mechanics' Institute.
,, 3	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 3	Glasgow Photo. Association	Religious Institn.,177,Buchanan-st
,, 3	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 4	Sheffield Camera Club	Whiteley's Institute,NewSurrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

March 25.—Technical meeting.—Mr. Arnold Spiller in the chair.

Mr. E. Cocking said that having seen in The British Journal of Photography that the subject of the fading of photographs was again under discussion, he had brought to the meeting two specimens of photographs, one of which he had taken and printed thirty-one years ago. This print had not faded. It had been printed on albumen paper, sensitised on a sixty-grain bath, and toned with the mixture of gold in the fixing bath in use at that

period. The other photograph had been made four years since, and was printed on commercial sensitised paper, and toned with the acetate bath. This print had faded very much. They had been kept in similar frames and hung upon the same wall.

The CHAIRMAN thought that the quality of the albumen paper had a good deal to do with it. Some five years since he had used a particular cheap sample of albumen paper which he had sensitised himself; within two months many of the photographs showed signs of fading, and all had faded since.

Mr. CHAPMAN JONES inquired whether all the prints, mounted and unmounted alike, had faded.

The CHAIRMAN replied that the mounted ones had faded most, but all had gone to a great extent; the unmounted ones, however, had been kept in a drier place.

Mr. H. D. ATKINSON remarked that a moist atmosphere was very destructive. In some parts of Spain, where the air was generally very moist, photographs faded with great rapidity.

The CHAIRMAN inquired whether any one knew if encaustic paste had a preservative effect.

Mr. W. BEDFORD replied that it certainly was not a complete protection. He had a photograph by Adam Salomon, and two by a well-known English photographer, all of which had been treated with encaustic paste, and all showed signs of fading.

The CHAIRMAN had a large series of old photographs, three only of which were not faded; one of these was a carbon print and the two others had been treated with encaustic paste.

Mr. A. MACKIE said that Mr. A. L. Henderson had stated that he found the use of a dilute varnish of dammar in benzole exercise a preservative effect. Were there not two kinds of fading, one showing as yellowing of the high lights and the other as loss of image?

The CHAIRMAN said that the yellowing of the high lights was due to imperfect fixation. A print could be tested for this by the application of a dilute solution of ammonium sulphide, when the silver of an imperfectly fixed print would discolour in the lights.

Mr. BEDFORD asked whether the remedy that had been proposed for the want of solvent power in the hypo for certain silver compounds—the remedy consisting of the addition of carbonate of ammonia to the fixing bath—had proved a success.

Mr. J. SPILLER said that it dissolved nearly, but not quite, all the silver. The best result in that direction was obtained by the use of a very dilute solution of cyanide of potassium—half a grain to the ounce. Carbonate of ammonia proved to be the next best, but only with cyanide could he succeed in removing the last trace of silver from the lights.

Mr. T. SEBASTIAN DAVIS said that, now a great many negatives were exceedingly thin, he thought that with a good, vigorous negative, much more permanency was obtainable. Printing in the sun, also, he considered conducive to the same end. The acetate toning bath, now so generally used, originated with Mr. Hannaford adding too much soda to neutralise the gold in the alkaline toning bath, and then putting in some acetic acid to correct it. He found a good colour resulted, and afterwards used acetate of soda direct.

Mr. MACKIE inquired whether Mr. Davis considered that there was any difference in the prints made with acetate, borax, tungstate, &c.; he could find none when toned to the same degree.

Mr. DAVIS thought that the borax favoured a blue tone.

The CHAIRMAN was of the same opinion.

Mr. DAVIS added that a borax bath should be used directly, whereas an acetate bath was better after standing twenty-four hours.

Mr. W. E. DEBENHAM remarked, upon the keeping of toning baths, that he constantly found it to be assumed that the gold in them remained active until it was lost to the solution by precipitation. He had, however, observed that without precipitation, the gold passed into a state in which it either toned with great difficulty, or would not tone at all. Then, again, there might be a perceptible amount of precipitation, but what gold remained in solution might be very active. When the alkaline toning bath was first recommended by Hardwich about thirty-one years since, he directed that citric acid should be added to it, and that it should be heated until a slight bluish colouration, due to partial precipitation, took place. When cooled down, the bath was ready for use, and although the gold was originally in a dilute state, it was still active, and readily toned to the blue or grey stage.

The CHAIRMAN said that carbonic acid and hypochlorous were amongst the weakest acids, and that toning baths made with either of these, and with warm water, were the soonest ready for use.

Mr. JOHN SPILLER said that he had brought with him a number of prints—about forty—made from twenty-five to thirty years ago. In all these he could not trace any perceptible fading. They were not a selected lot, but all that he possessed of a set of prints made by direction of the War Office. The invariable practice was to use commercial albumen paper, to float on a sixty-grain bath, to tone with bicarbonate of soda, and to fix with fresh hypo. The washing was carried on for a time with a trough supplied by an intermittent syphon, and the prints were afterwards left for the night in dishes of water. They were dried before being mounted, and the mountant used was hot glue, beaten up into a froth before being applied with a brush. It was necessary to carry on this operation in a warm place. The mounts employed were of various tints, and obtained from different manufacturers.

Mr. BEDFORD considered thorough fixing more conducive to permanency than long washing. He used two fixing baths, one of twenty per cent., into which the prints were first placed, then they were removed to one of half the strength. He added two drachms of liquid ammonia to every fifteen pints of water used in making up the hypo bath. In reply to questions as to sensitising, Mr. Bedford added that it was generally said that paper containing citric acid was slow in toning. His experience was in direct opposition to this view. He prepared his paper by floating on a fifty-grain bath, which must be absolutely neutral. Any free nitric acid materially hindered toning. After floating for three minutes and being drawn over a glass rod, the paper was floated a second time for thirty seconds on a bath containing thirty grains each of nitrate of silver and of citric acid to the ounce. It was then drawn again over a glass rod to prevent dripping, and hung up to dry. This paper would keep good for months. The second bath did not require to be replenished with silver, but at the end of the day citric acid was added in about the proportion of five grains for every sheet that had been floated.

Mr. W. ENGLAND showed a dark slide which he had fitted to take celluloid films. It was impossible with these films to keep them flat when of large size, but they could be kept in shape if slightly curved. He had therefore had the dark slide so constructed as to give a slight concavity to the film, amounting to an eighth of an inch for the whole-plate size. The ends of the film being brought nearer to the lens, the focus at the margins was better.

Mr. DEBENHAM said that with a curved film and a non-distorting lens the image would be distorted to some extent; not enough to be noticeable, perhaps, in most subjects, but in architectural pictures, where the whole of the field was occupied, it might be perceived.

The discussion on celluloid films was adjourned to the next technical meeting, which, it was announced, would be held on the fifth Tuesday in April.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 20.—Professor E. Stebbing in the chair.

The SECRETARY read a circular received from the Camera Club, asking for the opinion of the Association with regard to the conduct of exhibitions.

On the first point, that exhibition authorities should decline to accept prizes offered for advertising purposes, the members were unanimously of the same opinion. On the second and third points, which were that a restriction should be placed on the number of awards, and that awards should be of equal value, the members thought they should be left for the decision of the authorities of each particular exhibition. The fourth and fifth propositions, dealing with the matter of classification and the selection of judges, were also rejected as interfering with the liberty that it was desired to leave to the management. Of the remaining points, a decided opinion was arrived at on the one relating to retouching, and on this a resolution was adopted that there should be at least one class for unretouched photographs at every exhibition. As to the proposition that every picture should be framed separately, it was felt that that must be regulated by particular circumstances, and that small photographs ought to be admitted framed together.

A communication was then read from the London Chamber of Commerce, relating to a proposed exhibition to be held in the City of London from June 1 to 15. The intention was to make the exhibition a free one as far as admission is concerned, and to pay the expenses by a small charge to exhibitors. It was requested that the opinion of the Association should be given as to the desirability of having such an exhibition, and a vote was therefore taken, which proved to be in the affirmative.

The CHAIRMAN then showed some excellent specimens of collotype printing upon unglazed paper produced by a new process by M. Balagny of Paris. The Chairman said that he had seen a dozen prints produced within three-quarters of an hour from the negative being handed in. It was intended shortly to introduce the process in London. Small presses were being made specially for the work, and answered very well, notwithstanding the price was low. The Chairman also showed some prints made in various colours by printing from several stones. The basis of the process was the bitumen method. He further brought before the Association the action of the French Photographic Society, and those of Lyons and Florence, in endeavouring to found an international exchange of dark-room accommodation to be offered to all members of photographic societies upon presentation of credentials from the Secretary of the Society to which they belonged.

The SECRETARY inquired whether the use of eikonogen developer had taken much root in France.

The CHAIRMAN said that it had not done so. For himself, he preferred hydroquinone, and had during the summer developed about nine hundred negatives, only four of which had not been good, and at a cost of about 12*s.* for the developer. The Chairman then referred to the subject of orthochromatic photography, and strongly advised photographers to prepare their own colour-sensitive plates by immersing them in a bath prepared with various colour sensitisers, according to the work to be done.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MARCH 18.—Mr. J. Traill Taylor (President) in the chair.

Mr. HOWSON, from the Britannia Works Company, gave a demonstration on *Printing on Alpha and Bromide Paper*. A large number of specimen prints on these papers were exhibited in the room. The arrangement for making the exposures consisted of two argand burners supplied with gas through a Sugg's regulator, so that the number of feet burning per hour might be known; behind this was placed one of Chappuis's circular reflectors fixed in a stand, and the light was thrown on to the negative through a screen of oiled paper. The printing frame was placed upon a stand which could easily be removed to any distance from the light, the distances being marked upon the baseboard of the stand. Mr. Howson, before commencing the practical part of the demonstration, made a few general remarks upon the development of paper prints. He said that the use of various kinds of paper on which to develop prints had been for some years coming more and more into use. Bromide paper was introduced in 1880, platinotype was only now coming to the front. The decay of silver printing had been prophesied for some years, but it was only now that we can see the end; no one wishes that end, but doubtless it was coming. Bromide paper gives a black tone, Alpha gives warm tones. A beautiful bromide enlargement was here shown, made from a quarter-plate negative and with engraving black tone. Prints on Alpha paper have a depth of tone not usual in developed prints. The advantage of being able to produce such beautiful prints by artificial light was pointed out. Printing on bromide and Alpha paper was comparatively easy, the only difficulty being the time of exposure. Study the printing quality of the negative, expose one piece of paper and see whether over or under-done, then arrange the printing frame accordingly, and the proper distance for every print from the same negative

was at once known. Mr. A. Pringle had said that bromide prints should in every case equal platinotype prints, if not, it was the fault of the workman. For platinotype printing you must have a good negative, but in bromide printing a shadow negative will yield good results, and even better could be obtained with Alpha paper. Mr. Howson then showed and explained Hume's cantilever enlarging apparatus, and showed two enlargements done on Ilford paper with it. He also passed round specimens of prints on platinotype and on Alpha paper sent to him that morning by a professional photographer in Oxford-street who had used the Alpha paper for the first time the day before. All the prints were excellent, but those on the Alpha paper were certainly much warmer in tone than those in platinotype. The lecturer and his assistant then proceeded to expose and develop several prints upon both bromide and Alpha paper. The exposures having been made with great care, the prints were developed according to the formulæ issued with the papers. In the development half the developer consisted of old developer, Mr. Howson explaining that such use gave greater depth of tone and greater latitude in developing. In the usual confined toning and fixing bath the Alpha prints seemed at first to lose a great deal of detail, but this was soon recovered, and in the end several beautiful bromide and Alpha prints were the result of the demonstration. Prints on both papers were made from a flash-light negative which Mr. Hart had made that day and had brought with him. These were most successful.

On the conclusion of the demonstration the CHAIRMAN made a few remarks on the permanence of albumenised and developed prints, and said that there was no doubt that developed prints were practically permanent.

Mr. HOWSON said that bromide paper had been submitted to the severest tests, some of it having been submitted to a current of sulphuretted hydrogen for three days, and it had come out practically untouched.

The CHAIRMAN then called upon Mr. Hart, and, to give point to the remarks of that gentleman, said a few words upon the introduction of the old into the new developer, and said it was this treatment which gave such beauty to some prints that had been sent over from Paris a few years ago. He thought the process was analogous to the introduction of the per-salts of iron into the developer in the old collodion process. Sometimes when it was found that a new developer did not act well the introduction of an old developer that had been standing on a shelf for some time caused everything to go brilliantly.

Mr. HART said that the ferric salts of iron have the property of dissolving finely divided silver. If we add sulphate of iron to a solution of silver and expose to the air till oxidisation takes place it takes a longer time to do so. There was an analogous process to this in the oxalate process. Iron acts very differently to bromide. If we use old developer we get more brilliant results. With an extremely hard, dense negative use almost fresh developer, but if the negative is soft use old developer, to prevent excessive precipitation of silver.

Mr. A. MACKIE: There is one point in Mr. Hart's remarks to be quite clear about. It was proved conclusively that old ferric oxalate acts as a reducer. Does not old developer redissolve the finer particles of silver directly they are formed?

Mr. HART: That was exactly the drift of my remarks; ferric oxalate precipitates and redissolves the particles of silver. There was an analogous process to this in the making of chloride of gold, from want of a knowledge of which many persons who made their own chloride wasted a large quantity of gold.

Mr. F. G. READER: If hypo is used in fixing these developed prints how is it that they are so permanent?

The CHAIRMAN: In the fixing of prints on albumenised paper it is hypo-sulphite of silver which has got entangled in the meshes of the albumen and takes so much trouble to remove.

Mr. MACKIE: There is no doubt that every print fixed in hypo ought to remain in the hypo a much longer time than it is generally allowed to do.

Mr. HART: We must wait a little while before we pass a judgment on the permanency of bromide prints. He would admit that all developed prints were more permanent than those on albumenised paper, but he thought that if as much care was bestowed on the fixing and washing of albumenised prints as was bestowed upon those which were developed we should not have much to complain of with regard to permanency.

Mr. PARFITT: Is hydroquinone a good developer for Alpha paper?

Mr. HOWSON: Alpha paper could be developed with hydroquinone, but stains were likely to arise. You might develop eleven prints all right, but the twelfth might be bad. He had noticed also the unequal development of hydroquinone.

Mr. MACKIE had also noticed this unequal development, even in negatives and lantern slides.

Mr. FULLER: Must Alpha paper be used quite fresh, or might it be old? He had some which he had cast on one side, thinking it too old to use.

Mr. HOWSON had used some paper four years old; the Secretary of the North Middlesex Photographic Club had used some that had been to Burmah twice. It must, of course, be kept quite dry.

Mr. READER: Have you used magnesium ribbon to make the exposures in printing?

Mr. HOWSON: Yes; three to five inches with small negatives.

Mr. L. MEDLAND: Direct or through a screen?

Mr. HOWSON: Direct for small negatives, at about twelve inches.

The CHAIRMAN then announced that the meeting on April 1 would be a lantern night, at which Mr. Reader would take the chair; and on the 15th inst. he should be happy to give them a paper on *Stereoscopic Photography*.

THE LANTERN SOCIETY.

OUR readers will be interested to learn that the above Society has been most auspiciously inaugurated. A highly representative meeting was held last week at St. James's Hall, when a set of efficient rules, which had been most carefully drawn up, was adopted. The prospectus or programme of the Society's work as shaped by the Executive embraces, amongst other things, the interchange of or provision for an interchange of slides between members of town and country; concessions in the shape of better terms from makers and dealers of slides, lanterns, and apparatus, together with an interchange between various clubs or exhibitions.

The following is the list of the Council as far as appointed:—*Chairman:* The Hon. Slingsby Bethell.—*Vice-Chairman:* Mr. T. H. Holding.—*Secretary and Treasurer:* Lieutenant C. E. Gladstone, R.N., Northwood Hall, Rickmansworth; together with Messrs. G. S. B. Cresswell, E. V. Hall, W. Macklin, Maw, A. N. Sheppe, and E. R. Shipton.

The annual subscription is a guinea, the entrance-fee a guinea, and for country members it is ten shillings and ten shillings, but all joining the Society before October 1 are admitted without entrance-fee, and all subscriptions will free members up to October, 1891.

HOLBORN CAMERA CLUB.

FRIDAY, March 21, was devoted to the instruction of beginners, when the first principles of bromide, silver, and platinotype printing, and of development, were expounded to an appreciative audience by Messrs. Dear, Bayston, Brocas, and Smith.

Friday next will be the usual monthly lantern night, when visitors will be welcome. After the slides have been shown the prizes won in the recent competition will be presented.

HACKNEY PHOTOGRAPHIC SOCIETY.

MARCH 13,—Dr. Gerard Smith (President) in the chair.

Mr. Birt Acres was elected a member.

The CHAIRMAN then introduced Mr. J. TRAILL TAYLOR, who said he would not give a formal lecture, but, as the circular had it, a "talk" on photographic optics, and he would make it as informal as possible. After showing wherein the optics of photography differed from all other kinds of optics, and giving a *resumé* of the history of photographic lenses from the earliest period to the present time, he said, when speaking of the properties of the various lenses, that the Petzval portrait combination was much the most rapid in action that had yet been introduced, as it could be made to bear a far larger angular aperture than any other; but for out-of-door or landscape work, in which the employment of a small diaphragm might be necessary, it was inferior to others, because by the employment of a diaphragm it gave an offensive flare-spot in the centre of the picture. For landscapes it was, therefore, better to use lenses constructed for the purpose, although even with these if the stop were not fixed at its correct place a flare-spot might result. He showed a small casket landscape lens of which the focus could be either five, seven and a half, or ten inches, according to which lens from the casket was placed in the mount, in which there was a draw-tube to separate the stop from the lens, according to which one was selected. Explaining the optical reason why landscape lenses gave distortion, he said it might be practically eliminated by using lenses of small diameter or placing the stop close to the lens, more especially if only a moderate angle of view were included in the picture, although a smaller stop would under such circumstances have to be employed in order to get the best marginal definition, as unless the lens were of a deep meniscus form good definition at the sides of the plate with a large stop was favoured by increasing the distance between it and the lens. At the present time it was probable that no form of lens was more used than the so-called rapid cemented doublets, which, although similar in form to each other, bore as many different names as there were makers of or dealers in them. When well made it formed a useful class of lens, as with full aperture it could take portraits or groups in reasonably quick time, while when stopped down it served as a copying and architectural lens. Its peculiarities and failings were then treated, and means of obviating the latter suggested. The various aberrations to which lenses are subject were illustrated and explained by diagrams on the blackboard.

The Chairman, Mr. H. Crouch, and others followed with remarks and questions, to which Mr. Taylor replied.

SHEFFIELD CAMERA CLUB.

MARCH 12.—A lecture was delivered by Mr. H. W. SMITH, the representative of the Eastman Company (Limited). The first part of the evening was taken up by the explanation of the enlarged Kodak camera, the roller slide, and new transparent films. Mr. Smith then proceeded with the main subject of his lecture—*Enlargements on Bromide Paper*. After detailing the most suitable lights, developers, &c., he gave a practical demonstration on the Eastman paper, explaining step by step the process.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

MARCH 19,—Mr. Paul Lange (President) in the chair.

The second of the series of practical demonstrations, mainly for the instruction of beginners, took place as arranged. Mr. J. L. Mackrell was the demonstrator.

The next demonstration will take place on Wednesday, April 2, embracing the important phase of developing, when three different modes now in popular use will be treated in a practical way.

LIVERPOOL UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

MARCH 17,—Dr. Kohn (the President) in the chair.

Dr. F. HURTER read a paper on *Recent Photo-physical and Photo-chemical Investigations*, giving the result of several years' work done by himself and Mr. Driffield. After explaining how light was absorbed by passing through dark and coloured media, and obtaining definitions of transparency, opacity, and density from the observed phenomena, Dr. Hurter went on to describe an instrument for measuring the density of negatives. He exhibited two forms of this instrument, the later form being much simpler in construction and easier to manipulate than the earlier one. The instrument is essentially a Bunsen's photometer graduated so as to give at once the logarithm of the opacity, a

quantity best suited for the plotting of the results on a curve. In studying the effects of developers, a plate was exposed and cut into six pieces, and for each piece the amounts of the various constituents of the developers were varied. In this way he found that a certain amount of pyrogallol was necessary for development, while more was injurious to the plate. The larger the amount of ammonia the denser is the negative, and ammonia will even develop an unexposed plate, and is, therefore, capable of fogging the negative. Dr. Hurter further went on to show that ammonium bromide simply prolongs the time of development and does not influence the density, the prolongation being due to the fact that the ammonium bromide makes the silver bromide less soluble in ammonia. The only cure for an over-exposed plate is to develop rapidly but not densely, and then intensify. All these points were illustrated by curves and photographs. The effect of exposure on the sensitive plate was next explained, and it was shown how, after a certain point, the density of the negative diminished as the time of exposure was increased, till, finally, the period of reversal was reached and a positive obtained. Several exceedingly fine plates demonstrating this effect were shown to the meeting. The fact that the gradation of the negative was true to nature was shown to be due to the opacity of the plate, and the fact that the silver first formed screens the rest of the bromide or iodide on the plate. The exposure curves were calculated for thickly and thinly coated plates, and the result obtained with plates specially prepared agreed well with those calculated. The result was that the thinner the film the harder it is to hit the right exposure, and that in very thin films the period of under-exposure passes at once into that of over-exposure. It is better to use a silver salt whose absorption coefficient is not very great and to use many molecules, than to use a salt whose coefficient of absorption is great and of which fewer molecules are used. Silver iodide is of the latter class, and in iodide plates everything is done at the front of the film. From these results, by trying a plate in the dark room, it is possible to calculate the correct exposure for any light, and a couple of very fine negatives exposed by calculation in this manner were shown.

A slight discussion followed.

DEVON AND CORNWALL CAMERA CLUB.

March 17.—A lantern evening.

Mr. S. Weekes exhibited about two hundred slides of his own making and from his own negatives, making appropriate remarks upon each. Some of these observations, explanatory of the manner in which the subject had been "caught," were productive of considerable amusement, and were greeted with applause by the audience. Mr. Weekes showed untouched specimens of his earlier work as well as that done when he had gained more experience, in order that he might thereby give encouragement to beginners, who might be down-cast if they thought that no one else had failures but themselves. A large proportion could, however, by no means be thus classed, but were, on the contrary, of high artistic merit. The lecturer led the company from Plymouth to the South of France, thence to Venice, Rome, the Italian lakes, Switzerland, and back to Devon and Cornwall, winding up with groups of persons associated with the Club, either as members or friends.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

FADING OF SILVER PRINTS.

To the Editor.

Sir,—I am glad to see your pages open to discuss the much-vexed question, viz., the fading of silver prints. I fully sympathise with "Nonpinssed" in his troubles; I will be pleased to give some ideas, in hopes that it may help to elucidate the mystery. I believe the causes are numerous, and hence the difficulty of diagnosis.

In the first place, it has always been advocated to use a strong printing bath, say from sixty to ninety grains to an ounce, and to float a short time in order to keep the image on the surface. Now with such a procedure it is evident that a mere superficial picture cannot be so permanent as one more in the substance of the paper. It is generally admitted that plain paper photographs are more permanent than albumenised ones. If we use albumen paper, not too highly salted, floated for five minutes on a twenty to thirty-grain silver bath, to which is added forty grains of nitrate of soda, we will find that we have a double print—one in the paper and another on the albumen. The resulting print should be more permanent. Slow printing—or rather, I should say, slow reduction of the silver to the metallic state—is conducive to brilliancy, depth, and permanency. Nowadays there is a tendency to thinness of negatives with a corresponding loss of silver in the prints.

Your correspondent reminds me of a pupil I had who was very careful in making emulsion. He succeeded well up to a point, but invariably failed by fogging by light before or during coating. "Nonpinssed" seems to have taken great care in all his operations, even to drying the prints in "thick, clean, white blotting paper pads, supplied for the purpose." Is he aware that thick white blotting paper is very impure? The grey, which is purposely made for filtering purposes, is not reliable. I have found a new nitrate-silver solution turn flocculent and turned and blacken after filteration.

On looking at some photographs at Christ Church the other day, I was interested to notice some that were mounted in optical contact fading very much in some portions; the air had not been perfectly excluded. These air spots had not altered very much, showing that probably the gelatine had not been pure. Gelatine for enamelling purposes should be washed in a weak solution of ammonia and water, and then well washed before melting up. *Apropos* of preserving prints, the discussion might include the preserving of gelatine negatives. I have never found a suitable varnish. Experiments lately made on some valuable negatives taken in the West Indies promise well. I simply coat the negatives with plain collodion, then warm the plate, and rub over some beeswax softened with turpentine (wax, one part; turpentine, six parts); polish the wax off with a soft rag. The surface never gets sticky, seldom gets rough, and then can be easily smoothed with the wax again. I have soaked test plates in water for days without showing the smallest indication of blistering or deterioration.—I am, yours, &c.,

Heather Dean, Bournemouth, March 23, 1890. A. L. Henderson.

To the Editor.

Sir,—Some years since I was very much annoyed by finding my prints go spotty very soon after being mounted. I tried every means to stop it, but without avail. I noticed that it was principally in my vignettes, the spots showing themselves round the soft parts the next morning after being mounted. We were in the habit of mounting them at night and leaving them to dry (ready for rolling) until the next morning, when, it being winter time, they where still slightly damp.

It struck me, after trying many experiments, that perhaps the fact of leaving them damp so long was after all the cause, so tried the next batch by drying them at once directly after mounting, and to my very agreeable surprise found we had stopped the fading. In every case where my friends have found their prints fade I have invariably found they were in the habit of allowing their photographs to dry spontaneously, winter and summer alike, but upon drying them quickly have got over their trouble and thanked me for the hint.

I am certain if photographers were to dry the paper rapidly after sensitising, well wash their prints in a running stream for two hours only, mount with freshly made starch (made by well boiling in a saucepan), and again dry the prints rapidly after being mounted, they would to a very great extent get over the vexed question of fading. I might add, that in my establishment every print above *carte-de-visite* size is washed separately on a sheet of glass, by being squirted on both sides from a rubber pipe screwed on to the tap before being placed in the running stream of the washing tank.—I am, yours, &c., G. A. Oldham.

Colchester, March 24, 1890.

To the Editor.

Sir,—May I suggest as a possible, though not probable, cause of this serious trouble, that commercial sugar always contains a small percentage of sulphur which it is almost impossible to get rid of by purification? Besides this accidental impurity, sugar refined in this country is often, if not always, mixed with a little ultramarine to give it a fine blue-white shade. As ultramarine contains sulphide of sodium, this also might contribute to the mischief. Of course the quantity of sulphur which could reach a print by this means is extremely small, but I think we do not yet know what weight of matter is used in forming the image of a silver print, so we cannot for this reason put the explanation suggested out of court. Starch also frequently contains ultramarine.—I am, yours, &c., C. I. Burton.

7 *Montpelier, Edinburgh, March* 21, 1890.

To the Editor.

Sir,—The question as to how we can make our photographs more permanent is no doubt a deeply interesting one. There is one thing certain, that photographs produced now are nothing like so permanent as those which were produced some years ago; and what is the reason? Science has made so much progress (?) within the last few years that the most objectionable and useless material can be so metamorphosed that our paper, our cardboards, our chemicals, in fact nearly everything we use, are not what they seem to be—the essence of purity.

I have at the present time a photograph which was produced in July 1856, and, with the exception of a slight yellowing of the whites, it is as good now as when it was first printed; there was no particular care (nothing like the care taken now) in either fixing, washing, or mounting, but the materials used in its production were very different to what are used now; in fact, such materials cannot now be obtained. The paper was Canson's, albumenised by myself with albumen from *new*-laid eggs: not eggs that had been in pickle for two or three months and then sold for new-laid, but *bond fide* new-laid ones; the albumen was well salted with ammonium chloride; the silver bath was sixty grains to the ounce; the hypo was good, honest material, costing at that time, not 6*s.* or

9*s.* per hundredweight., but about 1*s.* per pound; the gold chloride was home-made; the print was toned and fixed in the old hypo and gold bath, washed in repeated changes of water, left in water all night, changed again two or three times next morning, then blotted off and mounted with best gum arabic—and here it is to-day nearly as good as ever. I may here remark that the gum arabic of to-day is not the same that it was in the good old time, neither can it be obtained, for it is now so much bleached with acid that a perfectly neutral solution of it cannot be made. Years ago it was always neutral when first mixed; but let any one now make a solution of the best white gum arabic, and then test it with litmus, and he will soon find how much acid has been used in bleaching it.

I have also a bundle of *cartes* produced about twenty-seven years ago, as good now as then; these were printed upon paper albumenised by the late John Spencer, of Goldhawk-terrace, toned in the acetate bath with Sutton's neutral chloride of gold, then fixed and washed as usual, and mounted with gum on ordinary Bristol boards. The paper for these, I imagine, was well salted, as it required a sixty-grain bath for sensitising. The price of it was very different to what paper is to-day; I cannot remember with certainty the price, but so far as my memory serves me, it was about 8*l.* or 9*l.* per ream; the surface, too, was very different—none of the fictitious glaze of to-day, and which glaze is impossible to get with pure albumen from new-laid eggs.

The fact is, the price of nearly everything used in our art is too much reduced to allow of the very best and purest materials being used. My experience tells me that—1. We should carefully avoid all German albumenised papers, and especially that which is called double albumenised or enamelled, for, as I have said before, it is impossible to get such a very high surface with pure and fresh albumen. 2. To have nothing to do with paper the chief recommendation of which is that it requires only a thirty or not more than a forty-grain silver bath. 3. Avoid ready sensitised paper; I would recommend any one to moisten with one drop of pure distilled water a small piece of this paper, then attach to the paper a small piece of litmus, and note the result. 4. To use neutral chloride of gold in the toning bath; most of the gold sold is *very* acid; the acid penetrates the paper so very thoroughly during toning operations, that it is not got quit of with the slight washing the prints receive between toning and fixing, consequently there is great danger of sulphur being released and deposited in the paper when the acid prints are put into the hypo, and which no amount of washing will get quit of afterwards. 5. To avoid brown tones. 6. When mounting, have nothing to do with German mounts or boards, and especially fancy-coloured mounts, neither any so-called gold printing. I am quite willing to admit that fancy coloured mounts and gold printing very much improve the appearance of the picture when first produced, but permanence should be our first study; even cream-coloured mounts are bad, for the prints in the course of a short time absorb some of the cream tint, and this destroys their purity. 7. Have nothing to do with cheap hypo—there is a lot of rubbish in the market (I can remember hypo 3*s.* per pound). Lastly, in mounting use freshly made starch, avoiding the very white, as this is acid; make no addition to the starch, such as sugar, as this does no good, and possibly does harm.

In conclusion, I will just add that I have long been of opinion that Mora frames are very bad for photographs. I have proved that the prints fade very quickly in them.—I am, yours, &c.,

A Photographer since 1850.

To the Editor.

Sir,—The disquietude respecting photographic printing lately has been considerable, and will certainly continue unless some very decided change takes place both as regards the manufacture of the paper used for printing, and the cardboard used for mounting photographs on. All paper naturally turns yellow in time, as will be found in old engravings. I have some hanging in my room now. This can be entirely removed by a solution of lime, leaving the engraving perfectly pure and *intact*.

The other day I placed two sheets of ordinary mounting boards in the strong sun, one sheet merely covering half of the other. At the end of four days, on removing the top sheet, I found the covered part quite white, the exposed part having gone *very yellow*. Now what does this suggest? That the paper is very sensitive to the action of light. How is this? The manufacturer of paper could give a very certain reason no doubt. Can you or any of your correspondents render a cause?

I believe one cause of the *increased* fading is fixing *too many* prints in the same dish. Use three dishes instead of one, and constantly move them about, holding *every* print *up to the light* to see that it is *perfectly transparent*. *Then* it is fixed, *not till then*. I know, as a fact, too long washing is a fatal error. Constant and rapid changes of water is the only right and certain method.

This must be done *conscientiously* and *honestly*, however. I have a large photograph *framed* for thirty years; the photograph itself is as *good as ever;* it has gone *very slightly* yellow, hardly to be noticed. Such an instance is rare I am sorry to say—still, there the fact is—ever since the *carte-de-visite* came in prints have been less stable, from their number and the haste they were done in.

I wish, Mr. Editor, I could induce you to commence a crusade against hypo. Would some coming substitute for it be more extraordinary than the introduction of dry plates? Kindly do take *this* subject in hand.—I am, yours, &c.,

A Photographic Artist.

Cheltenham, March 22, 1890.

TEMPERATURE OF FLAMES.

To the Editor.

Sir,—Mr. Scott has missed the essential factor in his calculations of the temperature of various flames. The heat of combination, specific heat, &c., are of very small importance in comparison with the temperature at which the gaseous products of combustion are dissociated into their elements. Clearly the combustion of hydrogen and oxygen cannot produce a temperature quite so high as that at which water is completely separated into its component gases. I do not know of any accurate data with reference to this subject, but I believe that water is completely decomposed below 2000° C., and that carbonic acid is decomposed into carbonic oxide and oxygen at a very much lower temperature. To decide the problem we would need to have the temperature at which carbonic oxide (CO) is dissociated. This temperature is undoubtedly high, and may be even above that at which steam yields. I have said that I do not know of any accurate data on these subjects, and I have not time to seek through the extensive literature of thermochemistry on the chance of finding it. Enough is known, however, to enable us to assert that the temperatures stated by Mr. Scott are at least three times too high.—I am, yours, &c.,

C. I. Burton.

7 *Montpelier, Edinburgh, March* 21, 1890.

STEREOSCOPIC VISION.

To the Editor.

Sir,—This discussion has now got into a condition such as does not promise much further light to your readers. My extracts from Kirkes' *Physiology* were made with the intention of showing that Mr. Pringle was quite wrong when he thought such material would be discussed in elementary text-books on *Optics*. Mr. Pringle cleverly fires off rockets to divert attention from the point under discussion, which of course is quite legitimate, only it is apt to leave the impression that Mr. Pringle is not willing to stand his ground.

The essence of the controversy consists of the following statements, upheld on the one hand and denied on the other:—1. That two identical pictures yield to, or induce in the mind, the impression of solidity when viewed with or without the stereoscope; that they, therefore, do yield "stereoscopic" impression. 2. That on looking at a single picture with one eye there is induced a more solid impression than when viewing the picture with two eyes, and this in virtue of the absence of the idea of surface which is suggested or induced by the power of two eyes to localise or measure distance. Other statements on the one side are built on these two, keeping in view also the additional fact of the special power possessed by the eye of measuring distance by muscular focussing action alone. There is nothing new in this; it is quite old and established. Mr. Pringle evidently is a large believer in text-books. All within a text-book is true; everything that is *not* in a text-book is not true. Will Mr. Pringle allow me to say that there are many true things not to be found in text-books, and further, that it is safe not to pin one's faith too closely to what *is* found in them?

In reply to Mr. Evans, I may say I consciously revel in very perfect eyesight; both my eyes have equal focus, or very nearly so, and are normal in other respects; I am conscious of very precise and clear vision at close quarters, as well as for distance, for which powers I am thankful. —I am, yours, &c.,

G. D. Macdougall.

SAFETY OF OXYGEN CYLINDERS.

To the Editor.

Sir,—Since your recent articles and letters on the above subject we have carried out several trials with oxygen cylinders, and have found that they will resist very much more ill-usage than ever we anticipated, and many blows dealt with the full intention of destroying the cylinders simply flattened or bent them, as you will see from the enclosed report. If you will take into consideration the weight necessary to deal the blows given during the trials, and the weight of a cylinder, it will be found that to produce the same effect a cylinder would require to be thrown from a height of several hundred feet.

We shall be pleased if you can give the account of these trials space in your valuable Journal, and feel that by so doing you will bring the matter before those most interested.—I am, yours, &c.,

Henry Brier.

The Scotch and Irish Oxygen Company, Limited (Brin's Process), Rosehill Works, Polmadie, Glasgow, March 20, 1890.

The report alluded to by Mr. Brier is as follows:—

"A series of experiments were conducted at Stevenston by the Scotch and Irish Oxygen Company Limited (Brin's Process), for the purpose of demonstrating the absolute safety of their cylinders for containing compressed gases. It will be remembered that a fatal accident occurred to the foreman of their

works at Polmaise by the bursting of a cylinder some six weeks ago, and the impression was conveyed to the public that the explosion was due either to some defect in the cylinder, or to its strength being overtaxed by being charged to an excessive pressure. A thorough investigation was, however, made into the cause of the accident, and the facts disclosed left no doubt that it occurred through a mistake on the part of the unfortunate man himself. It was clear that he had introduced oxygen into a cylinder which was already partly charged with hydrogen, these gases forming an explosive mixture when brought together. One fact especially which pointed at once to this conclusion was that the main portion of the exploded cylinder, found almost on the spot where the accident occurred, was almost too hot to be touched; whereas the portions of cylinders which have since been intentionally burst by being subjected to excessively severe treatment were found to be perfectly cold. In consequence of this erroneous impression it was thought advisable to subject the cylinders to an exhaustive series of tests, so as to prove beyond dispute that they are thoroughly adapted for the purpose of carrying the gases and capable of withstanding the most extreme amount of rough usage to which they could possibly be subjected during transit from place to place. The cylinders used are of different sizes, varying from 1 foot long by 3½ inches diameter to 6 feet 6 inches long by 5½ inches diameter. They are made of mild wrought steel a quarter of an inch in thickness, and before being used each cylinder is subjected to a hydraulic test of at least twice its working pressure, and is afterwards stamped with the pressure to which it was subjected, the date of the test, and the test mark. The cylinders are re-tested periodically, and for the purposes of safety the custom of the Company has been to paint these for the different gases in distinctive colours, so as to avoid the danger of mixing. As a further precaution, every cylinder which is brought into the works after having been in use is at once emptied. To make the recurrence of such a misfortune as the recent accident absolutely impossible, it has been decided to adopt a left handed thread for the valves on the hydrogen and coal gas cylinders, so that by no possible inadvertency can they be filled at the oxygen pumps. A number of experiments were made about ten days ago which gave excellent results. A 6 foot 6 inch cylinder, weighing about 1 cwt., was twice raised to a height of 35 feet and dropped horizontally upon a solid iron block 12 inches square and weighing 3½ cwt., each blow bending it to the extent of about three-quarters of an inch. It was then dropped vertically on to its round end, having a clear fall of 31 feet, when it was found that the impact had only flattened a part of about the size of a penny-piece. It was next placed across the iron block, and an iron weight of 6½ cwt. dropped on to its centre from a height of 26 feet, the blow crushing in the side to the extent of seven-eighths of an inch. The cylinder was subsequently placed on two iron blocks, set 4 feet 1 inch apart so as to support the ends, and the same weight again let fall upon it from the same height, with the result that it was bent 4½ inches from the straight, but did not explode. Another cylinder was afterwards tried in the same manner, with the exception of the crushing blow, and in this case even a more satisfactory result was obtained, as it was bent to the extent of 7½ inches by the bending blow and still remained intact. A smaller cylinder, measuring 31 inches long by 5½ inches diameter, containing 17 lbs. of liquified carbonic acid gas, was also dropped crossways and vertically from the same height, and was afterwards flattened to the extent of 1½ inches by dropping the 6½ cwt. upon it, without injuring it otherwise than in shape. Each of these tested cylinders were subsequently found to contain the full quantity of gas, and to be perfectly sound. Yesterday's experiments were of a similar character, and were equally satisfactory. A 6 foot 6 inch cylinder, weighing 107 lbs., including the contents, was dropped four times across the iron block from a height of 35 feet, these trials producing a bend of 2½ inches. It was also allowed to fall on its end, with little perceptible result. A smaller cylinder was treated in the same manner, and sustained no greater injury than a few dents. From these particulars it will be seen that the tests were eminently satisfactory, for it is inconceivable that such cylinders during transit could undergo anything like the severe treatment to which they were subjected, while it was evident that they still possessed a considerable reserve of strength."

[This subject is of such vital importance to photographers that we have given the report *in extenso* as it appeared in the *Glasgow Herald* of the 13th inst.—Ed.]

THE BURSTING OF A GAS CYLINDER.

To the Editor.

Sir,—I have been anxiously waiting to see if any further scientific evidence would have been forthcoming to satisfy the minds of the "Lantern Public" about the above, as I consider that up to the present the information offered has been meagre in the extreme, and not at all calculated to allay the minds of those who use *cylinders*; in fact, it seems as if those interested in the sale of gases are wishful for the matter to drop, or one would have thought that they would have let no stone be unturned until *satisfactory proof* had been forthcoming as to the *cause* of that explosion. It is quite evident that the pressure tests are a fallacy if cylinders are liable to burst up with such frightful results, and not be able to define the cause. I very much question if steel is the best material to use, for it is strongly condemned for use in gun barrels, cases being brought to notice of their suddenly bursting with very serious results after a short time in use, even when they have passed all the Government tests. Take a case recently, in which the purchaser recovered 1800*l.* damages from the vendor for personal injuries caused by the bursting of one of these steel guns, whereas had the gun been made of tubed iron it would have only required *up* in case of a burst.

Trusting that the matter will be thoroughly threshed out by abler hands than mine, and every means taken to properly investigate the matter, instead of, at present, hushing it up—I am, yours, &c.,

March 22, 1890. An Old Lanternist.

SCHOLARSHIP.

To the Editor.

Sir,—With your good leave I will occupy your space again with another suggestion on this matter. The Camera Club at their Conference on Friday suggested the desirability of instituting an annual exhibition of photographs somewhat on the lines of the Royal Academy or the Paris Salon, where the mere hanging of a picture would be a sufficient reward in itself, and only the really good work would be admitted. This most excellent idea it was lamented could not be carried out for want of funds. Now I may say that the Britannia Works would be most happy to place their proposed gift at the service of any body for the carrying out of such an excellent scheme. I see no reason why others, who have hitherto been talkers only, should not follow this admirable example, and we may then see both the suggestions made carried into effect, and photography raised to the rank which it deserves. Then we may look for our art science being taken note of by the various scientific and art papers, when it is on a par with other branches of learning which have endowments for the furtherance of their study, and ample rewards for those who excel therein.—I am, yours, &c.,

John Howson.

Ilford, March 22, 1890.

NEWCASTLE-ON-TYNE EXHIBITION.

To the Editor.

Sir,—In connexion with our forthcoming photographic exhibition kindly permit us, through your columns, to announce to intending exhibitors that we have, in their interest, decided to extend the date for sending in application forms from April 1 to April 7. Pictures must, as previously advertised, be in our hands by the 10th prox.—We are, yours, &c.,

James Brown,
Edgar G. Lee, } *Hon. Secs.*

Art Gallery, Grainger-street, Newcastle-on-Tyne, March 24, 1890.

CRYSTAL PALACE COMPETITION.—A PROTEST.

To the Editor.

Sir,—Enclosed is copy of a letter which I have this day forwarded to Messrs. Peasgood and Wollaston, *re* the award in the Challenge Cup Competition at the Crystal Palace Photographic Exhibition. I shall feel obliged if you will kindly insert it in your next issue.—I am, yours, &c.,

Edgar G. Lee, *Hon. Secretary.*

[Copy.]

"Gentlemen,—Confirming my telegram of the 19th inst., I am instructed by our exhibitors, whose names are appended at foot, to formally protest against the award in the Challenge Cup Competition, on the ground that, from authoritative information in our possession, a portion only of our exhibits was brought under the notice of the Judges. A large number of our pictures having been excluded from the competition, as we *know* to be the case, we hereby demand an explanation, and unless that explanation is satisfactory, we insist upon the entire Cup Competition being re-judged.

"A copy of this letter is being sent to each of the photographic papers.—

"I am, yours truly,

Edgar G. Lee, *Hon. Sec.*

"The Exhibitors' names are:—Auty & Ruddock, T. Galloway, J. P. Gibson, J. E. Gould, Edgar G. Lee, W. Parry, J. Pike, H. R. Procter, H. G. Ridgway and Lyd. Sawyer."

A WRONG QUOTATION.

To the Editor.

Sir,—Mr. C. Ray Woods should apologise, not to William Shakspere, but to Joseph Addison, for his pardonable misquotation in the number for March 7 of your Journal. The lines are,—

"'Tis not in mortals to command success,
But we'll do more, Sempronius, deserve it!"

—I am, yours, &c.,

E. Healy.

10, *Endymion Terrace, Finsbury Park, N., March* 22.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange balustrade and rustic stile for good interior background.—Address, The Royal Studio, Warminster.

I will exchange a Marlborough tricycle for a whole-plate camera and rapid rectilinear lens by Dallmeyer.—Address, A. W. Creighton, 1 Malvern-villas, Brunswick-park, New Southgate, N.

Will exchange some high-class backgrounds for others; also a Seavey boat for a rustic window or porch, or other outdoor accessory.—Address, W. P. Marsh, Photographer, Begnor.

Wanted, Ross' 8½ × 6½ rapid symmetrical and 6½ × 4½ portable symmetrical lenses; exchange, cameras, backgrounds, plate boxes, studio stand, &c. Cash adjustment.—Address, F. R. Turner, Cross Studio, Tewkesbury.

For exchange, a Seavey's rustic bridge, two backgrounds, half-plate portrait lens, several years of The British Journal, wanted, 12 × 10 camera (outdoor), or Gurney's shutter or quarter-plate set. Difference adjusted.—Address, W. Bassett, Stoke-road, Guildford.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

W. H. H. (Paris).—In our next.

J. LENDON BERRY.—Many thanks. We shall defer publishing the case until it is completed.

W. C. W.—We know no more of the alleged discovery than what has appeared in the daily papers.

JOHN W. BRAND.—The makers of the Aristotype paper do not publish the formula by which it is prepared.

W. S. KEDDIE.—We require to know more concerning the person named ere the note can be published. It might be actionable.

B. INGRAM.—If the weight of brass is objected to, the stops can be made of thin sheet-ebonite; that is light enough, but, unfortunately, it is somewhat brittle.

EDWIN BEECH.—We expect soon to know all about the machine in question, and will then publish particulars. At present we are short of information that can be relied on.

O. B. M. W.—Full directions for making camera bellows are given with illustrations in an article by Mr. J. T. Hackett, on page 128 of the ALMANAC for 1876, to which we refer you.

W. G.—Hughes & Kimber, West Harding-street, E.C., supply ruled copper plates of different grades. Get some of these, and obtain prints from them, then copy the prints in the camera.

P. S.—1. All the formulæ about which you inquire are given in the ALMANAC. —2. From fifty to sixty grains to the ounce.—3. Any photographic warehouse.—4. About 2*s.* 6*d.* or 3*s.* a quire.

R. E. J.—Carbon tissue is not difficult to make, but unless the consumption is somewhat large, it will be found more economical to purchase it. It may be had in small quantities, ready sensitised.

W. P. A. inquires: "Is there any way of rendering celluloid insoluble in alcohol and ether (mixture)?"—No; except by coating it with a protective substance, which must be impervious to the solvents.

W. A. R.—The Woodburytype process is about the best for producing large numbers of small portraits, and at the same time the cheapest. They can be made in the same time as silver prints, from which they are scarcely distinguishable.

B. W.—Few lanternists now make their own oxygen. Most get it compressed in cylinders. We imagine that if you send your bags to the Company they will fill them for you. You are not the only one who has had his confidence in cylinders shaken. We still use the compressed gas ourselves.

J. B. W. inquires where the large sheets of brown paper, such as that upon which backgrounds and side slips are painted, are to be obtained without folds.—This paper may be had in continuous lengths and about five feet wide from most large upholsterers. It is sold under the name of "carpet paper."

A. H. BENHAM.—1. A diaphragm placed vertically, no matter what may be the form of its aperture, will not serve the same purpose as one placed in a diagonal position.—2. Possibly the crystals are those of hyposulphite. Apply the tongue and see how they taste. We should be glad to examine them.

W. STEVENS.—From the description we imagine the lens has not been very seriously injured by the accident. We imagine the concussion has merely bent the brasswork and caused the balsam cementing the two glasses together to give way. The best plan will be to send the lens to the maker to be repaired.

W. JONES (Wolverhampton).—In the back lenses of the portrait combination the convex surface of flattest curvature must be placed to the outside, the most convex surface going next to the separating ring. It is impossible to say whether the marginal definition can be improved unless we had the lens for examination.

S. BILTON.—Two single lenses with a difference in their foci of three-eighths of an inch are of no use for taking stereoscopic pictures, even if the stops are identical in aperture. One would not only be more rapid than the other, but one would produce a larger image than the other. Accurately paired single lenses are not very expensive.

PUZZLED (Brownhills).—The yellow stains seem to be silver sulphide, due to imperfect fixing. The long keeping of the paper has nothing to do with their formation. See that the fixing bath is strong and not too cold when used, also that the prints are immersed for a sufficient time, and you will not again be troubled with such stains.

C. TURNER.—There are no means of preventing the stains on the engraving showing in the negative. They can no doubt be removed by cleaning the print: that is, treating it with chlorine. In this case, as the engraving is a valuable one, the work had better be put into the hands of a picture-restorer and not be attempted by a novice.

AG. O.—No one can prevent you from making carbon prints with an enamelled surface and a tinted border, with imprint, &c., *à la* Lambertype. "Exclusive rights," "sole licensee," &c., is merely bombast now.

HUNTINGDON.—For general purposes a lens of the rapid series is much to be preferred, therefore take the one marked C in your note. The wide-angle one will be of little use except for taking a picture in a confined situation, and then the perspective will be strained. The price of these lenses appears to be very low, even for second-hand ones. Better get a trial of them before purchasing.

SAILOR.—A lens working at *f*-6 will be very suitable for a detective camera, but one of five inches focus, with the full aperture, must not be expected to cover the quarter-plate sharply to the edges. The shutter shown in the sketch is very good, but it is not new. It was at one time, we believe, patented, but we think the patent was allowed to run out; of this we are not, however, certain.

EXPERIMENTALIST.—1. We cannot, in this column, spare space to give practical details in electrotyping; better get a cheap manual on the subject.—2. It is impossible to say whether the process would be patentable without knowing what it is. If it be novel, then of course it can be patented.—3. The Government fee for provisional protection for nine months is 1*l.*, and for a patent for four years, 4*l.* If the patent is taken out through a patent agent, his fees will be in addition to the Government ones.

X. X. X. (Sheffield).—For portraiture by the electric light it is the arc, and not the glow light, that must be used. One light is all that is necessary, but the shadows must be softened by reflectors. An ordinary arc lamp with a large concave reflector behind, which can be turned in all directions, is all that is required. It is usual to place a small reflector in front of the arc, so that the light itself is not seen by the sitter, but is projected on to the large screen. The time of sitting will depend upon the power of the light and the distance it is from the model. If you are not conversant with electrical matters the installation had better be placed in the hands of a practical electrician.

X. Y. Z. puts the following query: "If a person brings a sitter to be photographed, and they bring with them a copyright picture, painting, or engraving, and the sitter is dressed as much like the original as possible, and I try to photograph the sitter as much like the picture as possible, would it be infringing the copyright of the picture?"—We imagine there would be no infringement in law; but it is such a purely legal question, we do not like to be positive in the matter. Of course it would be quite possible to make the two pictures so much alike that it might amount to a colourable infringement. Perhaps some of our legal friends will give the benefit of their opinion on the matter.

RECEIVED.—Manchester Report; F. S.; J. J. A.; Dr. Maddox; and others. These in our next.

MR. JONATHAN FALLOWFIELD requests us to announce that his new central premises in Charing Cross-road are now nearly complete, and he hopes to open them early in June.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, April 2, *Standard Solutions, and the Expression of Photographic Formulæ*. Bank Holiday, outing at Godalming.

THE AUTOMATIC PENNY PHOTOGRAPH MACHINE.—The following appears in the *South Wales Echo* of the 19th inst.:—"The latest put-a-penny-in-the-slot machine, which provides the investor with a photograph of himself in a few seconds, was exhibited at the works of Messrs. G. Salter & Co., West Bromwich, yesterday, to about a hundred capitalists and journalists, the majority of whom travelled specially from London. In appearance the apparatus resembles the ordinary slot machines. The person who wishes to be photographed puts his penny in the slot, stands opposite the lens, and in four seconds the ringing of a bell indicates that the operation is completed. A few seconds more are required for drying and other processes, and the photograph appears upon tinfoil about an inch and a half square. Another halfpenny in the slot secures a gilt frame. The experiments indicated some defects, but it was stated that these may be easily remedied, and no doubt when that has been done the machine will create some sensation. All the visitors speculated three-halfpence, and the majority of the photographs were certainly equal, if not superior, to those examples of the photographic art with which visitors to the seaside and country fairs are familiar. Subsequently the company were entertained at luncheon. Mr. Rosenthal explained that the machine was not actually perfect, some alteration having to be made in the lens. They claimed for the machine that it would take a portrait complete in forty-five seconds, but if necessary they could minimise that time and reduce it to thirty seconds, which all depended upon the size of the machine inside. The object need only be exposed three seconds.'

*** GOOD FRIDAY. *As we publish next week on Thursday, all matter intended for our next issue must reach us one day earlier than usual.*

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1561. Vol. XXXVII.—APRIL 4, 1890.

PAINTED PHOTOGRAPHS.

A somewhat extensive inspection of series of photographs painted in water-colour and pastels, framed and hung in various parts of the country, has led us to the conclusion that the question of permanency in connexion with painted photographs might logically be treated side by side with that of plain silver prints now being discussed in our columns. Any professional photographer of position can say how important a branch of professional portraiture this is, from the highest class of work, at prices counted in tens of guineas, to the lowest and simplest cheap "tinting," which we suppose there are few studios ignorant of. Unfortunately the question is complicated at the outset by the uncertainty attaching to some forms of pure water-colour painting, a number of which fade very considerably through sheer ignorance of the artist as to the qualities of the colours he employs. We were discussing this phase of the question some time ago with a gentleman who had once been very successful in hitting the popular taste in water-colour landscapes of particularly pleasing conception and execution, and he informed us that quite a large number of his patrons had complained to him that his paintings, after a few years' exhibition in ordinary rooms, had faded so much as quite to spoil them. He honestly undertook the blame, and repainted them after "getting the subject up"—he, a painter of repute!—and he said that after he began to "set his palette," according to the instructions he found in Field's *Treatise on Colours*, he never had any more failures in this direction. Now, when we remember that the work in question was published very many years ago (our own copy—"New and Improved Edition"—is undated, but we have possessed it for thirty or forty years), we have here proof positive that the fugacity exhibited by any particular painted photograph does not necessarily implicate the photographic base as guilty of contributory negligence.

What is required to discover is whether a photograph in silver, carbon, or platinotype, used as a basis for an artist to paint upon, has any inherent tendency to produce fading in the colours laid upon it. To do really artistic work of this kind (and such only do we now treat of) requires skill and practice, and it must be borne in mind that, unless the picture be painted entirely, or nearly so, in "body colour," the half-tones and shadows of the photograph are utilised by the painter to assist his effects. In this way painted photographs are exactly analogous to the very earliest efforts of water-colour painters—Paul Sandby, the originator of the art, who died in this century, using his water-colours on the top of a previous wash of Indian ink, while Cozens, who was born twenty years later, put his local colour over a previous image in grey composed of Indian red and indigo. It is generally admitted that the permanency of the results in water-colour painting was secured by the method introduced by Girtin, who painted direct upon his paper the colours he wished to portray without any previous ground of grey. It was found that the colours put on the grey lost their force by gradually sinking into it. A well-known publisher of engravings and photographs has told us his experience of painted carbon work, and it was very similar to this—he did not care for it, he said, for "after awhile the colours sank in." We were inclined to demur to this, though his experience was an important factor in coming to a conclusion, until we remembered the fate of the water-colours executed by the founders of the art. It will be very advantageous if our readers will give us their experience in this direction, both with simple "tinted" work, as it is called, and also with highly finished paintings. Another cause of confusion may here arise, a cause most readily indicated by a professional photographer of our acquaintance, who told us that in complaining to an artist who painted for him of a large number of pictures done some few years before, all of which had begun to fade—some very badly—he was met with the rejoinder, "Oh, it is good for business; there will be all the more for you to do; and, besides, I must leave something for my son to do when he grows up!"

Our own conclusion is that water-colour paintings upon carbon and platinotype are perfectly safe, and those on silver eminently unsafe, if any one nowadays were to be so foolish, or worse than foolish, as to send out such a kind of painting to his clients, though, strange to say, we saw about three months ago a water-colour painted silver print done thirty-four years ago in which the flesh tints were far more preserved than in some pictures with a carbon basis that we have seen which had not been painted one-third the time.

It is certainly incumbent upon the artist who does this kind of painting to be most scrupulous as to the colours he employs. A study of the report presented to Parliament two years ago on the subject of water-colour fading would be very beneficial. And we may here allude to a letter by Mr. A. P. Laurie, M.A., in the *Chemical News* for January 31, in which he points out that experiments which he describes indicate the possibility that some samples of madder lake—the sheet-anchor of the miniature painter for his carnations—gave very strong indications of having been brightened by the introduction of a little cochineal in the process of manufacture, all cochineal colours being, as is well known, fugitive.

Of all coloured photographs we have examined, those finished in pastel have been most nearly permanent, though here, once more, the subject is complicated by the fact of the employment

by some colourists of preliminary washes in water-colour when doing pastel work.

We have now, we think, put the subject fairly before our readers, and we invite contributions towards a solution of the question from all quarters.

A SUBSTITUTE FOR HYPO AS A FIXING AGENT.

Once more the cry seems to be against hypo as a fixing agent, and from various directions we hear complaints, warnings, and suggestions. One speaker, at a recent meeting, casts strong doubt on the permanency of developed bromide prints for the sole reason that the objectionable hypo is employed in their preparation. A correspondent in last week's issue implores us to commence a crusade against hypo—a somewhat injudicious proceeding unless it can be satisfactorily replaced, a consummation, however, not yet apparently attained.

Dr. Liesegang has, nevertheless, it appears from foreign prints, been experimenting in this direction, having selected, as the best agent to employ, magnesium chloride, which is an easily obtained and harmless salt if its thorough efficiency be proved. The chlorides, and indeed other soluble haloids, have long been recognised as fixing agents, and were, in fact, employed in that capacity before the discovery of the greater power and value of hypo; it would seem, therefore, that some very good reason should be provided at this distance of time for a complete reversal of the decision arrived at forty years ago or more.

Let us see what are the requirements in a fixing agent. In the main its duty is to dissolve or remove the haloid, be it chloride, bromide, iodide, or other salt of silver, that has not been acted upon by light, and so prevent the print being further altered by exposure. Taking chloride of silver as typical of the other haloids, we know that it is soluble to a very considerable extent in the soluble alkaline and metallic haloids, and that so far as the chloride alone is concerned these answer perfectly, if slowly, in comparison with hypo for its removal.

But is chloride of silver the only sensitive material with which we have to deal? In albumenised paper, under any circumstances, such is certainly not the case, for a compound is formed between the silver and the albumen which is far more difficult of removal than the plain chloride, and which has to bear the blame of a good deal of the fading to which such prints are subject. It remains doubtful whether this complex organic substance is thoroughly dissolved by hypo under the most favourable conditions of treatment. Mr. John Spiller, who has made the subject his special study, has repeated recently that cyanide of potassium is the only agent that will unmistakably clear a print of these organic compounds; but it is pretty certain that in the hurry of fixing and washing a large number of prints it is a very easy matter to let some of the objectionable compound escape to spread ruin and destruction amongst the proofs.

The sulpho-cyanides were many years ago proposed as substitutes for hypo, possessing the useful fixing powers of the latter without its objectionable features; but careful trial established the fact that though useful enough as solvents of silver chloride, the new agents failed to reach the organic compound referred to, and had to be relinquished.

But there are other organic compounds of silver which may be found in combination with silver chloride in positive printing papers, either added designedly or produced indirectly in the course of preparation and treatment. This is especially the case with plain papers, and with those prepared from a basis of gelatine or collodion emulsion. These compounds are not invariably soluble in the alkaline chlorides, or if so to a less extent than the silver chloride itself, and then only perhaps in consequence of being just converted into chloride. This being the case, it is easy to see that unless special precautions be taken in the way of using a very strong bath, or even a succession of fresh baths, as much uncertainty may be imported into the use of the chlorides as fixing agents as already exists with hypo; and even then it is doubtful if any kind of advantage accrues from the change.

The charge against hypo is that it forms deleterious silver compounds, which, if allowed to remain in the prints, ensure their ultimate destruction. The remedy appears obvious; let the dangerous compounds be thoroughly removed by washing. "But," retort the opponents of hypo, "the compound is insoluble and cannot be washed out;" to which we reply, such is not the case if the fixing have been properly performed, that is, if a sufficiently prolonged immersion have been given, and sufficient hypo solution employed to bring the silver salt into the soluble condition.

In fact, as has been proved over and over again, not in these columns only, but by writers in every part of the world, the real trouble of fading is not to be traced to hypo as such, but to downright carelessness in its use. In other words, prints fixed in hypo are not necessarily bound to fade, as is so far proved by the unchanged condition of many of the very earliest produced, but that they do fad under conducing circumstances requires no argument. The question is, whether under similar conditions of carelessness chloride-fixed proofs would not be equally unstable.

The difference would be just this:—In the hypo-fixed prints, whether insufficiently fixed or insufficiently washed, the impurity remaining in the print would be a sulphur compound, and as such liable to produce in decomposing, not only yellowness of the whites of the prints, but also true fading, or partial disappearance of the image from its conversion into a sickly yellow sulphide. Exposure to light has never, so far as we are aware, been observed to produce any darkening effect on such imperfectly treated proofs, though of course ordinary atmospheric influence may be expected to hasten whatever action may be lying dormant.

In the case of a chloride-fixed print, whether imperfectly fixed or insufficiently washed, the resulting impurity would consist of a soluble double chloride of silver and the base of the fixing salt. Imperfect fixation would of course leave more or less unaltered silver chloride, and this, as well as the double salt formed on fixing, would remain amenable to the action of light, and the deterioration of the print, when it occurred, would partake of a general darkening rather than yellowing or fading. Indeed, if protected from all access of light there is little reason to suppose that such prints would undergo any serious deterioration, as neither the pure silver chloride nor the double salt is particularly liable to spontaneous decomposition. It is even possible that an imperfectly treated proof by this method of fixing might, at any subsequent period, be placed in a position of safety by repeating the various operations, provided of course that no signs of incipient change had made their appearance.

We have here entirely overlooked all outside influences that might possibly contribute to the production of fading. Clearly a print containing locked up in its pores a soluble salt of silver is not only in a more unsafe condition than one thoroughly

free from such contamination, but it is actually in the best possible condition to succumb to the effects of impurity of atmosphere. Though *per se* free from sulphur or sulphur compounds, the soluble or insoluble silver chloride is peculiarly susceptible to sulphurising influences, and consequently an imperfectly treated chloride-fixed print is in practically as favourable a condition to undergo fading in process of time as one in connexion with which the objectional hypo has been used. Indeed, we are inclined to think that a proof from which the soluble double chloride has been imperfectly removed is more likely to both discolour and fade than one originally fixed in hypo perfectly (or at least thoroughly) washed and finally red-toned into *pure hypo edition*.

Dr. Liesegang is stated to have observed that "washing is quite unnecessary" after the use of chloride of magnesium, as the latter "has no injurious effect." Dr. Liesegang is, we think, too experienced and astute a chemist to have made any such statement. True magnesium chloride, pure and simple if left in the print may have no directly injurious action on the photographic image, but owing to its deliquescent character it would give to the print a permanently hygroscopic condition, which would be scarcely conducive to stability; while if as is inevitable a silver salt were also present, the ultimate result would not be far to seek.

The chloride method of fixing, it may be remarked, has been chiefly used and recommended in conjunction with printing processes other than albumen. In the early days it was applied to plain paper before the advent of hypo; now Dr. Liesegang appears to have used it in connexion with collodio-chloride prints, and we have before us as we write a print on gelatino-chloride paper fixed with chloride of sodium which Dr. Liesegang sent to us some six or seven years ago. A faint, "pinky brown" tint pervades this print, which, so far as we recollect, was present when it first reached us, and which may be due to the peculiarities of the paper, such a general colouration being by no means uncommon with collodion and gelatine chloride.

But it may also possibly arise from the action of light upon an imperfectly fixed or washed proof. On this point, however, we cannot decide.

It is curious, as noted by our correspondent of last week, "A Photographer since 1870," that the high-priced papers of a generation ago are those we all fondly look back to as the only reliable ones in point of permanency. Possibly the same rule would hold good at the present day, only, unfortunately, high-priced papers seem to have gone out of fashion, and five pounds a ream seems to be considered a handsome retail price.

There is nothing surprising in the alteration in price, or rather there would be nothing surprising if only the quality remained intact. Advances in manufacturing processes and increased competition are frequently answerable for much greater reductions in general prices than those recorded in connexion with albumenised paper in the last twenty-five years, but then the very fact of increased competition compels the quality to be kept up to at least the old standard. We have now, however, a general drop in prices, an equally general improvement in the *look* if not in the *smell of* our papers, but unfortunately universal complaint as to the utter untrustworthiness of the article supplied.

We are not inclined to lay the blame entirely, if indeed it be necessarily laid in that direction at all, to the employment of stale albumen, or of albumen from blood or other sources than the egg. There is no reason why blood albumen, *properly* prepared, should not be practically as pure, chemically, as egg albumen, nor does it follow that because albumen that has been kept a few days does not smell as sweet as when fresh that it should be fatal to the permanency of the photograph printed on it.

The correspondent referred to doubts the possibility of obtaining the modern high glaze with pure albumen from new-laid eggs. We see no great difficulty in this. Albumenisers certainly, with the view of getting a better "glaze," keep the albumen until it gets stale and probably "stinks," this being apparently the simplest way of concentrating it, while at the same time its limpidity is improved. But there is no reason why more scientific means should not be adopted in order to secure the same end without the objectionable accompaniments.

Another point is alluded to by the same writer, namely, the quality of hypo employed now and then. Five-and-twenty years ago sixpence a pound was a price that could scarcely be beaten, and it was not all small purchasers who could get it at that. In larger quantities it was not much less, but at least it was of excellent quality in fine dry crystals that would *keep* dry under reasonable conditions. Then came improvements (?) in manufacture, and the stuff that has been shot on to the market at from 12s. to 8s. per cwt., cask included, is quite sufficient to account for all our faded prints. Let any one compare a good modern sample of "pharmaceutical" hypo with the photographic article.

Mr. William Bedford made a rather important statement the other evening to the effect that, contrary to general belief, in his own experience citric acid in the paper rather hastened than retarded toning, and he proceeded to state, by implication, that the retarding effect was due to free nitric acid. Those who can go back far enough to remember when nitric acid was added to the sensitising bath in summer, in order to make the paper keep white, will recollect also not only the horrible brick-red colour the prints had when they came from the frame, but also the lavish manner in which the gold had to be applied in order to induce them to tone, and probably Mr. Bedford's explanation is a good one.

If a sheet of sensitised paper be taken from the silver bath and floated upon citric acid, as is frequently done, the free nitrate of silver is converted into citrate, and three atoms of nitric acid thrown into a free state. If citric acid be added to the bath itself the same action occurs, three atoms of silver are taken up by the citric acid, and three atoms of nitric acid liberated, so that the bath is really acidified with nitric and not citric acid. We cannot, however, see from the report how Mr. Bedford overcomes the free nitric acid in his method of working.

Apropos of the question of the keeping qualities of gelatino-silver papers we may relate an experience of our own, which, however, we do not recommend our readers to repeat. A box in which we kept different samples of sensitive papers, principally positive, became flooded, owing to the bursting of a pipe in the dark room. A packet of slow positive paper was completely saturated, and some weeks later was found to have dried into a sort of high quality millboard, being perfectly hard and firm. Out of curiosity the "block" was soaked in water until quite soft, the sheets separated and washed individually, and hung up to dry in the drying cupboard. With the exception of one or two slight abrasions of the gelatine film no injury had accrued whatever.

Mr. J. Craig Annan, in his paper on *The Sizes of Photographic Plates*, calls attention to an important feature in connexion with his suggested series of sizes, namely, that in doubling the sizes of the plates precisely the same relative dimensions are retained. Some few months back, in commenting on the propositions of the French Congress, we called attention to the weak point in their scheme, namely, that it entailed two entirely distinct shapes if, as was proposed, the successive sizes were gained by doubling. We at the time proposed a series of sizes that practically obviated this difficulty, but

Mr. Annan distinctly formulates the method by which such a series can be calculated.

Practically nowadays the sizes of plates in use are fewer than they used to be. Quarter, half, and whole-plate cameras are the standard sizes, and comparatively few photographers care to depart from the usual lines. Mr. Annan points out that in trimming a print it is frequently useful to do so with a special view of improving the artistic result, as by cutting away a strip of superfluous foreground or sky. Such being the case, it may seem that the shape of the plate is a matter of little importance, unless it can be altered to suit each individual subject; but at least we may select that shape which most nearly suits the greatest number of subjects. Some years ago the square plate was recommended as being equally applicable to every kind of subject, and so it was, for it had to be trimmed with equal severity whatever might be the character of the work.

If the process of collotype recently spoken of by Professor Stebbing be really as simple in manipulation as he claims, as good in its general results, and the necessary press so reasonable in price, we shall probably witness somewhat of a revolution on its introduction into this country; but it will not be among amateurs, at least not among "the million," for in its simplest and easiest form collotype must be infinitely more difficult to work than silver, platinotype, or bromide printing, and this part of the work is that at which the ordinary amateur usually "boggles."

The alleged discovery of photography in natural colours is being kept well before the public by the daily press. In the *Standard* of Friday last its Vienna correspondent says he has inspected the natural coloured photographs, by Herr Verescz, and also had a conversation with Dr. Eder about them, who, he asserts, is "greatly impressed with the value of the discovery." The colours, it is said, range from ruby red to light orange and to light blue, while green is missing. It appears, according to this correspondent, that the photographs are on glass as well as on paper, and that they have been exposed to a diffused light for three weeks, and are still as bright and well-defined as ever. Dr. Eder's name is being pretty freely used in connexion with this matter, and it is insinuated, in this country at least, that he vouches for its genuineness. It would, therefore, be interesting to English photographers, to whom Dr. Eder's name is so familiar, to have something direct from the gentleman himself on the subject.

Many former notices of the alleged discovery of photographs in natural colours, which have first been put before the public through the non-technical press, have been the preliminaries towards the promotion of companies, under the Limited Liability Act, to work the valuable (?) process commercially. What the results of these different schemes have been the too confiding investors know to their cost. It is to be hoped that the present asserted discovery will not be turned to a similar account; or, if it is, that the public will decline to embark its cash in the enterprise until it has something more tangible put before it than has been the case on previous occasions.

The correspondence in our columns anent the fading of silver pictures led to a discussion on the subject at the last technical meeting of the Photographic Society of Great Britain. The matter occupied the meeting for nearly the whole evening, yet nothing but what is patent to every experienced photographer was elicited. The somewhat vexed question as to whether protecting the photograph from the action of the atmosphere with a varnish, or by waxing, was conducive to permanency or otherwise was left just where it always was. When this Society possessed the vigour of youth, it appointed a Committee of experts to inquire, theoretically and practically, into the question of fading, and to report thereon. Committees for other purposes in furthering the art science were also appointed when the Society was active, the same as is done by most scientific societies except the Photographic. If some society of standing had the energy to take up the question now in a similar manner to what it was before, some good might possibly result. Since the former report was issued, a further thirty years' experience has been gained in photography which might be turned to advantage. Notwithstanding the rapidly increasing taste for platinotype and other processes, silver printing is not yet dead, and, for the credit of photography, every effort should be made to render the work as permanent as possible.

The votaries of instantaneous photography were in force at the boat race last week, and they were fortunately favoured with a light beyond the average of that on former occasions. Whether from the quality of the light, the extra rapidity of the plates employed, or from a longer exposure, all the negatives we have had the opportunity of seeing bear evidence of being better timed than the generality of those produced at previous races. This applies not only to photographs of the race itself, but also to pictures of the motley groups which always gather together on similar occasions.

In connexion with most large exhibitions, exclusive rights to take photographs are usually sold. But now, in the age of detective cameras, which are disguised in all manner of different ways, it becomes difficult to retain them. This point should be borne in mind when tendering for the privilege. It is tolerably well known that at the late Paris Exhibition, notwithstanding the vigilance of the officials and the penalties attached to the offence, a large number of photographs were taken surreptitiously, both in the buildings and in the grounds.

On each occasion that we visited the Photographic Exhibition at the Crystal Palace we noticed detective cameras amongst the visitors, in one instance in possession of apparently a clergyman, although Messrs. Negretti & Zambra pay for the sole right of taking photographs alike in the building and the gardens. In future, when an exclusive right is sold, some sort of bye-law should be framed for the protection of the purchaser from photographers with disguised cameras. As the matter at present stands with most undertakings, the only thing that can be done is to ask the offender to desist when he is detected, by which time he has of course secured his picture. He incurs no penalty, neither could his apparatus, as at the late Paris show, be confiscated. We doubt also if he could even be lawfully removed from the premises. Also if the exposed plates could legally be destroyed, as was once alleged to have been done on the now—to photographers—notorious Deal Pier.

Many outdoor workers appear to consider that photography cannot be satisfactorily pursued until the trees are in leaf, hence they have not yet commenced operations. However, without foliage, with the light we are now having, there is plenty of work in the field. Trees devoid of leaves, when illumined by strong sunlight, make far different pictures than do similar subjects in the dull light of the winter months. Moreover, the operator is far more independent of the wind when there are no leaves than when the foliage becomes developed. Of course, as yet, purely woodland scenery should not be attempted except for certain effects.

Camera makers have of late years expended a large amount of ingenuity on the construction of cameras, and there is no question that, as regards portability, there is little more to be achieved. But has much more been accomplished in the matter of weight and compactness than was done thirty or more years since? This question occurred to us recently when we were shown a portable camera made probably nearly forty years ago. It was one of the old-fashioned folding type for pictures about twelve and a half inches by nine and a half, and it had three double dark slides fitted with patent plate glass for paper negatives. These slides were no heavier or more bulky than those of the present day. The whole apparatus packed in a light wooden case about twenty inches by fourteen by four and a half. A similar apparatus of modern construction would occupy quite as much space, though in different proportions, and, we venture to say, would be more weighty. In this old camera, metal, which in the modern ones constitutes the chief weight, was conspicuous

by its absence. With the exception of the brass hinges and the clasps of the dark slides, there was no metal anywhere. Of course, this out-of-date apparatus did not possess all the numerous adjustments now considered so essential in a camera. Still, the work done at the period it was made proves that they are not altogether indispensable.

THE ART OF RETOUCHING.

Chapter III.—(*continued*).

The *light* by which negatives should be worked must necessarily be a good one. By this must not be understood a very powerful or a glaring light, but just enough to thoroughly show up all the defects in the negative. There have been some very elaborate desks offered to the public and the professional from time to time, but they have never come into general use. A few amateurs may patronise them, but the professional retoucher invariably gives them the "cold shoulder." The fact is, there is no necessity for a complicated machine; the simpler it is the better. A very good all-round desk may be found at Wratten and Wainwright's; it is very simple, and thoroughly suits its purpose.

A bottle of "*medium*" is indispensable. By rubbing a little of it with cotton wool on the parts to be retouched we secure a *tooth*, without which it would be impossible to work.

This operation may appear a very easy and simple matter, but it will be found to demand a certain amount of care in order to accomplish it successfully. We must not deposit too much fluid on the negative, or we may cause the surface to become somewhat *greasy* as it were, and anything but comfortable for working upon. But, bad as this is, it is not the only trouble, for a too plentiful deposit of the medium renders the danger of the removal of the work during the process of varnishing almost a certainty. No; we must try to put on a small quantity, and rub it so that it may leave a nice dry surface behind and yet cover all the film evenly upon which we intend to work. By this means we minimise the chances of our coming to grief in varnishing, to say nothing of the pleasure we will have while working.

In the good old wet plate days *medium* was not required, the negatives were what was termed *gummed*, a process which gave sufficient strength and tooth to the surface so as to allow of working up *delicately* with a pencil or brush; nowadays we have a tougher surface for working upon. The dry plate has often a very hard and tough film, which may be worked upon with vigour and thoroughly without fear of injuring it. When the medium has been properly applied (granted one understands what he is doing), there is no limit to the freedom of touch with which we may carry out our retouching. I am a great advocate of *freedom of touch*, and I have not the least hesitation in declaring that a *crippled touch*, such as is suggested by the so-called *touch* resembling the letter S, is as fatal to *artistic effect* in *practice* as it is *stupid* in *theory*. The success of our *touch*, as well as the *speed* with which we carry out our work, depends very considerably upon the manner of our rubbing the medium on the negative, or else I would not make these remarks thus early. In damp weather be sure that the film be perfectly dry before applying the medium, otherwise you will have anything but a pleasant surface for working upon.

We next come to the stumps. The judicious use of the stump can be made a great help to ordinary or defective negatives. Suppose a lady with a white dress has a rather inferior negative taken, with little, if any, detail in it—it may be a mass of half tone or else a patch of white. Here the stump will help us in gaining a very useful effect. With the stump, charged with lead, we can put in many of the details and broader high lights (impossible to produce with the pencil or brush), and so succeed in making a very passable photograph from a defective negative. This will be observable in such negatives as those of ladies in Court dress or evening dress, or any other class of picture where *white* predominates. It is very seldom in such negatives that we find sufficient detail—the dress being often a vast patch of white or else a mass of half tone as I said before. Now to attempt to work in the necessary detail with brush or pencil would be madness, whereas a touch of the stump will work like magic; we can also work in effects and modify shadows by stumping on the reverse side of the negative, having previously matt-varnished it or strained white tissue paper over it, such giving us a suitable ground upon which to carry out our work. Indeed, we can effect modifications in this way that would be recklessness to attempt with the pencil on the film side.

The use of the knife requires considerably more skill and delicacy of touch than does the stump, or even the pencil. The results are more forcible, and the danger of spoiling a negative very great. By this means a figure may be entirely cut out of a picture so skilfully that a moderately sharp eye would fail to notice the fact. Ladies' waists, too, can be cut away, and what might have been an ungainly figure made neat and presentable. Backgrounds also can be cut away and altered to almost any degree. In fact, it is very useful to acquire a mastery over the use of the knife. Be not too anxious to use it, but when occasion demands that you should, do so skilfully. Many cases arise where a nasty angle in a dress must be taken away, or else the beauty of an otherwise successful picture will be spoiled. If it were a black or dark-coloured dress we could carry out this operation with the pencil and brush; but where the dress be white, the knife is necessary. If, however, this objectionable angle can be taken out in the print by the *spotter*, by all means let it be done, but often it is impossible to do this in such a manner as not to attract the eye, and under this latter condition we (retouchers) are supposed to accomplish the task. For this purpose we must keep our knife or lancet thoroughly sharp and in perfect condition. It must *cut*, not *scrape* as it were, and must be handled *lightly*, in order to avoid any chance of injuring the film. When we have taken away what we think sufficient, we can put a little more medium on the abraided parts, and with the pencil or brush rectify any little defect that may exist after our *surgical operation*.

Brushes and colours are used in the *spotting* of the negatives or the taking out of very intense shadows. Colour also may be put upon the reverse side of the negative to lighten generally some offensive shadow. Colour can also be used, with care, upon the film itself. The opinions regarding brushes vary. I give *my* vote for the *best*. They are the cheapest in the end. The saving of time will soon repay the difference in cost, and the pleasure of working with good tools is beyond doubt. I should suggest having them medium size, but with fine points. For spotting, the quality of the colours matters but little, but for the difference in price I would still advise the best, especially wherever used on the film side of the negative. After very many years of experience, I can confidently say you cannot do better than trust to Winsor & Newton to provide you with this portion of your kit. They are always reliable, and for brushes and colour I have never been able to find anything better in the market.

Provided with the above materials, we have every means at our disposal to carry out successfully the retouching of any negative that may fall to our lot.

Of all these *materials* the one upon which we depend most is the medium. Since the introduction of the dry plate there has been, and is still, a want for a really good medium, one upon which a retoucher can get his pencils to take freely, and that will not let the *varnishing* reduce, to any very appreciable extent, the quality of the work. Nearly every photographer nowadays has his negatives retouched before varnishing, and it is very hard indeed upon the retoucher when (in the varnishing) best part of his work comes away, or is so materially reduced in power as to necessitate the working up afresh of the negative, this time, too, upon the varnish. There is no doubt a medium will be found that will not dissolve by contact with the varnish, and, as a consequence, to a greater or less extent affect the retouching. It is a most disagreeable task to go over a negative a second time. I have a very good medium which I use myself, but I feel sure a better still will be found. This matter of the medium in its application to the present plates affects to no small extent a day's work. There is little doubt that a good day's work now is not much more than half what it was in the good old times of the wet plates, but this is no fault of the retoucher, but the conditions under which he is obliged to work.

Redmond Barrett.

ON THINGS IN GENERAL.

The discussion on the cause—or rather, I should say, causes—of fading now being carried on in a friendly spirit in the pages of this Journal is opportune and none too early for the importance of the

subject; if silver printing is to hold its own, every effort should be made by all concerned to get to the bottom of this matter. For too many years it has been the fashion, whenever a faded print was examined, to say it was "sulphurised;" in fact, the mere employment of the fetish word "sulphur" in this connexion was ample enough to stifle all discussion and all attempts at explanation, for the utterer of the expression in ninety-nine cases out of a hundred did not know what he really meant, and the listener did not dare to ask, lest he should be put down as an ignoramus. It did mean something once, when the classical researches of Messrs. Davanne & Girard were fresh in people's minds, but eventually it came to possess about as much meaning as a fetish word employed by an old Manxman that I used to listen to at the Port of Peel:—"Why were passengers on the steamer sick? They had lost their nitre. Why had people indigestion? They had lost their nitre. Why did they come to the Isle of Man? To get a supply of nitre." And so on the old fellow used to yarn in so drolly pragmatic a fashion that to this day I am always reminded of him when I hear "Oh, yes; sulphurised." A somewhat similar fetish practice holds with regard to "hypo," whose presence is looked upon with as much horror as though it were the very individual popularly associated with sulphur. Now, while I will not go so far as to state as a fact that "hypo" in a silver print is innocuous, I do emphatically assert that the copious—or, perhaps, I should say thorough—washing always recommended to be given after fixing, is needed not so much to get rid of the hypo as of the silver dissolved by its aid and present along with the hypo. The unreason of imperfect knowledge has transferred the onus of guilt from the silver dissolved in hypo to the almost innocent hypo itself. It is singular that no records exist on the subject of the evil that the presence of hypo pure and simple has been proved to produce, though some years ago the results of a German photographer's experiments were recorded in these pages. They were to the effect that not the slightest visible harm was produced by painting a print with "hypo" solution.

An examination of this question of fading will have to be approached with care, and all statements in regard to it rigidly examined. For instance, a writer on page 206, speaking of using gum arabic for mounting (a very untrustworthy material by the way), speaks of the gum arabic of to-day not being the same as it was in the good old time, as "it is now so much bleached with acid." It would be interesting to learn how a piece of solid gum nearly an inch across could be "bleached by acid;" and further, when he speaks of "hypo" nowadays at nine shillings per hundredweight against one shilling per pound in 1856, the natural inference that hypo was then over five pounds per hundredweight is not correct. It is, however, a proper thing to point out that there has of late years been sold a large quantity of very imperfect "hypo," which we know by the efflorescence that takes place after keeping it a short time. Pure "hypo" will not effloresce; when a sample does so behave, it may, for aught the consumer knows, be composed half and half of real "hypo" and Glauber's salts, a very much cheaper commodity.

Mr. W. P. Adam's article on *Printing by Electric Light* is very interesting, and in towns where electricity is laid on might be a useful aid to those intending to utilise the light for printing by artificial illumination. For those who, to be able to employ electricity, would have to purchase their own steam or gas-engine and dynamo, it will help to reckon the cost when it is noted that, taking Mr. Adams's diagram as it stands, the electric light he describes would not admit more than six 12 × 10 negatives at a time; that is, six per hour, or, working from nine to five o'clock, fifty-four per day, supposing his estimate as to the average printing power of a negative to be correct. At any rate, we have a practical plan before us, and can estimate beforehand the cost and probable output.

I wonder how many of my readers have seen the excellent photo-engraving in the *Photographic Times*, New York, of the drawing for the proposed monument accepted by the Daguerre Memorial Committee. It is impossible to avoid wondering whether the whole thing is not a joke. Here we have a huge pedestal, surmounted by a big ball like the globes of stone much affected by some masons for capping gate-posts with. At the foot of this pedestal, and supplied with countless yards of hay-band, kneels a female, thinly clad, and twisting a bit of this band into a loop, through which we have a glimpse of the head and bust of an unhappy man, conscious that a huge globular mass of stone (or bronze?) a hundred times larger than his own head is ready to topple over and crush him. The whole composition is ludicrous if not a gigantic joke.

Turning from these realms of absurdity, it is a pleasure to speak of such really practical and valuable contributions to practice as Mr. Haddon's *Demonstration of Glass-blowing*, wherein he gave, in a short time, practical instruction which books cannot give, and, further, less valuable instruction which they could but do not give. The best book on the subject—so far as book teaching goes—that I know, is *The Methods of Glass Blowing*, by W. A. Shenstone. But half an hour with Mr. Haddon is worth a hundred books. By the way, as there are a thousand people who would like to know the pressure their gas is delivered at, to a single one who knows how, or is likely to try, to make the simple gas-pressure gauges shown by Mr. Haddon, I will describe the simplest of all guages. A plain straight piece of glass tube is attached to a gas bracket (divested of the burner) by a length of rubber tubing and lowered into a vessel of water several inches deep. The gas is then turned on, and the tube, held quite vertically, slowly withdrawn till the gas begins to bubble out. The length of tube in the water (easily ascertainable by a number of methods) gives the pressure of the gas. This is rough and ready, but can be made accurate enough for all practical purposes.

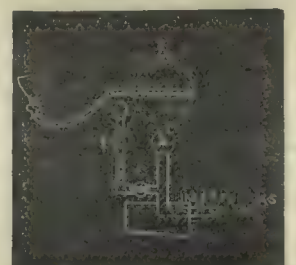
FREE LANCE.

A POWERFUL AND UNIFORM SOURCE OF ILLUMINATION.

LONG exposures, no matter whether required for taking negatives or making prints therefrom, are, as a general rule, to be avoided. It was with the object of reducing the exposure necessary to produce Alpha prints that I made some experiments in order to obtain a source of illumination which would not only be powerful in itself, but which would illuminate equally the whole surface of the negative with as little loss of luminous power as possible, and besides these requirements, to obtain something approaching an absolute standard or standards of uniformity.

Of the many illuminants in general use, gas is naturally the most handy and convenient for all practical purposes. Now, one of the best means of burning coal gas to advantage, as far as light power is concerned, is by means of mixing with it, before burning, vapours of a carburetting material to increase the percentage of the heavy hydrocarbons naturally present in the gas. This is the principle of the albo-carbon light, and with this source of illumination I made many experiments which finally resulted in failure, as far as the chief requisite was concerned; but as a knowledge of one's failures is often of value to others, I think it will not be amiss if I devote a few lines describing the apparatus I devised.

I found that an albo-carbon light, burning, say, two and a feet per hour, would certainly give as much actinic light as an ordinary (non-carburetted) gas flame burning twice that amount. One of the disadvantages of the albo-carbon burner, as it is usually made, is that it requires some time for the carburetting material to melt in order to give off vapour for mixing with the issuing gases, and if, when the gas flame has become constant, it be turned down for a few minutes (during developing) and again turned up, the light, in consequence of the cooling of the carbohydrate container, is not the same as before, but of less actinic value. Now, to avoid this difficulty, I devised the employment of a non-luminous Bunsen burner in place of the usual gas flame to keep the albo-carbon reservoir always the same temperature, whether the light be burning or not, and at the same time removing the ordinary flame to a position where it could no longer heat the reservoir.

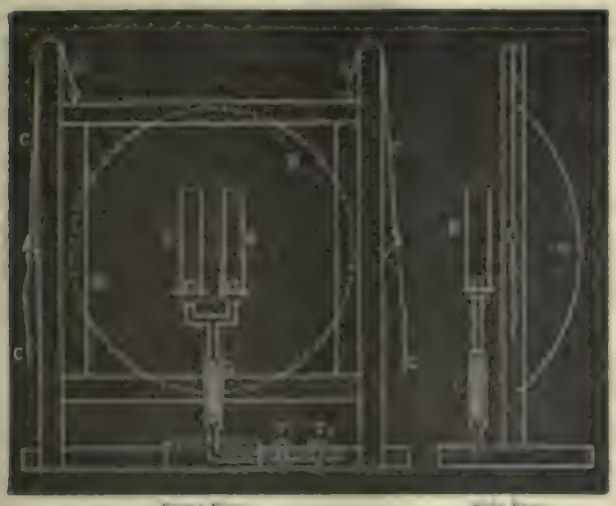


A is tap to turn on or off the carburetting arrangement, also with bye-pass to allow the flame to be turned almost out. B is Bunsen burner for heating the reservoir. C is cock to regulate supply of gas to Bunsen burner.

Now, although this arrangement when using a good-size burner, and with a good pressure of gas, gave a very brilliant light, it was

still difficult to get it nearly uniform enough in quality. Almost unobserved differences in the Bunsen flame made considerable difference sometimes in the luminosity, and this naturally made like difference in the photographic results, which should have been identical. So I finally gave up this light source for the one I am about to describe.

This consists of two Sugg's F Argand burners placed side by side at about three inches apart from centre of flame, as shown in diagram.



Front View. Side View.

C, Cord for regulating height of reflector. G, Gauge. T and T², Bye-pass and regulating taps. R, Reflector. B, Argand burner.

Below the Argand burners, and supporting them, is a Sugg's gas gauge, G; this indicates from two to fifteen feet per hour, for showing exactly the amount of gas passing at any given moment. T and T² are two taps, one a bye-pass for turning the gas nearly out, the other for regulating the amount of gas to be burnt, the gauge at once indicating the same. Fitted on a stand, and placed about six inches from gas burner, is a concave reflector for concentrating as much light as possible. For getting the right focus the reflector can be raised or lowered by means of sliding cords, as is shown. As far as my experience goes up to the present, this arrangement is at once a powerful light source, and also of sufficient uniformity for all practical purposes, for the supply of gas passing at any moment can be observed by simply looking at the gauge, and can be determined at will by means of the regulating cock. If the light be not perfectly evenly diffused the addition of a disc of tissue or waxed paper stretched on a frame may be an advantage. The time required for properly exposing an Alpha print behind an ordinary negative at twelve inches from the light burning eleven feet per hour is from two to three minutes, at six inches it would be but a quarter of this.

J. J. Acworth.

ON SOME EFFECTS IN BINOCULAR AND MONOCULAR VISION.

The following remarks, should you deem them, Mr. Editor, suitable for the pages of your valuable Journal, may not be entirely devoid of interest to your general readers, or to those engaged in the recent controversy on stereoscopic vision. It is not my intention to enter into the controversy, but simply to offer a few special and general remarks anent the same and a kindred subject: special as relate to myself, or personally to my own vision, stereoscopically speaking; general as to sundry theoretical views and possibilities in photo-micrographic stereoscopic images, &c.

We are all aware that by close attention and judicious exercise of our special senses their capabilities can be advanced so that by the cultivation given to them, the mental impressions received through them, and arranged and recorded by brain power, shall encompass such details the more readily and surely than could happen without such culture. Take, for instance, the wine and tea taster, or the touch of the blind, &c.

The culture of the stereoscopic vision of objects or images of objects properly produced and displayed is by some readily acquired under the power of normal vision without the aid of any optical or instrumental assistance. By normal vision is meant ordinary with concordant foci, or closely so, of both eyes.

Before entering on any details, let me ask whether much of the present controversy would not have been lessened if a little more definiteness in terms had been employed? Thus, for true stereoscopicity or images of objects seen solidly and in their true relations, by means of the use of both eyes, with or without the aid of any optical contrivance, could we not employ the compound word recto-stereoscopic and its derivations or adjuncts, and when seen or shown without such true relations either in perspective or position, pseudo-stereoscopic, *i.e.*, where solidity is preserved? It strikes me such terms would advance correctness of statements. The object here, however, is not to criticise, but to offer a few observations on my own part, and in doing so, I shall use these terms in the hope of making my remarks the more comprehensibly correct. Fortunately, like some others, I need no optical aid for viewing and combining recto-stereoscopic slides, whether transparent or opaque, or for pseudo stereoscopic images.

To enter into a few details which chiefly form the object of this communication, let me state, if I hold my two forefingers together vertically at the distance of ten inches before my eyes, I firstly see them as two separate fingers, and nothing more; if, however, I begin to move the fingers apart, keeping them in the same line parallel with each other, and at the same time try and regard the central space, shortly before a distance of two inches is reached between the fingers the left and right begin, as it were, to shift and slide towards the centre of the vacant space, and finally coalesce, forming apparently a perfect finger made up of the two dissimilar fingers; a central recto-stereoscopic image being produced at the distance of two and a half inches, and retained until the fingers are separated by a distance of eight inches. At the same time, the two real fingers are at that distance still perceptible, though somewhat indistinctly. The central image appears slightly smaller than either finger.

Again, placing the fingers as before, and more strongly converging the axes of the eyes, the two fingers gradually part to the extent of the width of the hand, and each finger carries over the opposite finger to itself, forming two two fingers, or two twins with a joint-knuckle space between them; or, in other words, the left hand has two forefingers, and the right hand two forefingers, thus producing the effect in each hand of a duplicate forefinger. The veins of the hands, which naturally run towards the thumb, unite and form the letter V, the body of the hands supporting the fingers assume the same shape. If, while the apparent image of the four fingers mentally exists, one hand is suddenly withdrawn, say the right, the previous mental impression results in two single forefingers remaining separated at the supposed previous distance, the one attached to the left hand, the other aërial. This latter now slowly begins to slide towards the left finger, and ultimately coalesces, the time occupied for the transposition being eleven or twelve seconds. This period is probably required for the eyes to assume their ordinary position of accommodation.

The opposite appearance results if the left hand be sharply moved away. Of course, all these details depend much on the power of the observer to govern the voluntary muscular efforts that produce them. If the two fingers be placed horizontally and parallel with each other, either together or separated by any interspace, by no muscular effort can my eyes displace their exact and relative positions, or produce an aërial recto or pseudo-stereoscopic image. If we obtain images of a saucer or shallow concave body having the concavity towards the observer, so that the combined images rightly represent the saucer as a solid body, with its concavity towards the observer, then we have a recto-stereoscopic image; but if in transposing the images or the pictures of the saucer, although we preserve the solidity, we reverse the concavity and obtain a pseudo-stereoscopic result. This will doubtless be readily remembered by those who have attempted to make stereoscopic images by the monocular microscope, by shutting off, as Mr. Wenham proposed, half the front lens of the objective, or using an adapter with a tube closed by a half-stop, as long since adopted by Mr. Heisch. These methods permitted the right-hand half of the front lens to furnish one image, and the left-hand the

other. As the ordinary microscope gives inverted images, so care must be taken in placing the resulting pictures, or pseudo-stereoscopic appearances form the combined results. A diatom, suppose of a coscinodiscus, with its convex surface towards the lens, may then either appear as a transparent, convex body, or a concave one, according as the images are rightly or wrongly mounted, and this whether viewed optically or simply visually.

If the entire front of the objective of a medium power be used with a large N. A., or numerical aperture, then there is more or less distortion in the combined image in the binocular microscope, according to the late Dr. Carpenter; but if the object be placed on a supplementary stage, as was done by Moitessier, myself, and others, so that one side of the central axis can be displaced, say 10° to 13° for one photo-micrographic image, and then equally depressed on the other side of the axis for the other image, the illumination remaining the same, solidity and recto-stereocopicity is retained according to my own experiments, made more than a quarter of a century since, but care is needed not to produce exaggeration. To attain the same object, Mr. Wheatstone, in 1853, proposed that the microscope should be capable of displacement "round an axis of about 15°, the imaginary prolongation of which should pass through the object." A most beautiful object for such images is the Volvox globator, with its daughter spheres; also selected Foraminifera and Polycystina furnish good examples.

As pointed out many years since by Mr. Wenham, when using high powers, say one-twelfth of an inch, a stereoscopic effect is produced by shifting the illumination to alternate sides of the object, so that the shadows shall fall on opposite sides of the details. This was the plan often adopted by the writer, but it always occasioned some difficulty in so placing the images, as regards detail, in exact position, and the images generally required to be brought rather closer together than in ordinary stereoscopic pictures to give the best effect.

One is led to ask whether, in the controversy amongst microscopists, structural details may not be beneficially elucidated by the aid of recto-stereoscopic images, *i.e.*, of course, as far as the microscope, even with the present beautifully perfect apochromatic objectives, can resolve structural detail into perfect images of the real structure.

To this a possible objection may be made under the plea that observers are not agreed as to the exact or proper plane upon which the foci of two dissimilar images shall be fixed. This, however, may be lessened if a statement accompany the result obtained, naming the plane focussed, and the surface of the object examined, whether outer or inner, or by taking images from three planes when the object admits of it, and combining the upper and middle or the middle and lower, or ignoring the middle and using the upper and lower for the stereoscopic picture. By this method, possibly, much confusion from hasty opinion, resulting in controversy, would be largely avoided, though absolute agreement may not always be very promising, as it is difficult to entirely shut out the personal equation. I have ventured these remarks in the hope they may, under the great facilities offered by the dry plate process, tempt some ardent observer to work in this direction. Those who are interested in this subject will find much to study in the address before the Royal Microscopical Society by the late Dr. Carpenter on *The Physiology of Binocular Vision with the Microscope*, published in the Society's *Journal*, June, 1884, and the article by Professor Abbe in the previous number. To quote the remarks made by the Secretary upon the two positions advanced would occupy too much space, but this much may be stated as regards the formation of the dissimilar images, Dr. Carpenter suggesting "that they are formed in the microscope just in the same way as in the case of the naked eye, *i.e.*, perspectively, whilst Professor Abbe insisted that oblique vision in the microscope is entirely different from that in ordinary vision, inasmuch as there is no perspective; so that we have no longer the dissimilarity which is the basis of the ordinary stereoscopic effect, but an essentially different mode of dissimilarity between two pictures," &c. A note, however, by Dr. Carpenter limits the discussion on his part to *dioptric* images formed by low power and small angular aperture, and not to images formed, as Professor Abbe states, by combination of *diffraction spectra*.

Before closing this part of my subject may I be permitted to ask if the word "stereogram" should be used in any relation to pictorial images? These are days of haste, and though our verbal diction may be dwarfed into correspondence with the times, will it compensate for a misleading vocabulary? The causation of, or the apprehension of, recto and pseudo-stereoscopic images is, I believe, not yet definitely settled physiologically, and probably will for many a long day remain for the hidden future.

To terminate this article may I use the opportunity to now relate a very curious effect that occurs under the following conditions? When I stand at a short distance before a window pane of figured greyed glass 14 × 13 inches, and distant from it, say, by measurement, five feet, or any less distance to within three feet, and look carelessly through the greyed glass into space without any distinct aim—in fact, what an onlooker might call looking into vacuity—I note, firstly, the design as clear glass and the interspace as greyed glass, but after the lapse of a few seconds, without any conscious effort, the window pane appears to move bodily and slowly away into the distance, preserving the distinctness of the pattern but under a considerable magnification. The real window pane has apparently become perfectly transparent, or does not appear to exist; as I recede the aërial picture recedes, but with rapidly increasing magnification; at the distance given of the observer, five feet, the central dots in the octahedrons of the design, which are three inches apart, have now become separated, as nearly as I can calculate by vision, to twenty-four inches, and on measuring the distance from the window to the supposed position of the aërial image I find it to be twenty-two feet. These measurements of magnification and position of the aërial image must not be taken as absolutely correct, but the nearest I can give. Approaching the window the image draws nearer and lessens in size. Thus much for the two eyes. On shutting either eye the aërial image remains after the binocular production of the same, whilst with a single eye regarding the window and looking into space there is no formation of an aërial image. There is also another point that may be named. The frame of the window does not appear projected into space, the aërial image apparently having no frame; movement of the head displaces the magnified image proportionately.

I cannot give any satisfactory theory to these singular effects, therefore silence is a safeguard. Nevertheless, I should be grateful to the editor if he can give a rational exposition to these appearances. We know the effect of a reflecting surface as the common mirror, but this differs entirely, for we must keep in view the statements; the real object becomes apparently invisible, and is removed into space greatly magnified; the magnification and distance in space are related to the distance of the observer from the window pane; the aërial image remains when viewed by one eye, but cannot be produced by it. No one to whom I have named the above has offered any satisfactory explanation. This, I trust, may prove an apology for trespassing on the good nature of our editor for a solution of my difficulty.

R. L. Maddox, M.D., Hon. F.R.M.S., &c.

HARDWICH ON SCOTT'S WARM-AIR SATURATOR.

In fulfilment of a promise given in my last, I now send you the result of some experiments made to test the capabilities of Scott's warm-air saturator in resisting the force of exploding gases.

The oxygen used in the experiments was supplied by Messrs. Jameson & Reid, of Newcastle-on-Tyne, agents to the Manchester Company, Limited, working Brin's patent, and Mr. Reid himself kindly consented to be present as a witness that the experiments were conducted with impartiality.

I am aware that Brin's oxygen does not contain more than ninety-two per cent. of the real gas, but it is the kind most usually employed; and probably oxygen made from chlorate of potash would seldom be purer, taking into account the atmospheric air from the bag and also from the retort and washing bottles.

Another reason for using cylinder oxygen was that many persons suppose that if an explosion were to occur, it would be more dangerous than with bag oxygen, in consequence of the high pressure of the gas as it issues from the regulator, amounting often to as much as twenty-five inches of water when the cylinder is full.

Mr. Scott sent the saturator to me ready charged, so that I do not know exactly how much gasoline it contained, but he tells me that his rule is to put in enough wool to absorb and retain twenty fluid

ounces of liquid, after filling and draining off the excess in the way you do with the small benzoline sponge lamps.

I began the experiments by using the saturator for one of my ordinary limelight lantern lectures. It ran well for an hour and a half with a single wick Price's night-light, and the supply of gasoline vapour kept up to the end without any alteration of the taps. On weighing the saturator after the lecture was over, I found that it had lost three and a half ounces, equal to about five fluid ounces of gasoline.

To reduce the gasoline still further I passed a slow stream of air through the saturator for a couple of hours, and, taking off the nipple, burnt it at the open end of the jet nozzle. It burnt with a yellow smoky flame, very much like the gas you see flaring away in a butcher's shop.

On putting the saturator again into the scales it had lost four ounces, equal to six fluid ounces of gasoline, so that I calculated there would be about nine fluid ounces still remaining. Such being the case, I thought the time had come for connecting it with the cylinder of compressed oxygen.

The pressure in the cylinder at the time of starting was shown by the gauge to be 124 atmospheres. The cylinder valve was opened to the full extent, and both the taps of the saturator were turned on full, so as to bring the whole of the pressure to bear upon it.

I did not attempt to burn the oxy-gasoline vapour at the open end of the nozzle pipe (although it might have been done safely at this stage of the evaporation), but screwed on a nipple having an orifice of exactly one-twentieth of an inch. On lighting up, the flame showed signs of yellowness, and had too much carbon in it for incandescence; for when the valve of the cylinder was suddenly closed, leaving all the other taps open, the flame gradually died out at the end of the nipple, and did not pass back into the mixing chamber.

On starting everything again, and turning on enough oxygen from the O-tap of the jet to bring the flame to what experience had taught me to be the hottest point, it passed down readily into the mixing chamber when the cylinder valve was closed, but would not go any further. Clearly there was still too much of the hydro-carbon vapour in the saturator to admit of an explosion.

There was, therefore, nothing to be done but to pass more oxygen through the saturator and patiently to watch the flame until the best point had been reached, the O-tap of the jet remaining closed.

But perhaps someone will say, How can you tell by looking at the flame whether the gases are in the right proportion to produce the most violent explosion? The answer is, by its general appearance, and especially by the length of the *interior cone of imperfect combustion* at its base. Oxy-*hydrogen* passes back with the loudest report when there is no interior cone at all, the two gases being present in the right proportions to form water. Oxy-*ether* requires a cone of a quarter of an inch long to explode in perfection, whilst oxy-*coal gas* is intermediate. I began by assuming that oxy-*gasoline* would correspond to oxy-ether, but I found that such was not the case, for after five or six trials the loudest report was produced when the interior cone at the base of the flame was very small, viz., about one-eighth of an inch long, the same as for coal gas.

This, then, was to be the crucial experiment—to cut off the supply of oxygen, whilst all the taps were open, except the O-tap of the jet, and a clean pencil of violet-coloured flame of ten inches long burning at the nipple under strong pressure, with a minute interior cone of about one-eighth of an inch. The experiment was accordingly made. We took out our watches and suddenly shut the valve of the cylinder. In fifteen seconds (as soon as the pressure in the regulator had relieved itself) the flame passed into the saturator with a report about as loud as a small pistol. I was pleased to find, however, that no harm was done; and on immediately turning on the oxygen again, it appeared that the wool packing was not on fire, for the flame could be relighted at the tip of the jet.

If time permitted I might indulge in theorising, but as it does not, the facts must speak for themselves. We fired the gas six times, in four of which, at least, the flame appeared to me to go down quite into the saturator. Yet, as far as I can see, it is still in good working order, and I intend to use it in my next lecture, with the simple precaution of having an other tank at hand in case the wool should prove to be singed and shrivelled up by the explosions.

Two points I have omitted to mention, viz., that the saturator was connected with the cylinder of compressed gas by an indiarubber tube five feet in length, and with the jet by two short pieces of stout rubber, small in bore, of nine inches each. Also that the lime cylinder was removed from the pin during the whole of the experiments.

If you wish to study the oxy-hydrogen flame, the lime should always be taken out of the way. And it is questionable whether, in the foregoing experiments, the flame would have burnt at the tip of the jet for a quarter of a minute after closing the cylinder valve if the lime had been present. Certainly it would not have done so if the nipple had been very close to the lime; for in that case the flame is always deflected backwards at the lower part, and tends to pass down into the mixing chamber. Supposing the angle at which the jet nozzle is bent to be an angle of 45°, the flame should be a quarter of an inch long before it touches the lime.

T. Frederick Hardwich.

A FARTHER NOTE ON EIKONOGEN.

In my last communication to The British Journal of Photography on the subject of eikonogen, I think that I emphasised the fact that it by no means follows that because a certain developer is good or bad for one kind of plate it is good or bad for all, and that it need not even be concluded that because a developer shows no particular advantage for any of several kinds of plates it will not show a decided advantage for some. I had so remarkable a confirmation of this since I wrote last that I think it is worth describing.

I received a week or two ago a sample of a German brand of plates for trial, and along with them a bottle of Dr. Andreson's new eikonogen in large crystals that I have heard described as "white." A word on this eikonogen first of all. It could not by any possible stretch of imagination be described as "white" as I received it. It was of a dark, purplish-brown colour. One Japanese friend described it as of the colour of "doro," which, being interpreted, means mud. A closer examination showed, however, that the colour was due only to an inexceedingly thin surface coating of crystals that were at least something approaching white in the inside.

I suppose that the substance absorbs oxygen when dry; but if it be kept in a properly stoppered bottle it can, of course, absorb only the very limited amount that is in the air that is stoppered up with it, and that cannot, I imagine, do any harm. At any rate, the eikonogen that I speak of gave a solution of great brightness and clearness.

Concerning the solubility of the salt, I found it possible with some difficulty and the use of warm water to make a five per cent. solution of it, and this solution would, I imagine, have been permanent, so far as retaining the salt in solution is concerned, in fairly warm weather—certainly in the hot summer weather that we have here: but it was not permanent in my dark room, which is very cold in winter. The eikonogen soon began to crystallise at the bottom of the bottle. Even diluting this five per cent. solution with equal parts of water so that it was at a strength of only two and a half per cent., or at about the strength recommended in use for some purposes, a little of the substance had crystallised on the bottom during the night, but as at this time of year the temperature of my dark room must fall very nearly to the freezing point during the night, I consider this no fair test. For ordinary temperatures it is quite feasible to use a solution at least as strong as three per cent.

As to the action of this new form of eikonogen, I think that, taking it all round, it works better than other samples that I have had; but what I wish to do here is to draw attention to the result of a set of comparative experiments with this developer and pyro on two different kinds of plates.

I set about testing the German plates that I refer to above, using first the ordinary pyro developer with sulphite of soda and carbonate of soda.

The quantities were:—

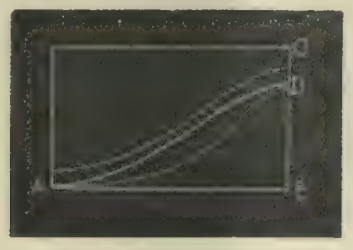
Pyro	2 grains.
Sulphite of soda	8 „
Carbonate of soda (in crystals)	10 „

to each ounce of developer.

I found, on developing plates exposed in the camera with the above solution, that good clear images were got with a short exposure, but that, although the detail was plentiful, it was somewhat thin, giving the appearance of under-exposure. The "curve of density" was, in fact, a low one, and to raise it to something approaching the straight line that it ought to be, or, in other words, to produce negatives that appeared fully exposed and gave correct gradation, or "values," as it is now fashionable to call it, it was necessary to so far increase the exposures that the extreme shadows were slightly veiled.

A comparison was now made between the action of pyro and of eikonogen. Two plates were exposed on the same subject for the time that gave, in the first experiment, an appearance of under-exposure. They were developed side by side, using, in the case of the pyro, the developer given above; in the case of the eikonogen the same, but that six grains of eikonogen took the place of the two of pyro.

The result of the comparison was very surprising to me. The image appeared a little sooner with the eikonogen than with the pyro, but density in the high lights was got in the same time by both. There was the utmost difference, however, in the appearances of the images. The ultimate detail, as judged of by looking at the faintest that became visible, was the same in both cases (as a matter of fact, the same sensitometer number was afterwards got by the two developers), but the detail was so much stronger under the eikonogen than under the pyro, that the eikonogen negative had the appearance of having had at least twice the exposure of the other, and this result was confirmed by trying how long it was necessary to expose to get a similar result with pyro. It is to be observed that the same result, exactly, could not be got with any variation of exposure, as the curves of density differ. It took, however, in the case of pyro, fully twice as long exposure to get that somewhat indefinite thing, a "correctly timed negative," that it took to get the negative that would answer the same description with pyro. It is therefore the



case that, for this particular brand of plates, the use of eikonogen in place of pyro enables the exposure to be reduced by at least one half, a thing that is, I need not say, of the utmost importance.

It is difficult to judge of a curve of density by mere inspection of negatives, but I think that the above is a fairly approximate representation of the three curves referred to. The line A B is supposed to represent light, the line B C density, and the gradation of density in the negative ought, of course, to be a straight line starting from A and cutting the line A C at some point, say D. The thin lower curve is supposed to be the density curve of the pyro-exposed plate with the short exposure. The thick full line above it is the density curve of the negative that had had the same exposure, but that had been developed with eikonogen, and the dotted line is the curve of density of the pyro-developed negative that had had twice as long an exposure.

These results were so different from any that I had had before that I decided on a set of comparative experiments between different plates. I took a brand of plates made in Japan that I had tried with eikonogen in previous experiments without particularly favourable results.

The two brands of plates gave practically the same sensitometer number when developed with pyro; but the last seven or eight figures were much thinner in the case of the German than in the case of the Japanese plate.

A German and a Japanese plate were exposed for the same length of time to the same subject, and were developed side by side in the same dish with the pyrogallic developer given above: result, that the German plate had the appearance, after fixing, of having had considerably less exposure than the other.

In the next experiment the only difference was that the two exposed plates were developed together in the eikonogen developer described above. Here the results were just reversed. The eikonogen brought out a negative on the German plate having the appearance of quite full exposure, and with ample density. The negative on the Japanese plate had the appearance of having had somewhat less exposure than the other, and was in every way a poorer-looking negative.

It was quite evident that, whereas pyro suited the Japanese plate best, eikonogen suited the German plate best. A comparison was therefore made between the pyro-developed Japanese plate and the eikonogen-developed German plate. Both were very satisfactory, but, on the whole, the latter had the appearance of having had the fuller exposure.

It is difficult to give the result of the comparison of the pyro-developed German plate and the eikonogen-developed Japanese plate. The former appeared to have had less exposure than the latter, but the latter was generally somewhat flat and unsatisfactory.

The experiments were repeated a second time with a like result.

Afterwards a set of experiments were made with eikonogen and the German plates, to study the result of varying the quantity of eikonogen whilst keeping the other constituents of the developer constant.

By doubling the quantity of the eikonogen the rapidity of development was much increased, and at first sight it appeared as if there was a gain in detail, but a close inspection of the fixed negatives led to the conclusion that there was no actual gain, but that the appearance was due to a slight fogging action of the developer, whilst the high lights seemed distinctly to suffer, getting "clogged up."

I found, as in my first experiments with eikonogen, that very satisfactory negatives could be got with very weak solutions, and that the same amount of detail could be brought out as with strong, if only long enough time were allowed; and, indeed, I should incline to advise those who have patience enough to use only half the eikonogen that I mention as having used (only three grains to the ounce, that is), and to wait patiently till detail and density are got, as they will be in time.

The result of these experiments is to show that the new brand of eikonogen appears to be an improvement on the old, and that there are some plates for which eikonogen is a distinctly better developer than pyro, whilst there are others for which it is barely as good. On the whole, these latter experiments impress me most in favour of eikonogen than did any previous ones. W. K. Burton.

BINOCULAR VISION AND THE STEREOSCOPE.

(Communicated to the Manchester Amateur Photographic Society, March 11, 1890.)

There are about one thousand two hundred millions of human beings in the world, "mostly fools" Carlyle observed, but still more "mostly" furnished with two eyes, not more, not less, as the universal—in fact, apart from accidents or "freaks of nature"—is abundant evidence in itself that the reason for our having them must be extremely cogent. Not only has man two eyes, not more, not less, but the same rule extends throughout the whole of animated nature.

It is true that there are certain apparent exceptions to this rule. The mole was long imagined (erroneously) to be blind, certain fishes which inhabit the everlasting dark waters of the Great Kentucky Cave are said to have no appliances for seeing, and certain insects are said to have not one, but *several hundreds* of lenses in each of their two eyes. These seeming exceptions, however, only prove the rule. In the absence of light any number of eyes, whether large or small, would be destitute of use, and as for the number of "facets" in certain spiders' eyes, their use, whatever it may be, is clearly subordinate to the principle of vision with two eyes; and whatever the number of facets we find, they are found on *two* eyes.

What, then, is this enormously important principle of seeing with two eyes, or of binocular vision as it is termed? With a single eye we can form certain not very perfect notions of length and breadth, but two eyes are absolutely necessary to form a judgment of depth or thickness. Binocular vision, then, enables us to see things solid. Writers on this subject are very fond of saying that the eyes suggest certain considerations to the mind, and propound as it were certain dogmas for its belief. This is one way of putting it, but it is not a good one.

What the eyes suggest to the man who has been born blind, but

who has received the power of sight from the instrumentality of the surgeon's knife is, that the objects which he sees are in *contact* with the eyes; and the suggestion is not true.

What the eyes do, is to present two pictures for the inspection of the brain, and what the brain does, is to learn through the instrumentality of the other senses and by the process of experience what these pictures mean.

That the pictures of bodies as seen by the two eyes are not alike, most of us already know. Euclid (B.C. 300) proved that he knew that the pictures of bodies seen with two eyes are formed by the union of two dissimilar pictures (one formed in each eye). But to make the matter clear to all, let us suppose a photograph be taken of this square box. We should produce an outline such as would be seen by one eye placed in the position of the lens. Now by removing the camera to a position two and a half inches to one side, we should produce another outline, and we see more of one side of the box than is shown in the previous picture, and this is what would be seen by the other eye. Then the pictures are not alike.

If we caused these photographs to overlap they would not register, and we should still see two different pictures, for they could not be united as one. But if these two photographs were placed side by side (at suitable distances), and the right eye photograph viewed with the right eye, and the left photograph viewed with the left eye, the brain would combine them, and we should see only one as in nature. Every person, however, cannot see these right and left pictures with the right and left eye *separately*, and the stereoscope assists us to do this.

Before entering upon the theory of the stereoscope it will be necessary to state a few facts, the accuracy of which we will endeavour to prove.

When we see an object distinctly, we only see a point of that object *singly* at a time, all other points are seen double and indistinctly because the image of them falls upon a portion of the retina that does not give distinct vision; and *when we see an object distinctly, the optic axes are converged to the particular point of that object*; the nearer the object the greater the convergence, and the more remote the less the convergence.

The eyes are capable of the most rapid movement, and with so great a precision that the optic axes may be united at several points in succession by muscular motions that are almost instantaneous; and *it is by greater or less convergence that we judge objects to be nearer, or more remote.*

But this successive convergence is not necessary to the impression on the mind of solidity. The images which are outside the optic axes, indistinct or "out of focus," make us *conscious of their presence*, and the mind associates them with distance or solidity.

Now let us test the accuracy of what has been said.

A number of experiments and demonstrations were now given, with explanations, illustrated by diagrams drawn on the black board.

If we hold this box at, say, eighteen inches from the eyes, and converge the optic axes to the corner which is nearest to us, we shall see that point distinctly, and at the same time shall be conscious of the presence of the other corners (which we shall see indistinctly), and the brain will associate them with a solid object, and of a certain size.

(To be continued.) W. I. CHADWICK.

THE ADDITIONAL AWARDS AT THE CRYSTAL PALACE EXHIBITION.

SILVER MEDAL, given by Mr. S. G. Buchanan Wollaston for the best picture, irrespective of class, in the Amateur Section, not having taken any other award in this exhibition. Awarded to Paul Lange for 1431, *A Tour in Norway.*

SILVER MEDAL, given by Mr. J. F. Peasgood for the best picture, irrespective of class, in the Professional Section, not having taken any other award in this exhibition. Awarded to F. Whaley for 1146, *A Tale of the World.*

SPECIAL SILVER MEDAL, for picture not previously shown at a public exhibition. Awarded to E. C. Middleton for 114, *Gossips.*

The attendance at the 1890 Exhibition has beaten the record of previous years by a considerable majority.

LANTERN SECTION.—BRONZE MEDALS.

Professional (sets of forty-eight slides).—Section 1. British Subjects, J. Dore; 2. Foreign Subjects, G. E. Thompson; 4. Microscopic Subjects, F. Evans; 5. Statuary Subjects, Sciopticon Company.

Amateur (sets of six slides).—Section 1. British Landscape, F. Griffiths; 2. Foreign Views, A. Heywood; 3. Seascapes, F. W. Wade; 4. River and Lake, J. E. Austen; 5. Architectural Exterior, E. A. White; 6. Architectural Interior, J. A. Sinclair; 7. Still Life, J. Carpenter; 8. Animals, K. L. Reynolds; 9. Figures in Motion, H. Little; 10. Microscopic, A. A. Carnell.

Foreign Notes and News.

A WORK is now being published in Amsterdam having for its object to give descriptions of all the animals in the Zoological Gardens. The publication is to be illustrated by photographs, and among these some of the most interesting will be the instantaneous views of living fish. Herr E. Cohen, by whom the fish were "taken," employed the magnesium flash light for the purpose. The fish were in the tanks usual in aquariums. The chief difficulty in the undertaking was due to the fact that the tanks could not be first darkened, as the fish then immediately went to sleep on the bottom. Notwithstanding this objection, and the further difficulty of catching the fish in the right part of the tank, the results are said to be highly satisfactory.

W. K. BURTON's paper on the relative merits of eikonogen and other developers is going the round of the foreign periodicals either in the form of abstract or translation. A full and very accurate translation of the whole forms the *pièce de resistance* of the last number of the *Photographische Mittheilungen.*

THE halation controversy still rages with unabated fury among our German colleagues, and this week has brought forth a rather interesting short paper by Herr M. Stolt. He points out that Dr. Stolze's experiments have demonstrated the truth of Herr von Gothard's supposition that total reflection has after all something to do with the matter. It would at first naturally be supposed that the ordinary angles of incidence met with in photography are not sufficiently great to permit of this phenomenon occurring; but Dr. Stolze appears to have succeeded in showing that it is not to the reflection of direct rays, but to the total reflection of the rays dispersed by transmission through the translucent sensitive film that the ordinary instances of halation are due.

AT the last meeting of the Berlin *Verein Photographischer Mitarbeiter*, some remarks by Herr Kieuning threw an amusing side-light on the opposition to the employment of flash-light photography which has been raised from various sides. Certain photographers, and as it would appear more especially certain photographers' assistants, have been at pains to prove what an unsatisfactory method the magnesium light method is, *because* they dread being obliged to take portraits of an evening if its employment become general.

HERR KIEUNING went on to give a good many valuable hints with regard to the practical application of the magnesium flash lamp, and drew attention especially to advantages of the circular close wick flame, which, when the current of air carrying the magnesium is blown through it, becomes intensely hot instead of being nearly extinguished by the cold, as is the case with a flat flame when blown upon from the side.

THE constantly wider diffusion of interest in photography cannot be better demonstrated than by the growth and formation of new societies. The amateurs of Brunswick have recently met together and arranged to form a "Brunswick Photographic Society." We wish them every success, and hope they may be induced to give the world some good reproductions of the wonderfully picturesque mediæval houses still remaining in their delightful old town before they have fallen a prey to modern civilisation.

THE Leipsic Central Union of Booksellers has arranged to hold an exhibition of photographic printing on April 15 in the spacious rooms of the "Buchhändlerhaus." The principal Austrian and German firms have already agreed to exhibit. This exhibition is to be followed by a second one in May, which will embrace portrait, landscape, and scientific photography; in fact, all the subjects usually included in such exhibitions.

THE Photo-chemische Gesellschaft of Berlin has, on its own initiation, arranged for a photographic competition, 200 m. being the prize to be competed for, and the subject a perfect (?), sharp, instantaneous view of people or animals—military, race, or sporting subjects, &c. The subjects must be sent in by August 31, 1890.

IN spite of Dr. Eder's rather dubious estimate of its advantages, formic aldehyde as an addition to plates and developers is being patented in all countries. However, the actual usefulness of an invention or discovery at the present day is not of much importance; the main thing is to get somebody to buy it from you, or, better still, to form a company to work it.

MESSRS. WILLIAMS, BROWN, & EARLE, of Philadelphia, have sent us a cabinet picture of a dog's head taken by the flash lamp of Mr. E. M. Pine. It is a fine example of the possibilities of nocturnal photography.

INTERNATIONAL EXHIBITION, EDINBURGH.—We learn that Mr. A. P. Baker, as representing the London and County Photographic Company, has been appointed official photographer to this exhibition.

Our Editorial Table.

PRACTICAL PHOTO-MICROGRAPHY. By ANDREW PRINGLE.
(New York: The Scovill and Adams Company.)

THIS work, which forms the most recent addition to the excellent and useful "Scovill's Photographic Series," is dedicated by its author to the medical profession, being partly intended to promote physiological research by photographic methods. It contains several illustrations, *inter alia*, a foot of spider, hairs on the proboscis of blowfly, typhoid bacilli in intestine, bacilli tuberculosis in lung of horse, with others of like interest. The work is the first of the kind that has been issued since time has elapsed for proper trials of the two great and novel features of the science—apochromatic objectives and colour-correct plates.

Mr. Pringle commences at the beginning. After a chapter on the history of photo-micrography he speaks of the best forms of microscope stands, several of which are figured. Passing on to the objective, or object glass, he observes that the first essential is that it be corrected for photography. Should the objective not be thus corrected in itself (the best plan), then by the use of a supplementary lens the chemical and visual rays should be brought into coincidence.

The condenser is stated to be of almost equal importance with the objective, but those who cannot afford to buy an achromatic one need not despair of producing very fine work, though the very finest is beyond their reach. In this chapter Mr. Pringle describes what he considers to be the best forms of condensers for photo-micrographic work.

For illumination the merits of five radiants are considered, viz., sunlight direct, daylight diffused, electric light, oxy-hydrogen limelight, and lamp-light. Of these the limelight is preferred by the author for reasons given. Where time is no object a good oil lamp will also be found to answer all desired purposes.

In like manner, and with all necessary fullness, the various other stages of the work, from fixing and adjusting the camera to the printing of the resulting negative, are gone into, and one feels as he reads that the author is intimately and practically conversant with all the details of photo-micrography, and knows the most fitting language in which to clothe his ideas so as to render his teachings perfectly understood by those whom he is addressing, and for whom it will form an invaluable guide to a fascinating branch of science. Besides the full-page plates of enlarged objects already referred to, the work is well illustrated throughout with cuts of apparatus and other diagrams.

As a book it is got up in the usual admirable style peculiar to all the Scovill's series. It contains 190 pages; price two and a half dollars.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,393A.—"Improvements in the Films or Supports used for Photographic Negatives or Prints." Communicated by F. Crane. J. S. FAIRFAX.—*Dated June* 26, 1889.

No. 4606.—"Improvements in the Manufacture of Transparent Flexible Films for Photographic Purposes." J. LESLIE.—*Dated March* 25, 1890.

No. 4666.—"Improvements in Photographic Cameras." J. C. E. CARRÉ.—*Dated March* 25, 1890.

No. 4704.—"Improvements in Cameras for Photographing Objects in Motion." F. H. VARLEY.—*Dated March* 26, 1890.

No. 4863.—"Improvements in Apparatus for Lighting Photographic Dark Rooms." F. W. BRANSON.—*Dated March* 28, 1890.

No. 4918.—"A Frame or Stand for Photographs, Pictures, &c." S. M. HANCOCKS.—*Dated March* 29, 1890.

No. 4928.—"Improvements in the Mode of Using Compressed Gases for Illuminating Purposes." THE MANCHESTER OXYGEN COMPANY and W. M. JACKSON.—*Dated March* 29, 1890.

No. 4940.—"Improvement in Method of Providing Rigid Support of Sensitised Films during Exposure." W. HEIGHWAY.—*Dated March* 29, 1890.

No. 4956.—"Improvements in Photographic Printing Apparatus for Producing Photographic Copies at a Rapid Rate." F. GREENE and F. H. VARLEY.—*Dated March* 29, 1890.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Thursday next, April 10, will be the last lantern night this season. A special feature will be the exhibition of slide carriers and slide-changing apparatus.

HACKNEY PHOTOGRAPHIC SOCIETY.—Prospective arrangements.—April 10, J. Carpenter, *Lantern Slide Making*. April 24, Annual *Soirée*. May 8, Annual meeting. May 22, Mr. E. J. Wall, *Photographic Chemistry*. June 12, Mr. A. R. Dresser, *Hand Cameras*.

D. TRENT, manager and operator for the Danish Studio Company, sends for inspection some specimens of flash-light portraiture, and says that, statements to the contrary notwithstanding, the studio named takes precedence of all others in this country in priority of date.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 8	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 8	Derby	Society's Rooms, Derwent-bldings.
,, 8	Bradford	50, Godwin-street.
,, 8	Manchester Amateur	Manchester Athenæum.
,, 8	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 9	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 10	Birkenhead	Hamilton Rooms, Birkenhead.
,, 10	Cheltenham	
,, 10	Manchester Photo. Society	36, George-street.
,, 10	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 11	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MARCH 27.—Mr. F. W. Pask in the chair.

After some discussion it was resolved to hold a special lantern meeting—the last of the season—on Thursday evening, April 10, and it was agreed that on this occasion the exhibition and trial of the various slide carriers should form a prominent feature.

Mr. T. E. FRESHWATER pointed out the desirability of supplying competitors in trials of printing processes (whether for prints on glass or on paper) with sets of negatives made by a non-competitor, and it was arranged that this should be done when practicable.

The Rener method of stripping gelatine negatives by treatment with dilute hydrofluoric acid was next briefly discussed, and among others Mr. A. HADDON testified to the value of this method.

Mr. A. HADDON then gave a brief demonstration of the method of etching glass by means of hydrofluoric acid—this being supplementary to his recent discourse on glass working for photographers. The speaker first referred to the method of engraving on glass by means of a quickly revolving copper disc supplied with emery and oil—a method commonly employed in the case of the rougher commercial glass measures, and in introducing hydrofluoric acid he referred to the fluor spar or calcium fluoride as the most common fluorine mineral, and referred to its decomposition by oil of vitriol or sulphuric acid, whereby vapours of hydrofluoric acid are evolved, these being condensed in water, the ordinary "fluoric" acid of commerce being thus obtained. It is usually sent out in guttapercha bottles, guttapercha and lead being the only readily obtainable materials for making vessels in which to store it. Mr. Haddon then proceeded to coat glass plates and other articles with wax by first warming the glass and then rubbing on the wax; through the ground glass lines were traced with a steel point, and the glass being then exposed to the action of hydrofluoric acid the parts unprotected by the wax were soon deeply etched. A soft wax made by melting together one part of turpentine and four parts of beeswax answers well. For etching by the vapour of hydrofluoric acid Mr. Haddon stirred a little powdered fluor spar into some oil of vitriol contained in a leaden trough, and after having very slightly warmed the mixture he laid the glass over the mouth of the trough cover-wise. After three or four minutes the glass was removed, and on clearing off the wax the lines were found to be etched with the rough bottom to the furrows, which is characteristic of etching by the vapour of hydrofluoric acid. In another instance Mr. Haddon dabbed some of the liquid acid over a sheet of waxed glass on which a tracing had been made, and an etching in clear, bright lines was obtained, this clear line etching being the characteristic when the solution of hydrofluoric acid is employed. Etchings of this sort if filled in with pigment make excellent lantern slides when it is required to project diagrams or writings for lecture illustration. In etching by the vapour an ordinary carbon print may be used as a resist, and a photographic image in sensitive bitumen may serve with either vapour or liquid; in fact, commercial etched tablets are often made by printing from positives on bitumenised glass, dissolving away the unexposed parts by benzole or turpentine, and finally etching with hydrofluoric acid; when flashed glass is used the lettering or device stands out colourless on the coloured surface. Mr. Haddon cautioned those using hydrofluoric acid not to employ it in the same room where lenses are kept, otherwise damage to the latter might result; he also referred to the risk of injury to the lungs by the diffusive vapour of the acid.

The Secretary (Mr. F. A. BRIDGE) gave particulars of his experience in glass etching.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MARCH 28.—Mr. Bedford, Chairman.

The following were elected members:—Misses Barton and Martin, Messrs. Skillman, Gottheil, Farrington, Evans, Plummer, Hinks, and Dr. Roland Smith.

An application for assistance was considered and granted.

Mr. Hambly was appointed Hon. Local Secretary for Lincolnshire.

HOLBORN CAMERA CLUB.

MARCH 28.—This being the monthly lantern night, about eighty lantern slides were shown, together with a series made by members of the Club.

At the conclusion of the lantern entertainment the prizes won in the recent competition were presented to the successful competitors by Mrs. Tregaskis, who at the same time offered an Optimus lantern for the best set of six slides made during the coming season.

The remainder of the evening was devoted to music, &c.

Friday, April 4 (Good Friday), no meeting; Friday, April 11, annual general meeting.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

MARCH 24.—Mr. Thomas F. SMITH, F.R.M.S., delivered a lecture on *Micro-photography*, illustrating it by means of lantern slides, and showing the method of making the same. Both botanical and histor[illegible]ological slides of great interest were shown, and attested to the care which he must have given his subject, some of them being enlarged two thousand diameters.

An outing has been arranged for Easter Monday to Welwyn, train leaving Finsbury Park (Great Northern Railway) at a quarter to eleven. Any interested are invited to join.

BATH PHOTOGRAPHIC SOCIETY.

MARCH 26.—Mr. W. Pumphrey (President) in the chair.

Messrs. Thomas Bush, W. Charles Lee, Henry Isaacs, and Charles G. R. Wood were elected members.

The HON. SECRETARY (W. Middleton Ackman) read a communication from the Mayor of Sutton Coldfield (one of the Norway excursion promoted by the Vesey Club, which starts in July next.

The CHAIRMAN said the Vesey Club desired to associate with scientists of all kinds in this special tour. The arrangements were very complete and as he should be one of the party, he hoped to report favourably upon his return.

The SECRETARY drew attention to a lantern candle and reading lamp—the "Perfection" one advertisements in this JOURNAL.

The following gentlemen were appointed an Excursion Committee for the ensuing season:—Messrs George F. Powell, Augustus F. Perren, A. W. Yabsley, Charles Collins, and the secretary. The first outing will take place on Thursday, April 24, and Great Western Railway, 11.25 a.m., to Box and neighbourhood.

The CHAIRMAN announced that the annual report having been printed in full by the proprietors of the *Bath* newspapers, 250 reprints had been ordered, and those members who required copies could obtain them on application to the Secretary. There was one error as to date—the publication of Daguerre's process should be 1839 instead of 1840, and it would be more correct to say the neighbourhood of Bath was the scene of many of Fox Talbot's researches.

Mr. C. H. TAUNTON (son of Fox Talbot) said he felt responsible for those matters mentioned by the Chairman being spoken upon the meeting having spoken to Mr. Ackman concerning them earlier in the day. With regard to [illegible] there was an error in the Committee's report; he was not prepared to say then the exact date, but it would be found in the appendix to the second edition of Tissandier's book. His father made an application for a patent earlier than January, 1839. He communicated on the 25th of January, 1839, his method of making camera pictures, to avoid being forestalled in case Daguerre's process showed to similar. This was followed by the paper his father read on January 31, 1839, before the Royal Society. All these experiments were carried on at Lacock Abbey, thirteen miles from Bath.

The CHAIRMAN read a passage from Robert Hunt's early researches bearing on the discovery of camera pictures.

Mr. TAUNTON thought Niepce produced camera pictures at an earlier date than his father or Daguerre.

The CHAIRMAN said the process must have been a very slow one if Niepce used it chiefly for the purpose.

Mr. TAUNTON replied that Niepce's process was very slow. Daguerre's process did not succeed like father's; it might have been the other way, otherwise its publication might have been delayed; no doubt he published it to protect himself. He was inclined to think Niepce made the earliest camera pictures. Wedgwood tried it and failed.

A lantern exhibition of transparencies produced by members of the Society during the past session then took place. The exhibitors were Messrs. Bruton, Pumphrey, Mason, Wells, Perren, Powell, Pumphrey, and the Rev. E. A. Purvis. Some very excellent slides, toned with potassium sulphide, were shown by the President and Mr. Bruton. The remainder were by gelatine processes, developed either with hydroquinone or ammonia pyrogallol. An oxy-hydrogen apparatus was lent by the President. The Chairman hoped the members would try again next year, so that all might see the results of each one's work. Upon the whole, he considered they had had a very enjoyable evening of a variety of subjects. It was interesting to note the different treatment those subjects had received at the hands of the members.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

MARCH 25.—The meetings and friends to the extent of four hundred and thirty, held their first Ladies' social. Although the Association has been in existence since 1856, the experiment of a ladies' meeting had not been before attempted. The result, however, proved highly successful in every way, the large hall, the "Exchange," being occupied to its utmost capacity with an appreciative and [illegible] audience.

The first hour was devoted to an excellent concert (vocal and instrumental), some of the leading local musicians kindly assisting.

The entertainment concluded with the President's lecture on *Norway*, given for the first time to a Liverpool audience. This embraced one hundred and thirty views taken last June by the lecturer, Mr. Paul Lange. The pictures were shown to advantage on a sixteen-foot opaque screen.

MARCH 27.—The President (Mr. Paul Lange) occupied the chair.

The following gentlemen were elected members:—Messrs. T. J. P. Masters, H. G. Fleming, William Mason, jun., E. M. Entwistle, J. A. Knowles, Oswald Hemming, J. H. Fairlie, F. H. Dudley, and Dr. E. J. Foulerton.

The PRESIDENT announced that the new Boston slides, entitled *The White Mountains*, and Mr. John Hargreaves's lecture on *The Completed Survey of the Heights of Wirral* would take place in the City Hall, Eberle-street, on Monday, April 14. He also announced that the next of the series of practical demonstrations for beginners would take place next Wednesday, April 2, in the Club rooms at half past six p.m., the subject being *Developing*, illustrated and explained by Messrs. J. A. Sinclair, F. B. Illingworth, and Paul Lange.

Mr. FRED EVANS was then called upon to explain the arrangements that were being made concerning the Convention of Photographic Societies of Great Britain at Chester in the last week of June, when, amongst other attractions, special facilities not hitherto allowed to amateurs would be granted by the Duke of Westminster for photographing both the exterior and interior of Eaton Hall.

The principal business of the evening was the contemplated photographic exhibition of 1891. The PRESIDENT entered very fully into the particulars of the matter: that it should take place in the spring of 1891 for the term of one month; that the offer of the Library and Arts Committee of the Corporation of Liverpool be accepted for the use of the same splendid apartments in the Walker Art Gallery as used in 1888.

The members unanimously decided that such an exhibition should be held.

The PRESIDENT called on Mr. T. S. HAYNE, the Hon. Secretary appointed for exhibition matters, who then explained in detail some fresh features which were in contemplation. In due time full details will appear on the prospectus.

The meeting concluded with an exhibition of photographic novelties, of which there were a large collection.

Colonel ELLISON explained a new hand camera convertible into an ordinary camera, of his own invention, also working on an ingenious tripod ball-and-socket arrangement made by himself.

Mr. William Faltin showed Anshutz's tripod for hand camera work; Mr. Macdonald Bell, enlarging and reducing cameras; and Mr. Hayne, various novelties from Messrs. Marion & Co., William Tylar, Swift & Sons, Archer & Sons, &c.

MANCHESTER PHOTOGRAPHIC SOCIETY.

March 13,—Mr. T. R. Coblay in the chair.

Mr. H. M. WHITEFIELD introduced a subject which he had at a previous meeting brought forward—that of organising a series of competitions amongst the members—and gave further details and explanations of the system of grade classifications or automatic handicapping of the members, which he had also previously introduced.

The HON. SECRETARY (Mr. W. I. Chadwick) said the meetings of late had been conspicuous in the lack of interest displayed, and although competitions might be better than nothing at all, he would be sorry to see that course adopted in *this* Society, a course which he considered beneath the dignity of what the Manchester Photographic Society ought to be. If the senior members would read more papers and give more demonstrations, and young members would bring more of their failures, ask more questions, make more use of the question box, &c., the objects of the Society—"the advancement of photography"—would be better met than by holding competitions.

The Chairman, Messrs. Chilton, Blakeley, and others joined in the discussion.

Mr. WHITEFIELD quite agreed with what the Hon. Secretary had said, and only in the absence of this interest, which was so very desirable, he had brought the competition matter forward.

It was resolved that at the next meeting (in April) there be an exhibition of members' work (direct prints or enlargements), which the Council shall divide into three or four classes, and that the vote of the members present shall be taken on the merits in each class, and that the winners be awarded a prize provided by the funds of the Society; that no member be entitled to more than one prize; that the work be from negatives taken during 1889 or 1890.

The Hon. Secretary exhibited a half-plate cantilever enlarging apparatus by Hume, of Edinburgh, and also some bromide enlargements which he had made by a limelight magic lantern, with four and three-quarter inch condensers from the half of a stereoscopic negative.

PHOTOGRAPHIC SOCIETY OF IRELAND.

MARCH 27.—Professor J. Alfred Scott, M.D., Vice-president, in the chair.

Two members were elected, and two gentlemen nominated.

Mr. J. H. HARGRAVE, C.E., gave a short description of the Forth Bridge, and illustrated his remarks by a dozen lantern slides.

As it had been requested by the notices convening the meeting, members brought lantern slides to show through the Society's lantern. Over 100 slides were brought; in the majority of cases they were highly creditable. Thomas's plates were mostly used, although the Alpha and Fry's were well represented. One of the best slides was by Miss White, from a negative taken on one of Edwards's isochromatic plates. The others were mostly wet plate work. With few exceptions the views and objects photographed were Irish, and well-known to members present. Lantern slides were contributed by Messrs. C. H. Matthews, Alcorn, Colgan, Connor, Woodworth, Cooper, Befoy, and Blakenay.

The Chairman announced that Professor P. H. Stewart, B.A., B.Sc., would read a paper on April 11 on *The Optical Stop and its Centre*.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

MARCH 5,—The President (Mr. Frederic Graff) in the chair.

Mr. STERLING announced that forty-three English slides, representing the Society's share of the 100 sent to this country by the Camera Club of London on account of the last English Interchange, had been received. They had been selected by lot impartially, and after the meeting would be distributed in like manner to the ten members whose slides had been selected to send abroad. Mr. Sterling stated that hereafter the Interchange slides to be sent abroad would be simply loaned, the idea of permanent exchange having been abandoned, so that eventually each member would get back all slides loaned to the Interchange.

Mr. BELL presented a paper on *Gelatine Emulsions* [this will appear subsequently]. In introducing the subject, he said he thought that it was the late President of the Society, Mr. Bates, who was first in this country to bring into use the gelatine plate. In his frequent trips to Europe, Mr. Bates had had Mr. Kennett prepare some of them and they were brought over.

Referring to the sensitiveness of plates, Mr. CARBUTT asked what does "40" or "20" mean?

Mr. COATES: I think it means the gullibility of the buyer. I have bought "40" plates and found "20" much better.

Mr. BROWNE: Mr. Bell, in the early part of his paper, alluded to Mr. George W. Hewitt's experiments. So far as I know, Mr. Hewitt was one of the earliest experimenters with gelatine plates, and certainly Mr. Hewitt's process and the results that he succeeded in obtaining were very remarkable. There was one peculiarity about his plates that I have never seen in any purchased plates, and that was that the appearance of the image was more beautiful than I have ever seen in a commercial plate. The appearance of the image was slow and remarkably beautiful. I think that in the future Mr. Hewitt will always receive credit as being one of the very earliest experimenters in gelatine dry plates.

Mr. BELL: Mr. Hewitt developed the gelatine plate precisely as a collodion dry plate, bringing out the details and finishing with ammonio-sulphate of iron and silver.

Mr. SUPLEE: Do you think there is any advantage in that?

Mr. BELL: Oh, none at all; you can get all the density you want without it.

Under the head of "Verbal Communications," Mr. CARBUTT referred to the subject under discussion at the previous meeting—that of deposits on the cover glass of slides, saying that he had received a number of slides from Mr. Pancoast, accompanied by a letter, in which he said, "Referring again to the incrustation on lantern slides, I was looking over some old slides I made in 1883 (possibly 1882) on some of your A plates, and find them in A-1 order, no discolouring, mould, or incrustation whatever. They were not varnished or protected in any way, and were subject to the same conditions as the one I showed you at the Society." In another letter of a later date to Mr. Carbutt, Mr. Pancoast wrote on the same subject: "I send you by this mail one of the lot I spoke of in a previous letter, in order that you may see how perfectly it has kept. It was in the same box as the other slides, and subjected to the same conditions as those which show such a marked incrustation. I think the glass is B. P. C.; at least the plates were your regular A plates. These slides were made by contact printing, and developed with oxalate."

Mr. BELL called attention to a portion of the report of a previous meeting in which the words occurred, referring to the use of turmeric for colour screens for orthochromatic plates:—"Mr. Bell thought turmeric was adapted to the work with orthochromatic plates, and was as good as anything." He desired to say that he distinctly stated that turmeric could not be relied upon unless freshly prepared. Referring to orthochromatic photography, he showed a screen of brilliant yellow, prepared by Mr. Ives, and loaned by him. It was put behind the lens, holding back blue rays and allowing the yellow to act more strongly on the plate. It was necessary to have a plate specially prepared, as the ordinary plates would not answer—it should be an orthochromatic plate. He showed two glasses in illustration of his remarks, saying that turmeric would not answer. Continuing, Mr. Bell showed the same colour screens he had obtained in London last year. One was of pot metal, ground and polished like plate glass, and which he said would never fade. He had three tints, but finding one was too light, he had cemented two together with balsam of fir.

Mr. REDFIELD showed a screen similar to that of Mr. Bell's, made by Mr. Ives. He also showed the front board of his camera, and the slide in which the screen was placed. It was a double glass, prepared by Mr. Ives; another method was a circular piece of glass, prepared by Mr. Carbutt, which was dropped in the front of the lens, and a strip of blackened leather slipped in front of it, acting as a spring, and keeping the glass in position. Probably an improvement would be the introduction of some springs, bracing the plate squarely against the back of the lens, so as to prevent its being at an angle, and thus producing distortion. A still better way would be to coat the surface of the lens with some colouring matter, or have the lens made of some coloured glass, as suggested recently in one of the English journals.

Mr. CHEYNEY said he had found it utterly impossible to get a sharp image, focussing first, and putting the screen in afterwards. If focussing were done without the screen, and then the screen put in, the focus would be altered and thrown back as far behind as the thickness of the screen. Going to the blackboard, Mr. Cheyney illustrated his remarks by diagram.

Mr. SUPPLEE asked what would take place if placed in front of the lens.

Mr. CHEYNEY said the change would be very slight.

Mr. CARBUTT suggested the preparation of thin films of coloured collodion attached to diaphragms of black cardboard, and used in place of the usual diaphragms.

Mr. REDFIELD thought two pieces of thin black rubber could be used.

Mr. CARBUTT said he had suggested cardboard because it could be obtained so easily.

Mr. BELL said he had already gone over that process, and found the collodion film was too brittle and curled all up.

Mr. CARBUTT said it was not properly prepared then. It had a natural tendency to curl, but not to such an extent as to preclude its use. If five per cent. of castor oil were put in it would remain firm. Continuing the subject of orthochromatic photography, Mr. Carbutt showed some prints illustrating the excellent keeping of the plates, and also a photogravure print made by a publishing house in Boston from a negative on one of his orthochromatic plates. The print was from an old painting, and had a remarkable brilliant quality with correct colour tone.

Mr. TATHAM asked if any one used Vogel's eoside of silver plates. He had tried them, and found them very slow, about as slow as a Carbutt A.

Mr. STERLING reported from the Executive Committee that the catalogue of the library had been completed and copies could be obtained. The work had been a very laborious one, and the credit for the very careful catalogue was due to Dr. Ellerslie Wallace. The library belonging to the Society was exceedingly valuable, and there was probably no collection of photographic books in America that was as complete of that of the Society. Mr. Sterling placed a copy of the catalogue on the President's desk.

BERLIN PHOTOGRAPHIC SOCIETY.

FEBRUARY 20,—Dr. Stolze in the chair.

The PRESIDENT gave an account of various experiments that had been made with flash-light lamps. Those made at the last meeting did not turn out very satisfactorily. This was attributed more to the large meeting preventing the cameras being kept steady rather than to failure of light. The trials were subsequently repeated in the studio, the combustion of 0·1 gramme of magnesium being employed in each case. The experiments were specially conducted in order to test the relative capabilities of the following lamps:—1. Miethe's spirit lamp; 2. Beaurepaire's spirit lamp; 3. Schippgang's spirit lamp; 4. Schreiner's; 5. Lindenheim's; 6. Vever's; 7. Grundner's spirit lamps; and, 8. Dr. Miethe's gas lamp. Professor Schirm's representative was unable to attend. When all the impressions had been taken the whole of the plates were developed together in one large basin with iron oxalate. They were all placed in one copying frame and printed off on Stolze A paper. The resulting proofs were laid before the meeting, and thereupon arose a mighty discussion.

Herr STOLL pointed out that all the photographs were taken with one source of light instead of with three lamps, as in Zieldorff's method.

Herr JUHR recommended the use of reflectors for modifying the shadows.

Herr KÜHN stated that he had obtained good results with aplanates with magnesium light, but not with wide-angle lenses.

Herr GRUNDNER remarked that the employment of reflectors, whether of linen or silver paper, was much more questionable in its effects with flash light than by daylight, as one was unable previously to observe the effect. To illuminate the shadows by a special lamp he found to give bad results. On the whole, flash-light lamps were an auxiliary, but it could not be expected that results of any very great value could be obtained by their means.

Dr. STOLZE, however, warmly defended the magnesium light, which he said was indispensable for groups and special occasions. He also pointed out the importance of having the walls and fittings of the studio of a light colour.

Herr SCHÜLER stated that he found a considerable quantity of magnesium powder on the floor of the studio where the experiments had been conducted, a proof that the combustion of some of the lamps must have been incomplete. According to Herr Ney, this often takes place through the tube through which the magnesium is blown being too long and insufficiently filled with the powder. This causes the flame to be cooled by a blast of cold air, and so interferes with complete combustion.

The subject then changed to a discussion of Stolze A paper.

Herr FRANÇOIS CORNAND said that years ago, when Dr. Meydenbauer praised this paper very much, he had been unable to concur in the favourable opinion expressed; during the last year, however, he had worked with it a great deal, and had come to the conclusion that it was most excellent.

Herr PAUL GRUNDNER pointed out the excellence of the half tones, especially in flesh and drapery, obtained on this paper.

Owing to the lateness of the hour the numerous exhibits by Herr Constantin Samhaler were reserved for the next meeting.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE ACTION OF LIGHT ON SILVER CHLORIDE.

To the EDITOR.

SIR,—Your leaders on Mr. Romyn Hitchcock's experiments on the action of light on silver chloride, and his objections to your criticisms, tempt me to trespass on your space with a few remarks on this subject.

In the first place, with respect to the method of experiment, Mr. Hitchcock dried his silver chloride over sulphuric acid at the ordinary temperature. Now it is very doubtful indeed whether this method will dry the silver salt completely, and chemists who have used silver chloride and bromide in determinations of atomic weights have considered it necessary to heat them at 150°–160°, in order to expel the last traces of moisture. There is, therefore, very considerable probability that Mr. Hitchcock's silver chloride still retained minute quantities of water. There is certainly no evidence to the contrary.

The most remarkable point, however, about these experiments is that, after so much trouble had been taken with a view to dry the silver chloride, Mr. Hitchcock proceeded to pass over it hydrogen, which, according to the published account of the experiments, *must have been nearly saturated with moisture.* "The slips were placed in a glass tube drawn off at one end to receive a rubber connexion from a set of U-tubes containing a solution of silver nitrate. The other end was closed with a tubulated rubber cork and connected with a hydrogen apparatus. *The hydrogen was passed through silver-nitrate before it entered this tube.*"* There is no mention of any endeavour to dry the hydrogen, and from the description it appears that the gas passed directly from a solution of silver nitrate into the tube containing the silver chloride. It is scarcely necessary to point out that under these conditions the hydrogen must have been somewhat highly charged with moisture. Mr. Hitchcock was therefore exposing silver chloride, in all probability not absolutely dry, to the action of light *in an atmosphere of very moist hydrogen.* I may point out also that the hydrochloric acid, hypochlorous acid, or whatever might be given off, had an opportunity of coming in contact with an indiarubber connexion, a possibility which ought to be carefully avoided in delicate work of this character.

Turning now to the results, we find that in the first series of experiments the total weight of silver chloride on the slips exposed was only 0·09944 gramme, the loss in weight of each slip was never much more than a milligramme, and the total loss of weight was only 0·0045 gramme.

* This volume, p. 9. The italics are mine.

The silver chloride collected from the silver nitrate bulbs was equal to only 0·0040 gramme of chlorine, and although the absolute difference between 0·0040 and 0·0045 gramme is small, the proportional difference is very large. In other words, the chlorine collected in the form of silver chloride is only eighty-nine per cent. of the total loss of weight! Now, since the amount of oxygen in the supposed silver oxy-chloride is only a small fraction over three per cent. of its weight, it is obvious that these experiments are not of the order of accuracy required in investigating this particular problem.

In his letter to you (page 189) Mr. Hitchcock claims that his experiments (1) prove that there is a considerable loss of chlorine when silver chloride is exposed to light—a fact not previously known. (2) They prove that the weight of chlorine set free is equal, within the limits of experimental error with the apparatus used, to the loss in weight of the slips—another fact not hitherto known. (3) They prove that there cannot be an oxy-chloride formed.

I will take these points seriatim:—

(1) Mr. Hitchcock opens his paper by stating that the loss in weight when silver chloride is exposed to light has been satisfactorily proved by Professor Newberry, and that the fact that chlorine is set free was conclusively proved by Scheele. It is difficult to reconcile these statements with his own claim.

I imagine that no chemist who had made any careful experiments on this point had any doubt about the fact that silver chloride when exposed to light does lose chlorine in some form, which can afterwards be precipitated by silver nitrate. I will refer only to an interesting paper by Gaston Jean (Annales, 1885, p. 350) which seems to have been overlooked by many writers, although it was read before the Photographic Society of Great Britain and published in the Society's journal. In one experiment ten grammes of silver chloride exposed to light in presence of water lost chlorine equivalent to 0·2125 gramme of silver chloride dried at 100° —*a quantity more than twice as great as the whole weight of silver chloride exposed by Mr. Hitchcock in his first series of experiments.* The water present doubtless assisted the decomposition, but probably not to a greater extent than the moist hydrogen present in Mr. Hitchcock's experiments.

(2) Most chemists will agree that the limits of experimental error were too wide. An error amounting to eleven per cent. of the total quantity to be measured is far too great to admit of any definite solution of the problem under consideration.

(3) The experiments certainly do not prove that an oxychloride cannot be formed. Although oxygen was not present in the free state, it was present in the form of water. It is obvious, moreover, that the exposure of silver chloride to light in an atmosphere of hydrogen, with its well-known reducing power and great tendency to combine with chlorine, is not comparable to exposure in presence of moist air, or of air and liquid water.

In one experiment Mr. Hitchcock found that the darkened product gave up considerable quantity of silver to nitric acid. We are not told whether all the other strips were or were not examined in this way.

The experimental results as described by Mr. Hitchcock agree quite as well with the supposition that part of the silver chloride was reduced to the metallic state whilst another part was converted into an oxy-chloride, as they do with any other possible explanation of the nature and course of the reaction.

I can only say in conclusion that I am quite in agreement with your opinion that the problems of the mode of action of light on silver chloride and the constitution of the darkened product will not be solved by experiments of the character of those which I have criticised.—I am, yours, &c.,

The Yorkshire College, Leeds, March 31, 1890. C. H. BOTHAMLEY.

A NOTE FOR SCOTTISH SOCIETIES.

To the EDITOR.

SIR,—Somewhere about the middle of last year there was a notice in your paper as to some society in Scotland wishing to exchange lantern slides. I wrote to the address given, and in due course received a small packet of slides.

They arrived at a time when I was very seriously ill, so much so, that for some months I was unable to do anything, and as my convalescence was followed by a transfer from one office to another, and also by a change of residence, I was not in a position to look over my photographic things for some months.

On putting my things in order lately, I came across the packet of slides, which I had completely forgotten, and as I have lost the address of the one who sent them to me, I write to ask you to give this room in your paper, so that the owner of the slides may give his name and address to enable me to send him a batch of slides in return.

Apologising for thus troubling you, and to the owner of the slides for my having overlooked the matter so long—I am, yours, &c.,

Sirumallur, Madras, March 11, 1890. FRED. DUNSTERVILLE.

A PAGANINI FEAT ON A GUITAR.

To the EDITOR.

SIR,—Might I ask the question if there is a single musician amongst the judges at the Third Annual Exhibition at the Crystal Palace? My reason for wishing to know is that I find that in Class A B, Section 2, they have awarded a bronze medal to 814 and 815, *A Favourite Air*, and *Melody*, by Mr. J. E. Austen. The model in these photographs is holding a guitar as no guitar player ever held it whilst playing, and, in addition to this, the guitar is minus two pegs, and the four strings present are so slack that it would be a physical impossibility for the model or any one else to get either "a favourite air" or "a melody" from an instrument in such a condition. I ask this question in the interest of art, as I find there are other photographers beside Mr. Austen who pose their models with musical instruments of which it is evident neither photographer nor model have any musical acquaintance.—I am, yours, &c.,

The Queen's College, Birmingham, March 31, 1890. CYRIL R. LUNN.

[Such carelessness in these days of "naturalistic" photography is reprehensible.—ED.]

FADING OF SILVER PRINTS.

To the EDITOR.

SIR,—"Nonplussed" is not the only puzzled one about the fading of prints; his *modus operandi* reads as if he takes more than ordinary care. Other writers, old hands, too, say as much trouble is taken now, or more, to arrive at perfection as of old, but, with all our striving, we get further away, and our prints of to-day are less permanent than a few years ago, and each year seems to be getting worse and worse. Does this not tend to prove the fault must be in the material? At page 97 in Robinson and Abney's *Silver Printing* a formula is given to detect hypo in prints. If this is reliable, hypo is strong in our albumenised paper when supplied, and in our mounts. I have tried three pieces of albumenised paper made in Germany, and each turned the pink in test at once. I happened to have a piece by me I know must be ten years old, and this seemed to be nearly pure in comparison to that made in the present day. The mount I tried also contained hyposulphite, both German and French. I will quote the test for the benefit of others:—

Potassium permanganate	2 grains.
Potassium carbonate	20 ,,
Water	1 quart.

"Add a few drops of this rose-coloured solution to a pint of water; it will yield a slightly pink tinge. If there be any trace of hypo present this colour will give place to one of greenish hue." Neither hot or cold water washing, however long, appears to completely eradicate the soda from the print, but a cabinet print seems to have less in it after washing *than the unwashed piece of albumenised paper tested as it comes from the makers.* Probably the soda which is in the print, through fixing, washes out, but that which is in the make of the paper cannot be removed. This test, bearing the names of two such well-known and clever photographers, should be reliable, and experiments seem to be in its favour. It would be well to hear the opinions of paper makers and albumenisers on the subject.—I am, yours, &c., PUZZLED.

Kingston.

THE ART OF DRAWING AND PHOTOGRAPHY.

To the EDITOR.

SIR,—Mr. A. M. Rossi's paper on *The Art of Drawing and Photography*, read at the Conference of the Camera Club, and printed by you in last week's number of this JOURNAL, is a curious specimen of surprising misunderstanding.

In it it is said that "by the perfection to which photography has attained, the long and tedious years of an art education have been so minimised that a youth with artistic proclivities could now accomplish in so many months what would formerly have taken as many years to learn."

Indeed this would be a marvellous advantage; but in what way could it be accomplished? The fact is, that the student can only learn drawing by the study of the forms after nature, and no drawing or photograph will give him any help whatever; and the time to learn it can never be diminished by a photograph.—I am, yours, &c., F. B.

[Let it be remembered that what we gave was only a mere synopsis of Mr. Rossi's paper, although, so far as it went, it embodied his sentiments. We shall print it *in extenso* next week.—ED.]

STEREOSCOPE AND LANTERNSCOPE.

To the EDITOR.

SIR,—We are reminded that the season of Lantern Slide Lectures is coming to a close by announcements "Last lecture this season." Nature is bursting again into animation, "Cauld winter's awa," and the woods are resounding with the song of birds. The amateur photographer is preparing for the great change of the season by examining his camera and dark slides, and taking care to see that every part is light-tight, setting

his lantern slides carefully past that he has so much enjoyed in the past winter, looking forward to having a rich addition by next winter.

My present object is to show how he may utilise them in the summer, but more anon.

In olden times no drawing-room but was furnished with a stereoscope. It, with the exquisite pictures produced by the sensitive albumen process—that never since has been equalled—has long since passed away, and I fear a revival will not be accomplished as easily as we expect. Our experience in Liverpool and Birkenhead, although there is every desire to give it encouragement by putting it on the list of awards last year, showed that out of two hundred and sixty-five members only two competitors came forward; the limit was three, consequently it fell to the ground. I see no evidence this year so far to lead me to expect an increase, and am, therefore, come most reluctantly to the conclusion that revival in popularity is hopeless. This is very unsatisfactory. Many happy years have I enjoyed with the stereoscope in the past, and possess many views by Wilson, of Aberdeen, that are priceless, and prove without doubt that in an artistic point of view they more than surpass anything of the present day.

The grand difficulties are the restricted size and the fact that all eyes cannot see stereoscopically, even with the best instruments. I recollect well the days of its popularity; you could not go out to a tea party, but the first thing after the tea was past and the cups and saucers were disposed of, one or two stereoscopes were produced on the table. Young folks would invite the old ones to come and look at their art treasures, but sometimes you would be rebuffed: "I canna be fashed by thae things, for they hirt ma een."

Then came the album age, and its fashion is passing away.

Can no one bring out a novelty fit for a drawing room that would be easy of exhibition, to have a single eyepiece, with a lens moveable with a rack and pinion, to suit all sights? and thus give an opportunity of displaying in summer days the lovely slides that have been produced in the last year all over the world. This is moving in the march photography is taking towards a more real picture and reflex of nature's beautiful scenes of sky and earth.

Mr. Tylar, of Birmingham, has brought out an instrument of this kind which with a very few alterations may be made to suit my views.—I am, yours, &c., JAS. ALEX. FORREST.

THE PHOTOGRAPHIC SOCIETIES' NATIONAL CHALLENGE CUP.

To the EDITOR.

SIR,—In reply to the letter in your last number, signed by Mr. Edgar G. Lee, we append the following copy of a letter addressed to that gentleman some days before the opening of the exhibition:—

[COPY.]

"EDGAR G. LEE, ESQ. "*Crystal Palace, Feb.* 26, 1890.

"DEAR SIR,—Your papers duly to hand, and we are much obliged for the great care you have taken. We must just point out that Mr. Gibson has included two pictures with the same titles as previously sent; also, Mr. Lyd. Sawyer has sent again *The Boat Builder*, though shown here in 1888, and *The Castle Garth*, shown here last year. As we cannot admit pictures more than once, perhaps they would like to substitute others.—Yours truly,

"J. F. PEASGOOD."

We venture to think that your readers will conclude that in offering to allow the Newcastle Society to substitute other pictures for those which had been previously shown and medalled at the Crystal Palace Exhibition we did even more than they had a right to expect.—We are, yours, &c.,

Crystal Palace, S.E., March 28, 1890. S. G. BUCHANAN WOLLASTON.
J. F. PEASGOOD.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

I will exchange Marion's rolling press, with ten-inch roller, in good condition, for whole-plate studio camera.—Address, J. BIDDLE, 97, Medlock-street, Manchester.

Will exchange powerful night and day telescope, good condition, London make, draws to two feet; studio accessory for babies required.—Address, W. H. DOUGLAS PYM, Streatham, S.W.

Will exchange numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY, years 1881-2-3-4-5-6-8-9 (a few numbers short), for cheap half-plate set.—Address, W. CHADWICK, 82, Crab-lane, near Manchester.

Will exchange a Scovill Company's 8×5 landscape camera, three double dark slides, solid leather case, and portable tripod stand, for a Dallmeyer's wide-angle rectilinear lens, 8½×6½.—Address, H. R. TAGGART, JUN., Tontine House, Glasgow.

EXHIBITION OF APPARATUS.—The Photographic Section of the Chamber of Commerce intend holding an exhibition of photographic apparatus in the beginning of June. The Worshipful Company of Drapers have granted the use of their fine hall in Throgmorton-street, E.C., for this purpose during the first ten days in June. The public will be admitted *free* to the exhibition.

Answers to Correspondents.

LENTIL AND OTHERS.—In our next.

J. STANLEY DOBSON.—We are making inquiries, and will write privately.

J. W.—The retouching is a good deal better than some we often see in portraits issued by reputable firms.

C. R. (Leeds).—It is a matter for the County Court; but would it not be better to give a resitting and so please your customer?

A. J. E.—The Indiarubber, Guttapercha, and Telegraph Works Company, Cannon-street, E.C., supply thin sheets of ebonite.

J. G.—Any colour soluble in the varnish will answer. Dragon's blood will do, so will most of the coal-tar colour, such as aurine, chrysaniline, &c.

F. S.—There is no such society or club. The only one that aids photographers upon whom adversity descends is the Photographers' Benevolent Association.

F. H.—If you want the studio for portraiture of the higher class build it with the span roof, and put as shown in sketch. If for copying or similar purposes re-erect it as it was, running north and south.

W. GIRLING.—1. It will eventually be published.—2. Many of the pictures were criticised in our pages several years ago, and we found it too hard a task to recapitulate. We are quite of your opinion.

S. BENTLEY.—It is exceedingly difficult, indeed impossible with the majority of negatives, to obtain on albumenised paper the same black tones as by the platinotype process. The latter is not, as you suppose, a difficult process to work; certainly not more so than bromide paper.

C. R. J. wishes to know if there is any difference between photo-zincography and what is called "zinco" work?—There is a wide difference. Photo-zincography is analogous to photo-lithography, the zinc plate taking the place of the stone. Zinco is surface block for printing with type made by the etching method.

W. BYRNE.—All the portraits are spoilt in the lighting—too much front light has been used, which makes the faces appear flat and map-like. As an improvement, stop out all the direct front light and work only with a side light. Unless the model is illumined so that it has the appearance of solidity, it is impossible to obtain that effect in the photograph.

X. Y. Z.—It is against our rule to recommend any particular manufacturer's goods. All the cameras mentioned in your letter may be relied upon. Celluloid films are much lighter than glass—that is their only advantage. If the roll holder be adopted, have the new film in preference to the stripping film, as it involves less trouble in working. Indeed, we are by no means sure that the latter is to be had now.

INTERIOR puts the following query: "Supposing I have to photograph the interior of a drawing room and some copyright pictures are hanging on the walls—the owner of the house will not have them taken down, as he wants the photographs to show the room as it is always furnished—shall I render myself liable for penalties by taking the pictures?"—In such a case no penalty will be incurred, notwithstanding that the copyright pictures are included, provided they are not made the most conspicuous thing in the photograph.

W. D. H. (Paris.)—1. The information relative to numbering diaphragms according to the United States system will be found on page 187 of our ALMANAC for 1886. If you experience difficulty in seeing this ALMANAC, apply to Professor Stebbing, who will willingly show it to you.—2. There is no such work, although much information is given in patent specifications for particular productions.—3. All lenses, whether wide or narrow angle, have, or should have, their diaphragms marked alike. The majority of photographers in this country seem to prefer the *f* system of marking diaphragms.

G. ADAMS.—The sketch shows the design for an excellent studio. Thirty to thirty-five feet will be long enough for all purposes, but we should advise you to increase the width considerably—to, say, fourteen or fifteen feet; the latter will be best. Also make it eighteen inches higher both at the ridge and the eaves. There is no advantage in glazing down to the floor—to three feet from it will be sufficient. Dark blue or green curtains and blinds will be best for that aspect. Black will scarcely be needed. You must bear in mind the aspect of the proposed studio is widely different from the one you have been working in.

McK. says: "I have several times had to photograph the interior of conservatories, and I have always been much troubled with moisture, like dew, forming on the lenses. As fast as it is wiped off more seems to form. Sometimes it is quite impossible to wipe the glasses dry, even on the exposed surfaces. As the atmosphere always seems damp in greenhouses, is there any way of preventing it condensing on the lenses?"—The trouble may easily be avoided by, in the first instance, making the lenses warmer than the temperature of the conservatory before they are taken into the building. So long as the glasses are warmer than the atmosphere no moisture will condense upon them. Keep the lenses near the fire for an hour or two before starting for the work, and carry them to the place in the trousers pocket; then the heat of the body will keep them warm. Another plan is, after arriving at the conservatory, to at once place the lenses in close proximity to the hot-water pipes. There they will be warming while the other apparatus is being arranged.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1562. Vol. XXXVII.—APRIL 11, 1890.

THE ULTIMATE EFFECTS OF HYPO ELIMINATORS.

At various times during the past ten years we have written on the subject of hypo eliminators, so-called, or substances employed for the supposed purpose of destroying or removing the last traces of the fixing salts left in prints or negatives. We have at all times deprecated the use of such agents, pointing out the danger incurred, and that they can only be employed with any prospect of safety after a course of careful washing, which would be in itself sufficient guarantee of the permanency of the proof.

During last year the topic once more arose, and at the time we commenced a series of experiments for the purpose of practically testing the after effects for good or evil of such applications, and in connexion with the recent discussion on the subject of permanence an account of the results up to the present time may not be without interest.

A number of prints were produced in the usual manner, the paper being of good market quality, fairly heavily salted, with a medium gloss, and practically free from smell. So far as we are aware it was of English manufacture, at least so far as the albumenising is concerned. The bath employed was of sixty grain strength, the ordinary acetate toning being used, and the tone carried well into the "purple" stages. The fixing was performed with hypo of the strength of three ounces to the pint, carefully neutralised, and used slightly warm, immersion being continued for twenty minutes.

After fixing and a slight rinse through one change of water, each print was cut into four sections, the portions being numbered and transferred to separate dishes for subsequent treatment. Those marked "*a*," "*b*," "*c*," and "*d*," were respectively treated as follows: "*a*," rinsed through a second change of water for five minutes and blotted off and dried; "*b*," rinsed for five minutes, immersed in the "eliminator," again rinsed and dried; "*c*," washed for six hours in a constantly changing stream of water, blotted off and dried; "*d*," washed for six hours, immersed in the eliminator, re-washed and dried. The washing after immersion in the eliminator was such as might be supposed to leave some of the substance remaining in the pores of the paper being only extended to a rinse through three changes of water following one another immediately.

The eliminators employed were—(1) solution of alum, one part saturated solution to three parts of water; (2) solution of calcium hypochlorite, made as per formula given in the Almanac, one drachm to the pint of water; and (3) per-oxide of hydrogen (ten vols.), half an ounce to the pint of water. The prints, each batch separately, were immersed for five minutes in these solutions and immediately washed and dried.

In order to give every chance for the occurrence of spontaneous change, or otherwise without unnecessarily courting it by establishing specially trying conditions, the prints were rolled up loosely as they dried, each singly by itself, and placed in a light wooden box, which in turn was placed in a damp cupboard, where it has remained throughout the winter. The local atmosphere has been sufficiently charged with moisture to produce mildew on many of the articles that have remained intact during the same period, and the prints when examined were found to be quite limp from damp.

The actual results may be summed up somewhat briefly, so far as they have gone; for though the effect already produced is appreciable, it cannot be supposed to be complete, and we shall therefore subject the proofs to a longer trial.

Upon putting together the separate sections of each print, in almost every instance the portions "*a*" and "*c*" were found to be quite indistinguishable, showing that however perfunctorily the washing might have been performed in the first case, the time was yet not sufficient to produce any visible deterioration. This may, perhaps, be accepted as evidence that imperfect fixation—*i.e.*, the employment of insufficient hypo or too short an immersion—has more to do with fading than insufficient washing.

Of the "*b*" sections, those treated with alum were found to be in all cases duller in tone than "*a*" or "*c*," the colour having a browner shade than in the case of the simply fixed proofs. This can, perhaps, scarcely be taken as an effect of time, as no doubt it was equally palpable before the prints were dried, being due to a certain toning action of the alum. The prints treated with hypochlorite were many of them commencing to show yellow patches and spots, though these varied very considerably in different examples, some being practically few, others exhibiting but one or two small specks like mildew points, while others again approached general bleaching. From this result we gathered that with so powerful an agent, the washing, to secure its removal, had been totally inadequate. The effects produced on the hydroxyl-treated sections were somewhat similar, though much slighter than with hypochlorite.

Of the "*d*" sections the alum-treated ones showed no change, the other two being very similar to those already described, and scarcely less strongly marked, showing conclusively that the remedial (?) agent, and not the fixing salt, was to blame.

Of course the treatment given, in the matter of not more thoroughly removing the eliminator after it has played its part, was very severe, but it serves to emphasise the danger of these

agents. We shall still watch these samples until we can detect, if possible, any evidence of hypo fading, and, *par conséquence*, any possible benefit of the eliminator.

FADING.

THE correspondence now taking place in these columns will, it is hoped, lead in the end to increased permanence in silver prints. Without question, it appears to be the common experience of the older members of the profession that the general run of commercial work now is less stable than it used to be in the earlier days of the art science. And, what is more, the most unsatisfactory point in connexion with the subject is that the increased, and still increasing, fugitiveness cannot be accounted for by any apparent care in the manipulations. Indeed, the opinion of most of the older workers with whom we have been in communication is, that more care is at the present time bestowed upon the manipulations than in the past. Different opinions have already been expressed as to the possible root of the evil, and many more will doubtless follow, all of which will, as a matter of course, tend to the elucidation of the at present apparent mystery.

The object of the present article is not to pass any opinion whatever as to the cause or causes of the undoubtedly increasing instability of silver prints, but merely to point out, for the benefit of those who are giving attention to the matter, some of the influences which may, and frequently do, either individually or collectively, conduce to it, and which did not prevail, at least to the same extent, in former times.

In the first place there is the paper itself. This is sometimes said to be inferior to what it used to be prior to the introduction of hyposulphite of soda as an "anti-chlor," and when the excess of chlorine used in the bleaching was eliminated by washing alone. It has also been asserted that the paper sometimes contains traces of the anti-chlor. If it did, the sulphur compounds of silver formed when the paper was sensitised might have some deleterious influence on the finished picture. However, we may say that in every sample of photographic paper we have tested we have failed to detect any trace of hypo; but it has been prevalent enough in many other papers of fine quality, and by the best makers, that we have examined.

In the albumenising of the paper the conditions are widely different from those which used to exist. Formerly undiluted albumen was seldom if ever employed, and fresh eggs were always used. Now, not only is the albumen used without dilution, but it is even further concentrated by evaporation, or by the addition of dried albumen. This concentrated albumen is but slightly salted, whereas the diluted was heavily charged with the chloride, sometimes to the extent of three times that adopted by some modern albumenisers. The earlier albumenised pictures would now be almost classed as prints on matt surface paper. Then this thinly albumenised yet heavily salted paper was sensitised on a silver solution three or more times the strength of that commonly employed. Furthermore, the prints are made from negatives which are feeble in comparison with those of former times. Hence it follows that only a small proportion of silver is reduced in forming the image as compared with what used to be the case. Therefore, it will be seen that in the old method of working the image was largely in the body of the paper, while now it exists almost entirely in the albumen on the surface.

The thin image formed under the above conditions will require but little gold to tone it. Some papers are said, as a recommendation to their use, to require but half a grain of the chloride to the sheet. Supposing that the salt contained its theoretical proportion of metal, and the whole of it was reduced in the operation of toning, there would be but a quarter of a grain of gold distributed over the entire sheet of paper. An important matter in connexion with the albumenising is that when diluted albumen was employed very little albumenate of silver was formed. Now, however, a large proportion is always present, even in the finished picture, and this, it is said, conduces to instability.

It was estimated, on good authority many years ago, that only five per cent. of the silver consumed in the preparation of the paper existed in the finished print; and this conclusion was arrived at when the highly sensitised paper and dense negatives were in vogue. If the estimate were correct, it is clear that far less reduced metal, both silver and gold, must now constitute the image. With regard to the fixing agent, on this we commented in a leaderette last week; therefore we will only add that a large proportion of the hyposulphite of soda now in the market is totally unfit for any photographic purpose.

Next in order of the manipulations comes the important operation of washing the prints after fixing. Formerly this used to be accomplished in from two to four hours; now they are frequently left in water for from twelve to fifteen hours, sometimes more. This is another point to be borne in mind.

The mountant almost universally employed now is commercial starch, and hitherto this material has been considered beyond reproach. Starch, when made from common materials, is sometimes said to be bleached with chlorine; chloride of lime is added to the starch, and the chlorine liberated by dilute sulphuric acid. Again, a blue pigment is sometimes added to starch to give it a ficticious whiteness. This is said to be an artificial ultramarine, a sulphur compound. At one time gelatine was a favourite mountant. This did to some extent insulate the print from the mount if that happened to be impure. This is not the case with starch.

With regard to the mounts. In the early days these were mostly of plain white paper and printed with ordinary ink. At the present time they are made of various tints, and often surfaced with pigment. They are frequently printed in fancy inks, and even with bronze powder, and very often are made of the cheapest and most impure materials. Photographic mounts are now chiefly made abroad, and they are not in high repute as regards purity. But unfortunately, if English manufactured mounts are purchased, there is no certainty that they are not made of foreign and doubtful material.

A large proportion of the smaller photographs are now "burnished." The effect of the burnishing—by the great pressure brought to bear upon them—causes a more intimate contact between the print and the mount than that produced by simply rolling.

The object of this article, as just mentioned, is not to express any opinion on the question now exciting so much attention amongst the profession; it is merely to indicate some points which should be kept in mind while seeking for the cause of the continued increasing evanescence of silver prints.

A FORTNIGHT ago we briefly alluded to Mr. Falconer's paper on Hannaford's collodio-albumen process, and pointed out that some of the old methods might with advantage be resuscitated at the present day, at least for transparency work and similar purposes. A suggestion

has since been made to us that we should devote a series of short articles to the subject and describe some of the best and most suitable of the forgotten processes for the benefit of the new recruits in our ranks. Apart from the fact that such articles have already actually appeared at intervals during the past few years, we scarcely think such matter would prove attractive to more than a very few of our readers, who when they really require such instruction know where to seek for it. The gentleman who made the suggestion, though only a photographer of a few years' standing, is one of the class, now comparatively rare, who think it worth while to work out such matters for their own satisfaction, and is himself tolerably familiar with most of the old processes of any value, so that he cannot be considered as asking assistance for himself.

In speaking for others, however, he overlooks the fact that all are not of his own way of thinking. The convenience and the cheapness of modern commercial dry plates, and above all their quality—elements that have operated to bring into existence the large majority of the amateurs of to-day—are too powerful attractions to allow us to suppose that any considerable number of average amateurs will ever put themselves to the trouble of mastering the working of a new process simply to enable them to make a dozen or two of lantern slides in the season, when they can very well manage them with commercial plates at a shilling a dozen. If it were only coating *fairly* clean glass with collodion emulsion, these gentlemen would scarcely undertake the task; but imagine them settling down to get the glass *chemically* clean; imagine them getting a silver bath into working order, or better still keeping it so; imagine them spending a whole evening, perhaps well into the small hours, in the preparation of half a dozen plates; and, in fact, imagine a hundred other *impossibilities*. No, sir! In the matter of writing up old processes we think we had better "let well alone."

Mr. C. P. Lunn's letter last week, under the heading of *A Paganini Feat on a Guitar*, calls attention to a fault which is not attributable to photographers alone, but may be met with in all branches of art. It reminds us of the story of the painter who was exhibiting his last work, a farmyard scene, to a worthy couple who were "in the line!" in other words, to a farmer and his good lady. After examining the picture intently for some little time both his critics burst into a fit of laughter, much to his disgust. On inquiring as to the cause of this, to him, unseemly hilarity, he received the reply, "Who ever seed a 'cow' get up *that* way!" In his ignorance of bovine habits and peculiarities the artist had represented a cow in the act of rising from a recumbent position, temporarily seated on its haunches with its forelegs straightened, whereas, as his critics were well aware, the animal commences to lie down by bending the forelegs first, and in rising it straightens them last. It is perhaps too much to expect any artist—photographer or painter—to possess a universal knowledge; but still they might "read up" special subjects.

In a recent discussion at a meeting of the Photographic Society of Philadelphia the question of the suitability of turmeric as the colouring matter for the screen, used in conjunction with orthochromatic plates, was raised, and an opinion expressed to the effect that it is quite unreliable unless freshly prepared. Our own experience coincides with this, omitting the last proviso, for though we have used it with several different kinds of orthochromatic plate, we never found it produce any appreciable effect. The orthochromatic plate appears, in fact, to be very discriminating in its behaviour: screens, whose tints are to the eye identical, and which are scarcely different when examined spectroscopically, will frequently produce widely different effects. This is specially the case with different samples of aurine, some of which are perfectly inert, others highly active.

As better than the film of stained collodion cemented over the aperture of a diaphragm to be inserted in the lens mount recommended at the same meeting to replace the ordinary colour screen, we would repeat the suggestion previously made of a piece of microscopical "covering glass" coated with a fine structureless, stained, collodion film inserted in a recess in a piece of thin metal or cardboard.

Our readers may remember a controversy carried on a number of years ago in the newspapers of the day, in which the main point was to controvert the thesis advanced by a well-known literary man that there was no proof of the correctness of the reputed longevity of any one of the various people who were reported to have been more than a hundred years old when they died. It is now well understood that the contention was kept up more from a desire for logical proof than a disbelief in the correctness of the alleged longevity, and it is surprising how difficult it was to bring forward satisfactory proof. We do not, of course, allege that a photograph can supply the deficiency or be accepted as evidence, but in connexion with the subject we may draw attention to the recent publication of a work on *Old Age*, by Dr. George Murray Humphry, in which, besides sundry other valuable photographic illustrations, there is as frontispiece a portrait of a man and his wife each of whom is over one hundred and one years.

At the meeting of the Royal Astronomical Society held on the fourteenth of last month, a most important novel application of photography was described in a paper by Professor E. C. Pickering. Owing to an observation by a lady assistant—Miss Maury—that in certain photographs of the spectrum of a particular star the K line was hazy and ill-defined, while it was perfectly sharp in others, a close scrutiny was made, with the result that the line was found to be doubled every fifty-two days, and hazy for several days on each side of this doubling day. The only satisfactory explanation, and what Mr. Ranyard termed a remarkable discovery, was that this star (ζ Ursæ Majoris) was a close double that could not be separated visibly, and that the time of revolution of this system is one hundred and four days, that the velocity of the stars was about a hundred miles a second, the diameter of the orbit one hundred and forty-three millions of miles, and the weight of the stars about forty times that of the sun. It was singular that a good many years ago Captain Abney, as he pointed out at the meeting, predicted that photography would enable the rotation of stars to be proved. The notion was pooh-poohed at the time, but Professor Pickering's paper showed the correctness of the vaticination.

The new Jena glass, or rather glasses, for there are not far from a hundred varieties, each with different properties, have been sufficiently long before the public for every one to know that they have almost revolutionised some forms of microscopic objectives; what they have done and are likely to do in photographic lenses is not yet sufficiently public to found a discussion upon. Of course, the makers of the microscope lenses have not published how, or of what particular glasses they are made, and, indeed, a considerable amount of mystery has attached to them; but there now would appear to be every reason to believe that the essential secret of their construction has been revealed by Professor Abbe, this secret being the employment of the mineral fluorite in lieu of glass for some of the lenses they are composed of.

When the subject was mentioned at the Microscopical Society, one member stated that it was impossible anywhere to get fluorite that was quite clear, while another member suggested that if one mineral was found to answer there could be little doubt that something else would do as well. When the first Zeiss apochromatics introduced were compared with some English lenses made on the same principle, it was next to impossible to arrive at a conclusion as to which was the better, and it was only when photography was called into play by the production of photo-micrographs with each of the rivals that a decision could be arrived at.

It is doubtless very interesting work taking telescopic photographs in a well-equipped observatory, and at times very fatiguing; but those observers working on Mount Hamilton had, in February last, experiences of a still more painful nature, for they were completely snowed up, almost buried. The road to the Observatory was

in places blocked up to a depth of sixteen feet, and the observers and the labourers had to live on the provisions that were stored there. Professor Keeler at last improvised some snow shoes, and travelled seven miles for help.

THERE is rather a rage for building observatories at great heights—an advantageous one it is true, for photographs can be obtained on a far greater number of nights than on lower ground, and with a far better general average of excellence. The latest of these is about the highest—the new observatory at Tananarivo will be about 4000 feet above the level of the sea. The French government will shortly supply it with a telescope for photographic purposes.

THE ART OF RETOUCHING.

CHAPTER IV.—THE STUDY OF FACIAL ANATOMY.

As the art of retouching is not likely to be mastered without a somewhat lengthened struggle, it will be best to start slowly and with the idea that we know little, if anything, about it. The more modest a man's estimate of his own abilities is when beginning to learn something of which he knows but little, the more likely he is to surmount all the obstacles that may cross his path. In a lengthened experience I have always found that the beginners who underrated the difficulties before them seldom, if ever, became masters of the art, while those who started by thinking it impossible to succeed have invariably, as the fruit of their hard work and patience, become first-rate retouchers. This does not alter the fact, however, that some will learn the art with comparative ease, while others will never succeed in thoroughly mastering its various methods and technicalities.

It will also be best, perhaps, to keep all *descriptions* as simple as possible, not resorting to the classical names of the various muscles of the face, showing that we possess that "little learning" which is supposedly so dangerous, but rather as we all hear them spoken of in our daily lives. To many I have no doubt this method of treating the subject will appear rather dull, if not absolutely stupid; nevertheless, it will, on the whole, prove the most advantageous to the student.

For the production of really first-rate work, to possess the ability to determine, at a glance, the necessary amount of labour required on the negative (not only as regards the removal of its defects, but likewise the improvement of its printing qualities), must ever be regarded as the first step towards becoming a competent retoucher. Until this is accomplished it would be folly to advance, for without the power to correctly appreciate the defects of the subject to be treated the efforts of the retoucher must be vague, and in most cases fail to be of any service in gaining an artistic result.

All the niceties of execution *may*, to a very great extent, be considered somewhat mechanical, but the power to vivify a portrait is an undeniable intellectual faculty, and the *constant* exercise of the latter will do much to relieve the somewhat monotonous character of retouching as a constant occupation. To carefully study the anatomy of faces generally, and to learn how to portray or to retain in each and every one the various peculiarities of character they may possess, should become, as it were, a second nature to any one intending to take up retouching as a profession. It may not seem easy to acquire this habit at starting, but it must be persevered in, and when once mastered will be no future trouble, but, on the contrary, an inestimable advantage and help.

This study and analysis of facial anatomy will prove not only beneficial to the retoucher in his negative work, but may, later on, serve him as a groundwork should his ambition lead him to essay crayon, oil, water-colour, or pastel work. Indeed, "crayon artists" may trace the falling off of their popularity to their neglect of this study. Had they seriously studied the anatomy of the human face, hundreds of the vile productions to be seen in this line would never have been turned out, likenesses would not have been lost, and so forced the public to lose faith in this style of portraiture, once so popular. These remarks are not altogether inapplicable to photographers; how few operators comparatively can ensure a really truthful likeness? When they do, however, produce a faultless negative (chemically and artistically), what can be more galling than to have it ruined by *the retoucher*, who, without any regard whatever for *expression*, drawing, or anatomy, simply directs all his labours to making the negative *fine* and smooth. In such cases all traces of character are lost; all faces are treated the same, quite regardless of sex or age. The vigour of the man's head is reduced to the natural gentleness of the woman's, the face of a man of sixty worked as fine and delicately as might be a schoolboy's.

Every individual is possessed of one or more distinguishing features, and it is absolute ruin in their portraits to efface them. Where they exist to a very marked extent it is *quite* allowable to modify them—even *considerably*—but they must be *retained*, although not in such a state as to attract any special attention. If the student, as he progresses, bear these hints in mind he will find them considerable help in enabling him to make with facility such alterations as his good taste may suggest. Thus he may alter the fixed, staring, unnatural look, so common to people being photographed, into an easy, natural smile. Whenever the muscles of the face show a tendency to fall or run down we must raise them, and thus alter what may have been a very *sorrowful*, if not quite a *sinister* expression into a happy and pleasing one. The changes thus to be effected are indeed numerous, and practice alone can make the student capable of working them all out satisfactorily.

In all these alterations great discretion must be used, and the beginner must earnestly strive to keep clear of that most usual fault, a tendency to impart too much rotundity to the face. If he do not succeed in this regard his negatives will produce prints absolutely devoid of all character, there being a total absence of all the delicate modulations and half tone which make the pictures life-like. All exaggerations, so numerous in photography, must also be looked to, and are often the most formidable difficulties the retoucher has to encounter. Of all the features the nose is generally the most troublesome. It is quite surprising the number of different shapes and expressions that may be given to this feature by the slightest alteration of the light, or the position of the sitter, or the accidental tilting of the camera. This is where the photographer shows his artistic knowledge, and by careful posing and lighting produces a successful portrait of a difficult subject that less skilful hands would have turned out absolutely unpresentable.

In the case of very strong freckles and very deep lines, much will depend upon the operator, as should he light the head carelessly, under-expose or under-develop the negative, the poor retoucher will have double the work. To *subdue* freckles when they are very bad is an object to be gained, and a very excellent way of so doing is to wash in warm water just before sitting, or even to rub the face well with a rough towel. This produces a general flush or redness, and as the freckles are yellowish, by giving a somewhat longer exposure than usual they will be scarcely visible in the negative. Even in the worst cases this method will so reduce them, and the retoucher's work being consequently so much lessened, that the photographer will be fully recompensed for his extra trouble. We can gain a similar result by using powder on the face, and in this manner we secure distinct advantage inasmuch as the length of *exposure* is very considerably reduced. The lines across the forehead—and all running in a similar direction—become terribly exaggerated should the operator chance to overbalance his lighting by letting in too much top light, and it is often found a very difficult matter to get the pencil to *take* sufficiently on such parts. This is still more noticeable should you fail to get sufficient lead to adhere to the negative the first time of touching.

The natural quality of the pencil is such that on its first application a more or less glazed surface is produced, and where greater density may be required, it is almost impossible (in some cases absolutely so) to effect it with lead. In such cases a little colour may be employed, but with great caution, so as not to completely destroy the necessary transparency. However, after some practice the retoucher will be able to judge pretty nearly the density needed in these cases, and will therefore be more firm in his touch, so that a sufficiency of lead may be deposited by the first stroke. In the present system of dry plate work a retouching medium is always used upon the unvarnished film to give it a *tooth*, the retoucher then sets to work to get all he can on the negative; if more be found necessary (which is an extreme case), the negative can be varnished, and being freshly rubbed over with the medium, the face can be worked upon to the desired extent

In so-called Rembrandt negatives a slightly different treatment must be adopted to that employed upon the negatives lighted in the ordinary way, as in those more than the latter the distortions caused by faulty lighting is more likely to be emphasised. The nose is by no means the only feature which becomes distorted or exaggerated, and which demands very skilful manipulation and experience to restore it to its true form. Every line, freckle, and mark of every description become more accentuated in this style of lighting. These defects are also very frequently rendered more remarkable should the negatives happen to be *under-exposed* and over-intensified, which must naturally produce too strong a contrast between the lights and shades. In no case is softness so essential to a really artistic result as in this style of portraiture. In most cases this tendency to hardness may be overcome by the retoucher, and it is his duty to do his utmost in this direction, although, strictly, this defect has more to do with the operating department, as it may be obviated altogether if properly attended to during the operations of lighting, exposure, and development. I wish also to draw attention to the too common treatment of some retouchers, who, by their *thoughtless* method of working, produce complete roundness in the *shadows*. This is all very well when the subject is round and plump, in other words, *really round in nature*, but should the features be somewhat square and angular such a treatment would be absolutely absurd.

There is really no extra trouble to the experienced retoucher to do all this as it should be done; on the contrary, it only necessitates a little *thinking* while he is working, and his always trying to preserve in the shadows the formations distinctly shown on the lighted side of the face. The *texture* of the work, too, deserves some special attention in negatives of this class. Ladies' heads should be very fine and delicate, while men's, especially when they are advanced in years, should be treated with more vigour, which would bestow character and style to the portrait. Many of the failures in this class of portraiture are undoubtedly the result of *thoughtless* (I will not say *lazy*) retouching. The *modelling* may be simply exquisite in such a picture, but all *likeness* will be wanting, and instead of a life-like portrait it might as well have been a copy of a statue.

Most students of photography must have observed that the labial furrows, a kind of shadow running from the nose downwards towards the corner of the mouth, is invariably more marked on the *light* than on the *shadow* side of the face. This is easily accounted for. We have only to observe that this furrow *on the shadow side* faces, as it were, the light in which the picture is taken, and consequently is illumined by it; whereas, on the *light side* of the face it is *crossed* by the light, with the result that the muscle over it excludes the light and thereby causes an inordinately dark shadow. This the retoucher can easily rectify. All other lines in the face are governed to a greater or less degree by the same influence, hence the shadow side of the face nearly always contains *less* modelling and half tone, but being as such it can be heaped up and balanced by the judicious work of a skilful retoucher.

A beginner may find all this very confusing, but a moment's reflection will show him where the fault lies. Should he *not* reflect he will start off filling up the *shadow side*, sparing neither half tone or characteristic marking, and fail to place a light or two to correspond with the other side of the face, thus losing his chance of making a successful picture. I will once more advise all beginners to make a very special study of *facial anatomy*, and the effects of light and shade thereon. Look well at your friends, examine them under various conditions of light, and you will be astonished at the results. You will discover *expressions* for the first time that you never thought possible, and that, too, upon faces that were the most familiar to you.

REDMOND BARRETT.

CAMERA CLUB PHOTOGRAPHIC CONFERENCE.

The Papers and Transactions of the Conference are reproduced from the Club's special Journal;

THE PRESIDENT'S ADDRESS.

This is the fourth annual Conference of the Camera Club over which I have had the honour to preside, and my experience of these Conferences has made me more than hopeful that the present one will be as successful, and even more successful, than those which have gone before. It always takes a little rehearsal before the exact procedure of any class of meetings can be considered as established, and I am in hopes, whatever defects may have been exhibited by your President, that it may be of some advantage that he should take the chair on this occasion also, since we may now consider that the rules and regulations which are to govern our orderly discussions are pretty well understood both by the meeting and also by your chairman.

In opening this Conference I have taken on myself to utter a few of the thoughts to which such meetings as this tend to give rise. I remember the time, as can many more who are here, when photography was fettered by difficulties, when its amateur devotees might be reckoned by tens instead of thousands, when the feat of producing an artistic photograph was something to be proud of, and when its scientific aspect was studied by not as many people as can be counted by the fingers on my two hands. How changed is this now! We have thousands going in for the art side, and a fair sprinkling, though not enough by any means as yet, of students who engage themselves on the scientific side of photography. As these Conferences have very well shown, chemistry, physics, and mathematics, have all their place in photographic science, and by many the science of imagination is also strongly brought into play; a very useful science, too, when controlled and not controlling, which last, alas! is too often the case. Now, I am going to take advantage of my position to-day and ask you to follow me in utilising the imagination. In a sermon the preacher has it all his own way, and the only relief to the feelings of those who disagree with him is that they may discuss it outside the portals of the place of meeting, and disagree with the oration to their hearts' content. My address I believe to be similarly privileged, and I seize the opportunity of uttering something which has long been in my mind.

Though we know not the "reason why" of colour sensation, we yet know that there are three distinct colour sensations, the existence of which I have heard so eminent a physicist as Lord Rayleigh say is as well proved as the law of gravitation. I may add that I am one who boldly accepts the theory of trichromatic vision in a normal eye, and hold it as being sound physiological physics. But what has this to do with photography? Just this, that the same theory that applies to the sensitive retina may equally well apply to the sensitive plate. The eye, i.e., its retina, is sensitive to three primary colours—red, green, and violet—and if we take the spectrum we find that any intermediate colours can be compounded of two or more of these three colours. Thus the orange sensation is caused by a combination of the red sensation with green sensation, and the blue of violet and green. Further, when we come to show graphically on paper the curves of luminosity of the three different sensations to the spectrum, we cannot but be struck with the similarity that they bear to the curves of sensitiveness of the different salts used to register the photographic image.

There is no difficulty in taking in the fact that some one particular wave-length can cause one sensation in the eye, but it is harder to understand that another wave-length not differing much from it can give rise not only to the same sensation, but to one or two others. The theory of sound, however, helps us in the first case. When one tuning-fork is not quite in tune with another, the one sound from one will reinforce the other to a certain extent, but as the discordance increases the reinforcement becomes less and less, and finally vanishes altogether. So with waves of light, the waves which are in exact accord with one part of the machinery (whatever it may be) in the eye will produce a maximum effect, producing eventually a motion which gives rise to the impression of a primary colour. The waves which are slightly longer or shorter than this will be only capable of giving a smaller amplitude of vibration to the same part of the apparatus existing in the eye, and consequently less intensity of that particular colour sensation, till finally, as the wave-lengths become shorter and longer, the amplitude of vibration in that machinery becomes *nil* or imperceptible. But at the same time that part of the machinery which is exactly in accord with another wave-length, and is, consequently, another colour sensation, may also respond to the same wave-lengths as those which partially affect the machinery answering to the first colour sensation and for the very same cause, though it may be to a greater or less degree. Thus the same wave-length, which is not in true accord with either, may cause both colour perceptions to respond. The same argument applies to three colour perceptions, and would do so to more if they existed. Now a sensitive plate may be said to take the place of the retina, and the sensitive salts used to a colour-perceiving tissue. The simple salts have but one colour perception, but where two salts are mixed we may have two perceptions, and when dyed plates are used we may have two or three colour perceptions. Even where one sensitive salt—the silver bromide—has been used, I have traced three distinct colour perceptions, or, to speak more accurately, radiation perceptions—one situated in the violet, near G, another in the green, between

F and E, and the third in the red, and extending into the infra-red. The places of maximum sensitiveness in the three correspond to three simple colour perceptions, but not situated in the same place in the spectrum as those of the eye. These curves, however, differ from those of the eye colour perceptions, in that whilst the curve of luminosity of the spectrum arrived at by compounding the latter is a smooth curve, the former is not; but the curve of photographic sensitiveness is in a series of hummocks or ridges. We can find something similar in some eyes; for instance, where there is a slight deficiency in the perception of green. Again, there is this difference, that whilst in the eye the luminosity curves of the red and green are the greatest, and the violet the smallest, in the silver bromide the violet is the largest, and the green and red the smallest. In fact, when the colour perceptions of the eye are altered in their proportions, by looking through a pale blue solution they are very much the same as those of the photographic film already alluded to. It may be asked how and what am I driving at, and my reply is, that I think that the photographic spectrum curves of sensitiveness are analogous to the spectrum curves of colour perception in the eye, or, in other words, that a photographic plate has, in reality, only one, two, or three colour perceptions, and that all sensitiveness to other colours is due to only partial response of the vibrating atoms in the molecule to wave-lengths, which differ slightly from those with which one or more perception is in accord. A study of the simple mixture of the haloid salts favours this view, and I believe that by using it as a working hypothesis a better understanding of the apparent vagaries in the extent of sensitiveness will be obtained.

I would here add that the generally adopted physiological interpretation of colour perception is one which is very open to discussion. It can scarcely be conceived that even the delicate rods and cones of the retina are not much too coarse to be primarily affected by waves of light. In the ear there is an equally delicate mechanism which is affected by vibration in the air; and we can scarcely expect the mechanism in the eye to be responsive to vibrations infinitely more rapid, and in a medium infinitely more subtle. Probably it will eventually be found that light acts on matter to produce a chemical change in it, and that the change so produced is capable by electrical currents to set in motion the mechanism required to give the sense of colour. This, however, is travelling beyond the limits I have set myself to keep, and I leave it there.

I have to ask those of you who are interested in theory to take this hypothesis into your consideration. My late researches into the sensitiveness of various compounds recently published by the Royal Society have made me offer it to this Conference.

Quite recently we have had an announcement that a Herr Verescz has achieved photography in natural colours, and that it is a printing process. In the paragraph which appeared in the *Standard* the name of Dr. Eder appears as supporting the discovery. Were it not that the statement in some degree has received an imprimatur by such a name being connected with it, one would at once have discarded it as one of those periodical outbursts of journalistic credulity which are so often rife at certain seasons of the year. There is one thing which is admitted, viz., that although red and orange have been secured, they fade in the light.

Now, as I pointed out in my address to section A of the British Association, photography in natural colours is a *fait accompli* of many years' standing, but the process is so long, and the results so evanescent in light, that there has been no practical use of the discovery so long ago made. Before we can hope to attain the goal to which so many have tried to reach, at least two things have to be accomplished—the first, diminution in exposure of the sensitive surface, and the second, a means of preventing the print fading in white light, which is commonly called fixing the print.

That the first may be done I will not deny, but I think a glance into the physics of the matter will at once demonstrate that the second desideratum is chimerical, for the following reasons:—

There is no known element which is capable of taking on itself three colours, owing to molecular change, and this would be the least number of states in which it must exist to reproduce all the spectrum colours. We may, therefore, at once dismiss from the possibilities that a printed image in colours can be composed of elemental matter. This makes the possible image a compound, which has to be acted upon by light. The action that must take place on such a compound must be either a reducing action or an oxidising action (probably both), or else a molecular rearrangement. In the case of chloride of silver, which after a preliminary exposure to the light can be impressed by the spectrum colours, I have found that the blue end of the spectrum is reproduced by reduction, and the red end by oxidation, there being a position where there is a combination of both. We can conceive matter to be so composed molecularly that coloured light may sift out certain molecules which shall in the aggregate reflect red light when the rays acting on them are red, or when green light acts on them reflect the green rays, and so on. Let us fix our attention on the molecular aggregations which reflect red light. Since red light is reflected it follows that all the rays existing in white light are absorbed, except the red rays, and we know that when absorption takes place then internal work of some kind must be performed. In the spectrum, where these colours are produced on the sensitive surface, it must be recollected that no blue light acts on the part exposed to the red rays, and is therefore, during that exposure, incapable of doing any work in the molecules. Now the very fact that the molecules are ready to arrange themselves into aggregations reflecting different colours shows that they are very susceptible of taking a new form of aggregation, and those which had aggregated into red reflecting masses by the action of the spectrum would be the first to re-arrange themselves into blue reflecting aggregations when acted upon by the blue rays which they absorb. The blue reflecting aggregations would also be the first to re-arrange themselves as red reflecting aggregations under the action of red light, and so on. Red, green, and blue reflecting aggregations, arrived at by exposure of the matter to the spectrum colours on subsequent exposure to white light, which is a combination of the three colours, must, therefore, rapidly change to a neutral tint, following out the above reasoning; and this is found to be the case in the photographs in natural colour taken up to the present time. We may take it, then, that no mere re-arrangement of molecular groupings by coloured light can remain stable in white light. Let us see if there is a probability of fixing the colour by chemical means. Fixing would mean removal of some matter still sensitive to light. As from the nature of things such matter is part of the molecular aggregation which causes the colour to be reflected, it is evident that the removal of a part of such aggregation must at once change the colour. If fixing be attempted by adding to the molecular aggregation, the same reasoning applies. We therefore are in this quandary as to a printing-out process in natural colours. If the colour be produced by change in composition of the matter acted on, it must be fixed by chemical agencies, which means destruction of colour. If it be formed by altered molecular arrangement, white light must of necessity alter its colour.

A process in natural colours which depends on development is out of the range of probability, as I have already stated in my British Association address. An embryo photographic image in natural colours might be possible, but to imagine that a coloured image can be built up by chemical means, such as by the deposition of silver on such image, is to endow the depositing atoms with a discriminative judgment, which, so far as is known, not one has the slightest symptom of possessing.

It will be seen from this that I am no believer in the discovery of a really practicable process for producing photographs in natural colours. We may wish every success to the gentleman who is making these researches, but the telegraphic description in the *Standard*, to my mind, does not require to be read between the lines to see that there is a great deal more of hoped for, than of accomplished, success in what has been done.

THE ART OF DRAWING AND PHOTOGRAPHY.

By A. M. Rossi.

In an article written by me some time ago in the *Photographic Quarterly*, I endeavoured to show the preponderating influence that photography bears on art. I went, perhaps, a little too far in mentioning certain facts and incidents, and this brought upon me an avalanche of hostile criticism from my brother artists. On this occasion I purpose, notwithstanding, to follow on the same track, and try as best I can to prove that photography, instead of being the useful servant to art, has almost become its mistress.

When photography was in its infancy, a thorough academical art education was acquired by long, tedious, and assiduous study. Drawing, by which is meant not only an outline, but the inside accentuation and modelling of the form by means of the correctness of values and passages in the *chiaroscuro*, formed without exaggeration three-fourths of an art education. The rest was occupied by the student in learning—if learning it could be called—the art of painting. Students admitted in the academies began by copying from the flat, and then drawing from the cast, extremities, and heads, and busts, &c., attending at the same time classes in anatomy, geometry, ornamentation, elementary architecture, and perspective, all considered necessary for the formation of an art draughtsman, who, after a period of six or eight years, if he could distinguish himself by executing an original cartoon of a given subject, was promoted to the last and, to him, most fascinating school, that of painting from life, where he could nestle until he felt his wings strong enough to fly in search of name and fame. Beyond teaching a few tricks, and the way of holding the palette and the maulstick, the professors con-

tented themselves in passing their own private opinion upon the works. Hence it was that one day Professor A. would pronounce a painting too hot, and the same would be too chalky for Professor B.; an academy from life would be lacking in transparency for Professor C., and the same a day or two later on, in too light a key for Professor D.; and so on. He who is not born a painter can never become a great one. Some of the best prodigies in the academies, in emerging into the schools of painting, have thoroughly flagged, and it is hardly necessary for me to mention many names of men of modern times who gave up the palette, or used it to the detriment of their beautiful designs. We have an Overbeck, a Kaulbach, a Cornelius, a Tancrede, almost our contemporaries, great men who threw the brush away. We find an Ingres in France, a Maclise in England, who merely smeared their immortal compositions. The art of drawing constitutes the longest and only teachable part of an artist's education. In the days I am speaking of, painters were fewer than now. Only those who distinguished themselves were recognised, or even admitted into society—wonderful transition from the days of the Medicis, of Charles V., of Francis I., of Leo X., whose munificence made their Courts the centres of genius, for they loved art and honoured the artist.

Nine-tenths of the art students belonged to the lower classes of the people, mostly artisans or farmers' sons; the academies were, no doubt, well stocked, but not one in a hundred became an artist at all. Before the second or third year of their studies some would be caught by the conscription, others would become shopkeepers' apprentices, and I have known many of my chums accepting situations as waiters at a *café*: thus this little illustration, of which I can bear witness, is, I venture to hope, sufficient to prove that it was beyond any moral possibility in those almost pre-photographic days, for any house-painter's apprentice, or a boy sweeper, or a cabin lad, or an artists' colourman's son, to go to bed one night in the fulness of his various vocations, and awake a year or two later a ready-made artist, as has been the case in this and other countries beyond any possible dispute within these last twenty years; because in those days, when artists had to depend solely on their intellectual efforts and the training they received from their masters, who admitted in their *ateliers* only men of exceptional talent, the paths of art were comparatively free from the useless and poisonous weeds that now infest it. Now, thanks to the facility that photography offers alike to the strong and the weak, the ranks of art are overcrowded with aspirants to fortune and to fame. A few push their way through the crowd and attain excellence, more wrestle with cruel mediocrity, and the majority are canvas daubers, who glut the market with rubbish, to the destruction of art, the gradual degeneration of artists, and the disgust and confusion of the patron.

Having thus laid a certain basis, I will proceed to show that the marvellous perfection to which photography has risen, and the facilities that she offers us, has so minimised the long and tedious years of an art education that a youth born an artist can now accomplish in as many months that which would have taken him so many years to learn before photography.

The three great components that constitute an artist are design, drawing, colouring. By design we understand the idea, the scheme, the conception that an artist wishes to express. This is a creative faculty, and, like colour, cannot be taught; if it is to some extent acquired by tuition it will be destitute of individuality and void of originality. Drawing is the necessary foundation of painting, without which it is impossible to obtain the images of things or their action, their just proportions, expressions, or animation.

This knowledge, though infinitely easier to some than to others, can be sooner or later acquired, and by practice can be perfected. Colouring, as I said before, is an instinct born with us. Every man has a genius—the evil, the daring, the sluggish, and the bright genius that inspires in his works that mysterious breath of the spirit that makes him see lovely images. Unfortunately for many, their mind has been unable to carry them beyond the borders of the boundless area of mediocrity to get a glimpse of the glorious fields of immortality. Nevertheless, their academical education has not been lost, for it has given them experience which has convinced them that a true artist now is not made at an academy, or in any of the numerous schools where young people flock by the hundred to the destruction of art, but by going to nature; and if such youths, who can from nature's inexhaustible book get inspiration and learning, devoted themselves to art, it would be a blessing for all connected with it. Michael Angelo called with Vasari one day on Titian, at the Belvidere at Rome, to see a picture of a naked figure of Danae. Many of the guests began to praise the work highly, as do people when the artist is present, and Michael Angelo, when all had left, declared that the manner and colouring of Titian pleased him greatly, but that it was a pity that the Venetian did not study drawing more, for if, he added, the artist had been aided by art and knowledge of design as he is by nature, he would have produced works that none would surpass.

I would ask you, if an artist of Titian's gigantic powers lived now, and had produced a picture of a naked figure, would he have incurred the criticism that his great brother artist passed upon him? I think not; for conscious, as great men generally are, of the weak points in their works, he would be sure to use all the legitimate means in his power to secure a correct outline before applying to it his fascinating powers of painting. I can, therefore, well imagine a nineteenth-century Titian taking a good photograph of that he has conceived with his imagination, and tracing it on his canvas to his size before painting from his model, in which he would be sure to produce that which the modern Michael Angelo would admire, not only in the manner and colouring, but also in the drawing. It is indisputable that photography has destroyed all conventionality and mannerism in art, and has shown us the correct way of drawing, by placing before our eyes the true forms of lovely things and of all things.

With your kind permission I will now try and put before you an illustration in support of my forthcoming assertions. We take two young men—one in good circumstances with a liking for art, although not an artist, who not knowing what else to do, decides to become one. The other is a boy born in poor circumstances, but a painter; within him lies dormant the instincts of a designer and an artist. Whilst the first goes through his academical training, the latter goes about with the painter's can, being an apprentice to a house-decorator.

The former devotes six or eight weeks in shading the head of a Vitellius, stippling it with the point of the crayon and bread putty. The apprentice with a piece of chalk is smearing with forms of all kinds every available space of wall he can come across. The Academy student is busy trying to win a scholarship for best drawing from the antique, and the little apprentice, getting hold of a photograph, traces it on a smooth piece of board at his master's shop, and with his master's paints he colours it. It is a portrait of his employer, who, having detected him, instead of discharging the refractory one, sends him at his own expense to Heatherly's to join the evening classes. There he learns in six months enough drawing to enable him to copy with exactness anything from the flat. After six months' education he copies from a Christmas number a picture which he sells for 1*l.*; next he buys for 2*d.* the photograph of a pretty lady from a hawker's wheelbarrow, makes an enlargement, paints it, and sends it to an exhibition, where it is hung and sold. Without any further instruction the boy now devotes every available minute to painting from nature, and goes to the parks and in the country, producing landscapes. His first attempts are naturally consistent with the slow awakening of his genius, but steadily progressive, and gradually approaching that manly and rapid development characteristic to all men of genius. In that manner he devotes two years, when he has the courage of submitting one of his landscapes to the crucial test of the academical Council. It is accepted, well hung, and sells. This bit of luck gives him an opportunity of visiting frequently the Royal Academy, and he uses his keen eye of observation, without, however, allowing his mind to be influenced by what he sees around him. Meanwhile the Royal Academy student sends an ambitious figure-subject and it is rejected.

Henceforth the humbly-born young man is a regular exhibitor in the R.A., each succeeding picture is better than its predecessor, his development is surprising to all. A pastoral subject of ambitious dimensions the following year attracts great notice, and, to cut a long story short, the young man is in the enjoyment of a great reputation, and perhaps an associate of more than one institute of art. The R.A. student, discouraged at the repeated rejection of his works, at the hands most probably of his teachers, throws palette and brushes away, and turns his back on art for ever.

And yet, gentlemen, the house-painter could not draw, at this period of my narrative, from nature half so well as the Academy student, who is very well versed in anatomy, in geometry, perspective—all occult gifts to our young prodigy, who on his part could, however, produce a picture redolent with all the charms that only an artist can give. This little illustration, which I venture to hope will not flavour either of improbability or exaggeration, is a fact within my memory, which, however, could not have taken place in the days of Titian or Buonarotti under the same circumstances unless the poor boy had a camera and all the rest of the multifarious appliances that photography offers us now.

If, therefore, we can trace the career of a brilliant artist, almost self-taught, how many more similar cases might we not have amidst us of men who attain the same results with no better means; and thus it is that I maintain that the cabin lad and the yeoman's son and the artists' colourman's boy, if born talented, can all reach the apex of excellence in art. It is immaterial what means are used providing they are legitimate.

An artist must show what he can do and not how he does it. I conclude my paper by expressing my firm belief that the only teachable part of art, which is drawing, is sinking with the rising of photography, and, to my humble belief, the days are not far off when a youth, born with artistic instincts, in a few months of mechanical instruction can be his own teacher, and photography will be his academy.

DISCUSSION.

Mr. ADCOCK said: I merely wish to say that my interest in hearing this paper has been very great. In reading it over when published in our Club *Journal*, I am sure that interest will be even greater. I thoroughly believe in the opinions expressed by Mr. Rossi, and I can only say that those who pursue photography, not merely from the love of the mechanical part of the work, but for the art capabilities that it possesses, will find in it a treasury which will give them pleasure for all time.

Mr. DAVISON said: Mr. Rossi has put in a very able and interesting manner before us a view of photography, which may be taken by a few artists of modern stamp. At the same time I should doubt very much if that position be taken up by any considerable number of artists, whether they be of the advanced school or of the more orthodox type. I doubt, indeed, if the position will be found satisfactory either to the painter or to the photographer, if I may use that hackneyed expression. The use of photographs which Mr. Rossi advocates appears to be based on the view that photography is learnt immediately—for the artist could hardly learn much from such photography as might be itself imperfect. It must be remembered that he defined the drawing of photography not only as being mere contour and outline, but as the light and shade going to make up the whole drawing of the picture; and in that sense the study of photography is by no means one accomplished in a brief period. I do not think the nine years he referred to as the period of study for an artist is more than sufficient for the photographic artist. The study of tone, of which we have heard so much lately, is absolutely necessary, and will certainly take a large amount of time and practice. I cannot think that reliance on photographs should be allowed to shorten the painter's study and hard practice at drawing, particularly taking the definition of drawing which Mr. Rossi has started with. Even looking at a practical matter, in working over an enlargement, will not he cover up the drawing in almost every case, and have to draw afresh as the picture goes on to completion? It is too much like the old system—it still exists—of using "a crib" in classical studies, which is hardly held as tending towards sound scholarship. Mr. Rossi instanced a case where a house-painter's lad attained notoriety and excellence as compared with one who was given all the advantages of an academy training, and he deduced from that, I think, that a lad by the aid of photography could outstrip the artist trained in the usual schools. I hardly think these instances make for his argument at all; they do not prove that photography should, or could, be relied on by the artist. He says that, without any special instruction, the lad, after six months' drawing from the flat, devotes every available minute to painting from nature; but it ought to be remembered that in that work he is *not* drawing from the flat, and circumstances are entirely altered. It seems to me that the difference between the two cases is, that in one case the lad is an artist, and he attains to excellence not on account of his want of drawing or using photographs, but in spite of his want of education. With judicious education he certainly would not have been an inferior artist but a greater one.

Mr. DRESSER: Unfortunately, I am nothing in the way of an art photographer, but there are one or two remarks I must make for the sake of my friend Mr. Rossi. Mr. Rossi is not a photographer, and knows nothing about it. He referred to a photograph as an outline drawing, not as an art drawing made by an art photographer. So far as I understood the paper he referred to the drawing of the photograph as an outline, and when he illustrated his subject his illustration was that a person had to be born an artist, and the photograph assisted him by preventing him from being under the necessity of going to school to learn drawing. Not that photography made him an artist, but that he was an artist born, and photography assisted him by saving his time.

Mr. NEWMAN: I want to support Mr. Rossi as an artist, and yet I feel confidence in Mr. Davison's remarks. Many of Mr. Rossi's remarks about artists are very true indeed, but a man must be an artist before a photograph is of any use to him. Nobody knows better than I do the difficulty of copying a photograph; anybody who has tried it will know what I mean. If a man is able to draw and gets a photograph to assist him with his picture, there is no doubt the photograph will be a gentle reminder of passages he has overlooked, and when he refers to his model again he sees these passages and makes use of them. In that respect photography is very useful, but I agree that photography will not teach men to draw.

Major J. FORTUNE NOTT: I have listened to the paper with great pleasure, but I differ from the gentleman who preceded me; he entered into very controversial matter—photography in art. I think the title of the paper should be confined more nearly to the fact that photography could be of service to an artist. We know there are few trades or professions in which photography is not available, and we now have the word of an artist that it is valuable in the profession—which, of course, we knew long ago, though artists had not the candour to admit it. I should like to see the question of photography in art thrashed out by masters of the art world; I don't think Mr. Rossi is able to speak about it, as he is not a photographer. He says it gives outline, and is, therefore, useful to the artist who has not the power of accurate drawing. I do not think a man ought to enter the profession of art by the back door of photography. Photography is one thing and art is another, and I have not yet seen that the two meet in any way. Photography depends on accurate and correct lenses, of an accurate knowledge of the chemistry of the dark room, and it is in the dark room—after the selection of the image, which, of course, can be done by a man with an artistic eye—that the naturalists rely on the manipulation to produce the effect they desire. I should have liked to hear from Mr. Rossi if photography would produce real art.

Mr. ROSSI: Some of the well-meaning remarks of Mr. Davison tickled my fancy, and so I will reply to them. He seems to think that I tried to disparage photography. Then I must apologise for the deficiency in the expression of my views, for I had quite a different idea when I wrote the paper. I tried to place it on the highest pinnacle, and express my gratitude to it on behalf of my profession. As to the remark that photography is not useful to art, I must beg to contradict him, for I can prove that photographs do help men who, from circumstances, have not been able to get the education which would have enabled them to do without them. I am a painter, not because I can draw the outline of a hand, but because I see the sentiment of the hand. Let us suppose that I could not draw that hand from want of the necessary education, but I might still be able to paint it. Under those circumstances, a high-class photograph, with all the charms the photographer can give it, is an assistance to paint that hand, and the outline is not destroyed in the least degree; it is inside the outline I am working. I say the poor boy had not the opportunity of an art education, but he became an artist. Why? Because the marvellous perfections of photography helped him. But that does not mean to say that if the boy had received an academical education, he might not have been a better artist. Major Nott suggested that a man should not speak on what he does not know. Had he read my paper, or listened to my reading of it, he would have found that the only word I used was "the camera and the multifarious appliances of photography." I say that photography has risen to such a state of perfection, and that it probably took longer to reach that stage than it takes to educate an artist. I cannot agree that photography is no help to art. There is not an artist in Europe who is not provided with every photographic appliance, and some of them are extremely good photographers. I am not one of those. Some of the greatest luminaries in England use photographs because they offer facilities which life does not offer—especially instantaneous effects. The figures for many of the groups are taken with the detective camera.

Major NOTT: I said I was sorry you did not speak on the application of art to photography.

Mr. DAVISON: I certainly did not wish to convey the idea that photography was not of service to the artist. Certainly the painter has, for some years past, learnt much from photography, and this can be seen from a study of modern painting.

The PRESIDENT: I think Mr. Davison and those who agree with him do not give sufficient consideration to the fact that the greater part of the art shown in photography is either in the sitter or the subject taken. I mean to say that if the sitter has a bad expression on his face the photographer is powerless. I have an illustration here. At South Kensington I saw still-life objects set up for drawing lessons in the time studies; these were a jug, cabbages, and some oranges. I suggested that they should be photographed to send round to the various centres, and that was done as an instruction to the people how the objects were to be arranged for the lesson. The photographs were hideous, but when the time sketches came in to be examined, some of them were beautiful, and the grouping was not hideous. That was a case in which photographs were useful to show how the outlines were to be arranged, and nothing more. I am not going to agree with Mr. Davison when he says it takes nine years' study for a man to become an art photographer. I have been a student for something like a quarter of a century, and it is rather galling for those who have paid attention to photography for twenty years, after all the trouble and mess of the old wet plate process, on entering their pictures for exhibition, to find after all that a man who has learnt photography—what he calls learning photography—for six months takes away the best medal. All I can say is, that in this case it certainly did not take nine years to become a photographic artist. I believe I am not wrong in saying that the gentleman who took that medal is not far from me now. Perhaps Mr. Davison is a standing example of the nine years' apprenticeship, but I don't think he is. With regard to coloured photographs, I see no objection to them if they are really good. If a real artist chooses to use a photograph for outline it is perfectly legitimate. I will ask you to give a cordial vote of thanks to Mr. Rossi for his interesting paper.

LIMITATIONS IN THE TREATMENT OF SUBJECTS BY FOCUS.

By T. R. DALLMEYER.

THAT the combined chemical and mechanical process known as "Photography" be admissible in the sciences must be determined by its exactness. So far as a photographic lens can be made perfect (speaking technically, this means that the instrument be aplanatic) the applications to science are eminently satisfactory in records and investigations, in that but one plane of the object has to be represented by one plane in the

image, or that the conjugate points in the object are so situated that they are simultaneously received to an accurate focus on the plane of the photographic plate. These conditions are practically maintained in stellar photography, micro-photography, &c. Photography in many such applications is not only sufficiently truthful, but records on the sensitive plate more than the most practised eye can ever see, for physiological reasons. Immediately photography is employed to depict objects in different planes, where the corresponding points in the image are formed on sensibly different planes, the representation by receiving them on one plane is no longer truthful nor exact. A photographic instrument to accomplish this theoretically is simple enough, but nevertheless is a practical impossibility. It would only necessitate the employment of an imaginary "pinhole," the aperture of which shall be the section of a mathematical straight line. In such a case every plane in the object would be equally and perfectly rendered, mathematically true and exact in position on the plane upon which the image was received, the size of the image itself being dependent on the distance of this plane (of the plate) receiving the image from the imaginary "pinhole."

From the fact that in pictorial photography it is necessary to depict different planes at once, it follows that, strictly speaking, the results are untrue in drawing, although relatively they can be made in so-called sharp photographs far truer than any artist could ever expect or would attempt to render them in detailed drawing. Such approximate precision capable of being produced by a photographic instrument might be the envy of the mere still-life painter, and is certainly acknowledged by all painter artists as a useful elementary means to an end.

I understand the attitude of a painter artist in depicting a scene to be that of a workman with an artistically educated sight (with binocular vision), anxious to portray or reproduce the individual feelings and emotions produced in his mind by the scene before him, and with working tools at his command that he relies upon to help him in giving a truthful impression of what he sees. This individuality is not capable of any exact definition, although he may succeed in impressing others with the very same feelings that his transcript was intended to convey. Impressed by this individuality he will emphasise or subdue, according partly to his own taste, and partly according to the principles of composition (the latter being mostly negative principles), which are the result of long study and practice.

With the photographer the attitude is very different. Grant that he is perfect in his technique, the tools at his disposal are self-acting, recording the image from one point of sight only, and the individuality of the instrument is limited and capable of exact definition, but here his own individuality is restrained by the latter's artistic capabilities. The question of the production of effects is now one dependant entirely on scientific laws, and is defined by the optical construction of the lens itself and the law of conjugate foci.

As the camera can only depict what is placed in front of it, the photographer (to produce work that can be called artistic) has, or must cultivate, that artistic appreciation of nature in all her moods which the true artist observer and admirer of her finds so much pleasure in. The choice of the subject, its charm or interest, and its more or less good composition as seen from different points of view, will indicate the operator's greater or less artistic appreciation and individuality; but having only an inanimate and untutorable machine, he is bound to look for such phases of nature as can give that machine the greatest opportunity of utilising its limited powers. The limited treatment in point of definition lies in the adjustment of "focus;" the controversies that have arisen on this point, on the art side, have certainly done much to raise photography from a copying process to that of a fine art.

You have before you a series of photographs that show the *tendencies* by various treatments of the focus towards the destruction of the best possible image as given by a perfectly corrected lens. They are the result of a series of accurately performed experiments, and as a record may prove of value and impress the memory with the *tendencies*, without resort to the theoretical study of the principles that guarantee the results.

It is probable that you are all well aware that the test for a perfectly aplanatic lens is that when a point of light is focussed for the image it is seen sharp, and that on wheeling the plane of the best focus in or out the image vanishes equally on either side; if positive spherical aberration is present on the inside of the focus the image vanishes or loses structure very rapidly, but on the outside lingers for a considerable distance, and its structure is maintained; this becomes more and more remarkable the more positive spherical aberration is present. The converse of this occurs when negative spherical aberration is present.

The reason—and it is easily shown mathematically—is that in the former case there is an outward concentration of the image-forming rays outside the focus, and an inward concentration of the image-forming rays outside the best focus; and the converse of this occurs in the latter case. Again, it must be borne in mind that the least circle of aberration in a non-aplanatic lens is *not* the best focus visually, but at the plane where there is the strongest inward concentration of the image-forming rays. I have intentionally laid some stress on this point now, as objection has been taken to the fact that spherical aberration improves the out-of-focus planes, simply from ignoring the fact that the important element, viz., the measurement of the longitudinal aberration, has been lost sight of in comparisons made of the transversal measurements of the circles of confusion as compared to those of an aplanatic lens.

With regard to the illustration, you will note various regular steps in the alteration of the plane receiving the image; if the focus be shortened, or a movement *in* be made, you know it corresponds to a more distant object, and hence the plates in which there has been an inward movement correspond to *foreground* tendencies when some more distant object is focussed for; and, on the other hand, if the focus be lengthened, or a movement *out* be made, the focus is made for some nearer object, and hence the plates correspond in these cases to background.

It would be an easy matter with any lens to construct a table showing the limits of movement of the camera back permissible, not to exceed a certain definite out-of-focus circle (deemed consistent with sufficient maintenance of structure), for planes on either side of the one chosen that should include such treatment for the extreme distance and nearest foreground required. If these were exceeded by a given lens with full aperture, the requisite limit could be arrived at by reducing the aperture exactly in the proportion you wish to reduce the out-of-focus circle produced to that required.

There are only five treatments of the subject by focus possible:—First, the pinhole; second, sharp photographs throughout; third, contrasted definition between different planes with an aplanatic lens; fourth, the introduction of positive spherical aberration; and fifth, the introduction of negative spherical aberration. The last I do not intend to speak of, as it is of course the converse of the fourth, but is a treatment that is hardly ever required in practice.

First, the pinhole. I have spoken of the imaginary pinhole for mathematical accuracy, and the practical pinhole is an instrument that coarsely imitates it, every mathematical point in the object being represented by a cone of rays limited by the aperture of the pinhole itself, and the distance of the sensitive film from the pinhole, the pencils being represented by a series of small circles, becoming greater in diameter the greater the obliquity or the more the angle of subject included. Theoretically, the foreground is exaggerated in size in true drawing, and the distance dwarfed and better defined; but the pencils are so small that one would not appreciate it. The general effect is one of *uniform softness through all planes*: it is seldom art, for the unaided eye cannot receive the same impression.

Second, sharp photographs throughout. It is well known that if the nearest object in a picture to be taken is sufficiently distant that the rays coming from it to the lens may be considered practically parallel, all planes more distant will be sharp; or there is for every lens a plane of some distance distant, beyond which everything may be considered as topographically sharp. The nearer this plane is desired to be for a given lens, the more it must be stopped down, or the less does its intensity become; if this is so arranged that at the normal distance of vision the out-of-focus circles of indistinctness throughout the picture do not exceed one-hundredth or less part of an inch, or the circles subtend an angle of less than two minutes of a degree at whatever distance the picture be viewed, such a picture, to all intents and purposes, is a truthful record in drawing, granting that the angle included be no more than the eye is capable of taking in; or, on the other hand, that it be viewed at a distance of the focus of the lens itself.

This rigid exactitude and the brilliant results obtained are pleasing and popular mementoes, but can hardly be termed art! It is the simplest form of all photography, for the instrument gives an exact copy of what is placed in front of it, and no personal judgment is wanted to produce any truthful effect, such as the scene in reality conveyed to the brain by the eye itself. I will dwell on this later, and prove the contention.

Under the same heading as universal sharpness naturally comes the uniform out of best focus treatment with the aplanatic lens. This effect is easily produced by the instrument under conditions precisely the same as those just mentioned, and then to slightly wheel *out* the camera back. The evil in such a case to be guarded against is that this process should not include a foreground nearer than the first plane to be depicted, or it will have a better focus, and probably attract undue attention. The distance at which the picture is eventually to be viewed will, of necessity, have a great influence on the amount of out-of-focus effect allowable. It is a parallel with the pinhole and (in one way) the uniform sharp treat-

ment, and I therefore place it under the same category, *pro tem.* The process tends from original definiteness to pass *uniformly* to indefiniteness and weakness, from structure to destruction of structure. The points in the object, instead of being concentrated to points in the image, have passed their best focus, and are diffused into uniformly illuminated circles of a weaker character. It may be said to give a uniformly broader treatment of a subject, but as it rests somewhere between perfect concentration and brilliancy, and destruction of structure and consequent weakness, it must tend, as a process, to uniformly weaken. It is defined and determined by the size of the out-of-focus circle of uniform indistinctness chosen, or ascribed to the pencil after having passed the plane of best definition.

Third, contrasted definition with an aplanatic lens. That this may occur in any photograph, the lens employed must be of such a focus and intensity (or ratio of aperture to focus) that the plane in the object that is most favoured by definition is so situated that planes nearer to or further from it have conjugate planes distinctly and appreciably different from that on which the chosen plane is received by the plane of the plate.

As the plate is a fixture, points in these out-of-focus planes will be represented by circles of indistinctness, varying in size according to their distances from the chosen plane of finest definition.

It follows then that, strictly speaking, for mathematical measurement on the one plane of the plate, the drawing is untrue as regards the out-of-focus planes, and increases in this inexactitude and in weakness the more they are removed from the plane of chief interest. I refer you to the first seven plates as showing the tendencies, but it must be borne in mind that equal movements of the camera back inside the focus lose definition more rapidly for the foreground than the same distances outward would affect the background.

Under this heading I also include contrast in definition when the chief feature of interest is not at the best focus given by the lens, or when this feature is once focussed for as best the camera back is slightly wheeled *out*, as in the second part of the previous head. This treatment requires very careful adjustment and choice of subject, for if any portion of the picture intervene between the subject of chief interest and the camera, it must be better defined than that intended to be of chief interest, and detract from its value as a work of art by diverting the attention to objects practically out of the *picture*.

The difficulties of adjustment between the limits of out-of-focus effect, so as to subdue certain unimportant planes without carrying the tendency to destruction of structure too far, has made this process capable of engaging the skill and judgment of the artist to a much greater extent than the more limited methods previously described. This treatment is undoubtedly far *truer* in its rendering of what the eye actually sees, if the treatment of the limiting out-of-focus planes is not carried to a too extravagant degree. For *truth, as the eye sees*, the palm rests with this treatment, or with—

Fourth, the introduction of spherical aberration. Here the individuality of the treatment by the instrument is again different. As stated before, slightly beyond the least circle of aberration a focus, still more or less definite but softened, is formed by the inward concentration of the image-forming rays more pronounced and powerful than the weaker marginal rays. The latter, not coming to the same focus, produces a faint halo that tends to soften the image, but still *structure* is maintained here. This halo becomes more and more pronounced the greater the amount of spherical aberration introduced; but, at the same time, the greater become the limits between the planes (or the measure of longitudinal aberration) through which the plate can be moved still consistent with partial definition maintaining the structure of the image. But as there is an inward tendency on the further side of the least circle of aberration when positive spherical aberration is present, there is also an outward concentration of rays on the nearer side, tending toward a more rapid destruction of the image than is the case with an aplanatic lens. However, this detriment is not an important factor: first, because the best focus with a lens in which spherical aberration is outstanding is beyond the least circle of aberration, the definition at the least circle of aberration itself comparing very favourably with an out-of-focus circle of the same transversal measurement by an aplanatic lens; and secondly, this outward concentration corresponds in the image to foreground, or to objects nearer than that of chief interest, and this, as a rule, is a negligible quantity compared with the better maintenance of structure in the background or receding planes. By spherical aberration, then, there certainly is *depth* of definition, and in portraiture no artist denies the advantages of the resulting softness, and blending into background as compared to the contrasted definition by an aplanatic lens through such small limiting planes; the eye certainly never saw such contrasts in a single figure as the aplanatic lens of great intensity and long focus gives in a parallel case.

We have now discussed the various treatments possible, and it now remains to select that or those that most nearly represent what the eye sees.

I have several times come across the expression that to produce an artistic photograph we have not to consider only what the eye *can* see so much as what we wish it to see. This is undoubtedly true, but I am not content that the question of the scientific bearing of *vision* on this subject should be waived. I have not read up all the focus controversies, but propose to discuss and analyse a few vital points in the most recent contribution on the subject to the Camera Club by Mr. Burton. (1) One of the tenets of the naturalistic school is that no part of a photographic picture should be as sharp as modern photographic lenses (aplanatic) are capable of making it. Mr. Burton contends that the eye can define equally as well as such a photographic lens when focussed as sharply as possible, and says were this not the case the eye would be equally incapable of defining the reproduction. This is an undoubted error. The use of small stops in aplanatic lenses, even for one plane alone, certainly give a definition far finer than the eye ever can reach, cp. the reproduction of print in a photograph beyond the distance of distinct vision. (Explanation on blackboard). "Mr. Burton says the oft-repeated statement that the eye, having certain optical defects, does not define as well as a photographic lens, is a thing simply not true, and recently disproved." He does not quote his authority, but Helmholtz distinctly contradicts this in facetious and no measured terms. To make the comparison above referred to fair, both object and the photographic image must be viewed under the same angle. The conclusion I have come to in cases of normal good vision, is that the image can be seen much sharper than the object would appear to the most perfect eye. (2) Mr. Burton says that another tenet of the naturalistic school is that only the principal object, or the object of greatest interest, should be nearly as sharp as the lens can make it, and contends that "if an attempt be made to support it on scientific grounds, that attempt must of necessity fail, for there is no optical defence for it."

This is another error. It can be proved by trying *artificial means* to *make* the eye see what the lens can see. The same process must be applied to both eye and lens to place them on an equality in this respect: —Stop them down! The eye unaided has a continually varying focus that adjusts itself to plane after plane as occasion may require. By giving it a so-called fixed focus, the same effect of sharpness through all planes is arrived at as with the stopped-down photographic lens. To prove this to oneself, look through a pinhole close to the eye—a pretty large pinhole will do—and hold some object quite near the eye, with a distant distinct background, and look at the near object. The background and intermediate planes will be equally well defined. Now remove the artificial iris, and the near object alone is distinctly visible. The reverse of the effect is, of course, the case if the eye be focussed for the distant plane, the near one then being out of focus. An artificial diaphragm to the eye of course enables one to see very much nearer than would otherwise be possible, and also enables a short-sighted person to see to a distance. The eyelids, with a short-sighted person, often almost unconsciously serve the purpose of the artificial diaphragm when their glasses are not in use. Binocular vision in sight, too, of course has an important bearing on this head, particularly in the representation of near planes. The axis of the eyes are directed convergently towards one particular point in binocular vision, every other point in the scene producing different images on each eye, causing indistinct double images. The more the eyes are directed to distant objects the less noticeable does this become, the angle subtended by their separation becoming less and less. The treatment of planes parallel to the axis, or marginal definition, is more difficult to attempt on scientific grounds; but as the eye sees distinctly only through a small angle, it seems feasible (and it certainly is noticeable in nature) that there should be a slight marginal falling off of definition in the lens. If the lens of the eye gave a flat field throughout the one plane focussed upon, sharpness through this would undoubtedly be the desideratum. Mr. Burton is the only writer I have found who speaks as an authority against the scientific aspect of the tenets of the school of naturalists, and I regret that he is not here to argue on his side for, or concede the points in, the question.

The single eye then, in a fixed position, and more remarkably in binocular vision, undoubtedly sees nature under conditions of contrasted definition, and hence any method that rigidly gives uniform definition throughout all planes must fail to be artistic.

As to how the method of contrasted definition is carried out by the lens employed must be a matter of individual impression, and the focus and aperture of the lens so adjusted that the image is in effect the nearest possible to that the artist feels and wishes to convey. In this connexion the broader treatments, by slightly out-of-focus effect, or introduction of

spherical aberration, produce results that artists alone can decide, whether or no they compare favourably or not with the broader treatments by the pencil or brush. The answer to this question must decide how far photography may progress as a fine art.

The naturalistic school have shown results that cannot be denied to be eminently artistic, and there is without doubt the qualification of greater scope in their rendering. Dr. Emerson has produced work ranging from the beautiful in bright results to the sublime in the dreamy impressions of twilight and the impressionists' school. As the subject has appealed to the students of this school, so have they rendered it, within the limits of the definite powers of their instruments. There is no hard-and-fast line of one particular treatment, and my object has been to indicate the ground entered upon by leaving the limited and narrow treatment of universal sharpness, a treatment that is a triumph as an instrumental record; but, if taken alone into consideration, is detrimental to that art progress which all of us, anxious for the higher development of photography, have so earnestly and sincerely at heart.

THE LATENT PHOTOGRAPHIC IMAGE.

By C. H. Bothamley, F.I.C., F.C.S.

Few questions are of greater interest to the scientific photographer than the nature and properties of the latent image, *i.e.*, the result of impact of light on a photographic plate, invisible to the eye, but quickly revealing its presence when the plate is treated with a reducing agent in the form of a developer. It has been the subject of a considerable number of experiments and a very large amount of speculation, and a paper which aims at giving a complete summary of what is known about the matter, as distinguished from what is merely guessed or surmised, may not be without some value. It is often very useful to realise exactly what point we have reached, and what problems still remain to be attacked.

We are concerned with the action of light on the haloid compounds of silver embedded in gelatine or collodion and surrounded by the aqueous vapour and other gases of the atmosphere, and are only indirectly interested in the effect of light on these salts when pure or merely in contact with water. The changes which take place under the latter conditions have, however, an important bearing on the probable nature of the latent image. Briefly, it may be said that the published experimental evidence shows that perfectly pure silver haloids in a vacuum are not decomposed by light at all, but in presence of moisture silver bromide or chloride is altered with formation of a dark-coloured compound containing a lower percentage of the halogen than the original salt. At the same time a substance is formed which has the power of liberating iodine from potassium iodide, and if the action of light takes place in presence of liquid water the solution gives a precipitate of silver bromide or chloride on addition of silver nitrate. The nature of the substance which acts on potassium iodide has never been satisfactorily investigated. The dark solid product is in all probability not metallic silver, because the action of light readily takes place even in presence of nitric acid so strong that it readily dissolves the metal. For a long time it has been supposed that the dark substance is silver sub-bromide or sub-chloride, but this point will be discussed later on.

When light acts on the silver haloids in a collodion film, the halogen which they lose may interact partly with the moisture which is always present, partly with the pyroxyline. It is, however, well known that pyroxyline shows comparatively little tendency to yield chlorine or bromine derivatives, and hence it is probable that the part which it plays in the alteration of the silver salts is of secondary importance.

Gelatine, however, behaves quite differently. It readily takes up chlorine and bromine, and if bromine water is added to a solution of gelatine a yellowish curdy precipitate of a bromo-gelatine is formed. Knop found* that gelatine will take up as much as thirty per cent. of bromine, forming a yellowish insoluble compound. There can be little doubt, therefore, that when light acts on the silver haloids in presence of gelatine, the bromine or chlorine which they lose combines with the gelatine. We have, indeed, direct evidence in the fact that where the light has acted the gelatine becomes less soluble. The readiness with which the gelatine takes up the halogen explains its great efficiency as a sensitiser, and the consequent high sensitiveness of gelatine plates.

Three views as to the nature and mode of formation of the latent image seem to me to deserve attention. Many hypotheses, and guesses unworthy even of the name of hypothesis, have been put forword, but have served only to prove that their promulgators were incompetent to deal with the question by reason of their want of acquaintance with the established facts of chemistry and physics. The problem is, in fact, of a high degree of difficulty and complexity, and its solution will require experimental work of the same order of accuracy as the work involved in the determination of the atomic weights of the elements. It seems almost necessary to point out that work of this kind involves a certain amount of preliminary training.

The physical theory of the latent image assumes that the energy of the light rays is transferred to the molecules of the silver haloid, which are thereby thrown into a state of unstable equilibrium such that the compound is reduced to the metallic state by reagents which, under normal conditions, would have no action on it. The chief evidence in support of this view was the observation that the latent image spontaneously disappeared. There is, however, a considerable amount of evidence to show that the latent image does not fade spontaneously, but in all cases where its disappearance is observed it is destroyed by the action of atmospheric impurities, or by secondary reactions with substances retained in the film. Carey Lea, who was at one time one of the firmest supporters of the physical theory, showed† that silver iodide will absorb free iodine, and hence the gradual disappearance of the latent image on Daguerreotype plates or any other films obtained by treating silver with an iodising agent may be traced to the fact that the silver iodide has absorbed an excess of iodine during its preparation, and this iodine gradually acts upon the product of the action of light and reconverts it into normal silver iodide.‡

Analogy would lead us to expect that if the silver haloid were thrown into an unstable condition by the action of light waves, it would gradually and somewhat rapidly return to its normal condition when the disturbing cause ceased to act. I have myself kept gelatino-bromide plates for fourteen months after exposure without observing any reduction in the character of the image on development. Other workers have kept exposed plates for two§ and even three‖ years. It is in the highest degree improbable that a mere *condition* of unstable equilibrium would persist for so long a time, and these facts, combined with the fact that the latent image is destroyed by reagents of a particular kind, but not by others, seem to me to be conclusive against the physical theory.

A second hypothesis, also physical in its character, was propounded by Mr. H. S. Starnes,¶ and was based mainly on the facts that an unexposed gelatino-bromide plate is not affected by solutions which will reduce ordinary precipitated silver bromide, and that if a quantity of emulsion which has been exposed to light is melted up with a fresh quantity of emulsion or gelatine, or is simply remelted without any addition, the resulting emulsion shows only a trace of fog on development. It was suggested that each particle of silver bromide is enclosed in a protective envelope of gelatine, and that the impact of light waves ruptures this envelope and exposes the contained silver bromide to the action of the developer. The destruction of the latent image by potassium bichromate was supposed to be due to the hardening effect of the bichromate on the gelatine. It is not easy to see, however, how bichromate could heal up, so to speak, the ruptured envelopes; nor why the image should be destroyed by bromine, which tends to destroy or alter the gelatine; nor why silver bromide in gelatine should be more sensitive than silver bromide in collodion, the latter being by far the more porous medium of the two.

All the evidence indicates that the formation of the latent image is a photo-chemical operation, the composition of the material forming the image being different from that of silver bromide. The difference between the formation of a visible image and a latent image is, in fact, as our President, Captain Abney, has always insisted, a difference in degree and not in kind.

It is well known that bromine, chlorine, and any substance which will readily give up bromine or chlorine, will destroy the latent image, the result being independent of the mode of manufacture of the emulsion. (Examples shown.)

Potassium dichromate in neutral or acid solution has the same effect. I observed that a mixture of the dichromate and potassium bromide produced this result more rapidly than the dichromate alone, and therefore it seemed not improbable that the effect is not simply an oxidising action of the dichromate, but is due to a simultaneous action of the

* *Chem. Centralblatt*, 1879.

* *American Journal of Science*, xxxiii.; *Photographic News*, xxxi., p. 386.

† Carey Lea himself (*loc. cit.*) supposes that the iodine which the silver iodide loses when exposed to light is absorbed by the adjacent unaltered silver iodide, and in course of time reconverts the photo-iodide into the normal iodide. It is doubtful whether silver iodide can act as its own sensitiser, and it seems to me that the other explanation here given is the more probable.

‡ Berwick, The British Journal of Photography, 1882, pp. 542 and 549.

§ Wright, *Phot. Mittheilungen*, 1882, p. 16.

‖ The British Journal of Photography, 1883, pp. 653, 656, &c.

dichromate and the small quantities of soluble bromide which are almost invariably present in gelatine plates.* This point does not seem to have been investigated before.

It is practically impossible to wash out the last traces of the bromide, and hence the only course open is to convert all the soluble bromide into silver bromide, and this was done by immersing the plates for an hour in a two per cent. solution of silver nitrate, slightly acidified with nitric acid. They were then washed, first with distilled water containing a little nitric acid, perfectly free from chlorides, &c., and finally with water alone. I think it may be taken that they contained no soluble haloid salt.

Potassium dichromate solution (five per cent.) was purified from haloids by adding a small quantity of silver nitrate solution, and filtering through glass wool previously well washed.

The plates were exposed to light, and one half was immersed for five minutes in the dichromate solution, very thoroughly washed, and developed with ferrous oxalate containing no bromide. Although there could not have been any simultaneous action of the dichromate and a soluble haloid, the latent image was destroyed (example shown); and therefore we may take it, I think, as established that the destruction of the latent image is due solely to the action of the dichromate, which probably exerts an oxidising action, but may also be effective because it converts the material of the latent image into silver chromate.

Nitric acid is also commonly said to destroy the image, but I found that the strongest acid that the gelatine would stand after previous treatment with chrome alum certainly did not destroy it. (Examples shown.) A washed collodion emulsion made with excess of silver nitrate, and washed with distilled water in order to avoid introduction of soluble haloids, was exposed to light, and then treated for twenty minutes with nitric acid containing twenty-five per cent. of real acid. After washing and development it was evident that the latent image had not been destroyed. (Example shown.) Other similar experiments gave similar results, but in all cases the action of the acid on the gelatine or pyroxyline made it impossible to obtain density. I am making further experiments, but the result so far obtained seems to indicate that the nitric acid does not destroy the latent image, although it may prevent its development. In this connexion we may recall the fact that even the strongest nitric acid does not prevent the darkening of silver chloride or bromide when exposed to light.

It seems to me that it has not been clearly recognised that the formation of a developed photographic image takes place in three distinct stages, which may, and probably do, differ considerably in the nature of the changes which occur. First we have the *latent photo-image*, formed solely by the action of light, and therefore of photo-chemical origin; secondly, we have what I propose to call the *primary* or *fundamental image*, formed from the latent image by the action of the developer, and therefore partly of photo-chemical and partly of chemical origin; and, thirdly, the *developed image*, formed by the action of the developer from the primary image, and the unaltered silver bromide in the film. This last process is probably mainly electro-chemical.

Potassium iodide is also said to destroy the latent image, but I find that after immersion in a five or ten per cent. solution of the iodide for a time sufficient to convert all the silver salts in the film into silver iodide, there is still left an image which can be seen during development, and can still be seen after fixing, although it is then very faint. (Examples shown.) The same result is obtained with pure bromide or brom-iodide emulsion. It might be argued that the action of the iodide had not been continued sufficiently long. Twenty minutes' immersion in a ten per cent. solution of the iodide was the maximum given, but the conversion of the silver bromide into silver iodide was certainly complete, and it may be assumed that any action on the latent image had reached its limit. It seems, then, that potassium iodide does not destroy the latent image, nor prevent its conversion into a primary image by the developer, but does prevent the formation of a developed image, doubtless because the silver salts in the film are converted into silver iodide.

Hydrobromic acid and hydrochloric acid are also said to destroy the latent image. The action of the first acid I am investigating. Hydrochloric acid containing twelve per cent. of real acid does not destroy the image on a gelatino-chloride plate after twenty minutes' immersion. (Example shown.)

Very contradictory statements have been made respecting the action of alkaline bromides. Many writers have stated that they destroy the latent image, whilst others assert that they merely retard development. I immersed exposed plates of various kinds in a ten per cent. solution of potassium bromide for periods varying from five to twenty minutes. They were then thoroughly washed and developed. Potassium bromide does *not* destroy the latent image. Of course, if the soluble bromide were not thoroughly washed out of the film, development might be retarded to such an extent that no image would appear until after a long time, and possibly this is the explanation of the erroneous statements referred to.

It follows, therefore, that the latent image is destroyed by halogenising agents, and also by potassium dichromate, even in complete absence of soluble haloid salts, or of free acids. It is not destroyed by alkaline bromides, and apparently not by nitric acid, hydrobromic acid, or hydrochloric acid, but the effect of these substances, as well as of potassium iodide, which seems to prevent the production of a developed image without actually destroying the latent image, requires further investigation.* Ozone and hydrogen peroxide are also stated to destroy the latent image; but the published experiments are very meagre in details, and there is no evidence that any special precautions were taken to avoid secondary actions, or to eliminate the possible influence of minute traces of impurities. It is worthy of note that, according to Hodgkinson, silver chloride darkens readily when exposed to light in presence of hydrogen peroxide.† I am of opinion, therefore, that the action of these reagents also requires further investigation; but until the chemistry of hydrogen peroxide and ozone is better understood, no very conclusive results are likely to be obtained from their effects on photographic plates.

In all previous experiments in this connexion it is very doubtful whether sufficient attention has been paid to the possible influence of minute quantities of impurities. Probably in some cases all the reagents or materials were pure in the usual sense of the term, but latterly chemists have been learning that substances which they commonly regard as pure still contain sufficient foreign matter to exert a most powerful influence on their behaviour, and in the particular investigations under discussion the very highest attainable degree of purity must be aimed at. The quantity of matter composing the latent image is very minute, hence the relative effect of minute quantities of foreign substances may be very considerable.

(*To be continued.*)

* See, for example, Zettnow. *Phot. Correspondenz*, 1889, page 56 *et seq.*

* I may add that I am engaged with experiments in this direction.

† *Photographic News*, xxxi., 370.

BINOCULAR VISION AND THE STEREOSCOPE.‡

The stereoscope, it has been stated, is an instrument which is intended to present two pictures to the eyes for the inspection of the brain. The simplest form of stereoscope would be a plain box having a central division, with a suitable pair of pictures at one end, and two holes, about two and a half inches centres, at the other end, for if through these holes the optic axes were directed, perfect stereoscopic effect would be revealed. (It will be noticed that lenses, &c., are dispensed with.) Now let us consider the size of the pictures and the dimensions of the box.

When we look at a tree in nature, a mile away, we view it with so little convergence of the optic axes as to be termed practically parallel vision, and as it is "by greater or less convergence that we judge distance," we must view the photograph of that tree with no greater convergence than was necessary in nature (if we are to appreciate its true distance and size), and which in the present case is said to be "practically parallel;" so that, as our eyes are only two and a half inches centres, this dimension at once fixed the centres of the images of the tree in the two photographs at not more than two and a half inches; thus each picture cannot be more than two and a half inches wide.

Now we will consider the length of the box that would be necessary.

With ordinary vision we are unable to see pictures, or anything else, distinctly at a distance from the eye less than eight inches. Thus the box must be at *the least* eight inches long, and as has already been shown, to appreciate natural size, all photographs should be observed at the same angle at which they were taken (a distance equal to the focus of lens employed). This, then, establishes the fact that a lens of at least eight inches focus would be necessary to produce the negative from which these pictures, two and a half inches in width, were made, and such a lens would not embrace sufficient angle to be at all times consistent. Wider angle lenses are more generally used, and so the pictures must be viewed at correspondingly wider angles. Thus, if a five-inch lens be used with which to take the negative, the pictures must be seen at five inches from the eyes, and to do this the introduction of lenses is absolutely necessary. But, to appreciate the natural distance and solidity, the natural convergence *only* must be maintained, and to do this *only the centres of the lenses must be used.*

This, then, is the right principle, and the stereoscopes of commerce are constructed on a wrong principle. Sir David Brewster (the inventor) was himself responsible for this, and other writers who have followed Brewster's false theories are little less exempt from blame.

‡ Concluded from page 219.

The stereoscope of Brewster is provided with two lenticular prisms, mounted with their thin edges nearest together (sometimes whole lenses are employed, but as the centres of these often measure two seven-eighths, and as much as three inches, only the inner edges can be used, therefore the principle is the same). The images are refracted by each prism in an outward direction—towards the thicker portion of the prism (or the centre of the lens from which the prism has been cut)—and the optic axes follow the line of refraction, *and thus converge by force* uniting at a point where the axes cross, the images are said to overlap, and so coalesce.

But this "forced convergence" is unnatural, for the "tree situated a mile away," which would in nature be viewed by "practically parallel vision," would now be seen by a convergence due to something held in the hand. The true distance, then, is not appreciated, and the impression left for the inspection of the brain is that of a little model instead of a natural tree.

W. I. Chadwick.

THE NEWCASTLE SOCIETY'S PICTURES AT THE CRYSTAL PALACE EXHIBITION.

We have received a letter too long for publication in full) from the ten Newcastle exhibitors whose grievance has already been alluded to in connection with the "cup" that was awarded to Birmingham. They say:—

"We approach this subject fully aware how unpleasant is the task of characterising our own works; and this alone would have induced us, under any other circumstances, to leave matters as they stand in the Crystal Palace Club Cup Competition. But the glaring injustice of this extraordinary award, and the duty it involves of warning the photographic world against permitting its repetition, must be our excuse for taking action in the matter.

"We have no more proof of the cup having been misdealt with in this present case as to amount to a positive *suppressio de veritate* when it is necessary to reduce it to a sufficiently compressed space for presentation before your readers. Previous to determining on entering for the Challenge Cup Competition, we carefully perused the entire rules appertaining to it, as forwarded to us for that purpose, and found it to be thoroughly open, with absolutely no restriction as to exhibitors or pictures, only requiring, no limitation as to size or class of photographs, and no mention even that pictures which had been previously exhibited in individual classes at the Crystal Palace were not eligible. Carefully adhering to these rules, we selected and sent seventy-five pictures, more than forty-five of which had already received awards—twenty-four lantern slides and six stereoscopic slides, most of which had also previously been mounted. We received the following acknowledgment and acceptance of our exhibit, under date of February 26:—

"'Your papers to hand, and we are much obliged for the great care you have taken. We must just point out that Mr Gibson has selected two pictures with the same titles as previously sent (also Mr Lyd. Sawyer has sent one *Northumbrian*, though shown here in his name, and the *Castle Gould* shown here last year. As we cannot admit pictures more than once, perhaps they would like to substitute others.'

"This was, of course, tacitly accepting all our exhibits with the exception of the four pictures mentioned. These latter were sent because we found that there were no rule debarring them, and because it was announced in individual classes last year as to accept pictures shown in individual classes this year. However, on receipt of this letter, Mr. Gibson and Mr Sawyer each wrote to the Executive separately, requesting that the four pictures alluded to should be placed aside until the end of the Exhibition, and Mr Sawyer forwarded two others in place of those of his originally in. Subsequently we received another letter from the same source, of which the following is a sufficient extract, dated March 8:—

"'Your Club cabinet has arrived safely, and all pictures are hung. I think you will be very pleased with the work.'

"If all our pictures were hung, in face of two separate requests from us for four of them to be withdrawn, it suggests that either they were after all accepted as admissible by the Executive, or else that they were still hung as a weak plea for afterwards disqualifying us. Which was it?"

Here follow extracts from letters received from the "Executive," with comments on them. Seemingly there has been a misunderstanding, if not a muddle somewhere. The writers say:—

"From one of the judges we learn that Messrs. Gibson and Sawyer's pictures (not the four of them in question, but all, or nearly all) were left unjudged; hence, as the judges did not decide on all our exhibits, it is not a complete decision, and could not be final. Now what can your readers infer from this array of facts? The letter of the judge (a man of known integrity and experience) was not sent us for publication, so we refrain from any possible breach of confidence by further locating it. . . . We hope your readers will not think that we are still pushing for 'the cup that cheers' (?). We do not at all intend to obtain it by legal means, but must find it to be made of a too 'base metal' to touch on any consideration; and if our Birmingham *confrères*—against whom we have no single word to say—feel that they can hold with honour what they must now know is not fairly their own, then they are very welcome to keep it."

Their communication, the writers trust, "may come, at all events, with some negative appropriateness to the present discussion on rules and regulations at exhibitions."

Foreign Notes and News.

An amateur photographic exhibition is announced as about to be held in Buda Pesth from the 15th inst. to the end of May. The exhibits are to be located in the rooms of the Hungarian *Landesverein*.

An exhibition of amateur work is also arranged to be held in the galleries of the Frankfort Palmengarten on July 1st next. Prizes are to be awarded for work of special excellence, and to cover expenses a charge of 10 marks per square metre of space occupied will be made to exhibitors.

The *Amateur Photographe* gives an account of a rather entertaining experiment by which photographers might be supplied with an easy means of corresponding with each other in cypher. An inscription was made upon a card with a solution of sulphate of quinine. This was, when dry, obliterated with pencil marks. The card was then focussed upon the ground-glass plate of a camera in about its natural size and then photographed, without altering focus, upon an ordinary gelatine plate, which was developed with one of the ordinary developers, and fixed with hyposulphite of soda. The negative, which was of good quality, displayed the original inscription in transparent characters on a black ground.

M. Hurlbut has communicated to the *Société Française* the following formulæ for development with eikonogen:—

Rain water	300 c.c.
Sulphite of soda	50 grammes.
Eikonogen	10 ,,
After dissolving hot, add—	
Carbonate of soda	30 grammes.

For a very rapid instantaneous exposure this solution is to be used pure. For an instantaneous exposure of medium duration, 50 per cent. of water is to be added. For ordinary portrait work employ equal parts of the solution and water.

M. de Tournemine recommends the following solution for mounting proofs as particularly good for preventing crumpling:—

Alcohol	250 grammes.
Gum lac	50 ,,
Castor oil	10 ,,

The *Tägliche Rundschau* has recently been palming off upon its guileless readers an account of alleged recent improvements in photography in natural colours which ought to be preserved in perpetuity as a classical instance of what non-technical writers can do in the way of misrepresenting photographic processes. According to the *Tägliche Rundschau*, which has managed to drag in the names of Eder and Von Gothard into its article, objects can now be photographed *direct* in their natural colours. How this takes place is a little obscure, as something is said about printing under an artistically coloured screen, and it transpires that the original exposure has to be continued for several weeks! If any of our colleagues are troubled by curious customers desiring to be photographed in their "natural colours," we advise them to dwell upon this aspect of the subject. If any are found willing to pose for several weeks, they would deserve success.

At the last meeting of the Berlin *Photographischer Verein*, several matters of considerable interest came on for discussion. Amongst these, the subject of halation and total reflection was treated by Dr. Stolze in an admirable paper, which he illustrated by experiments, proving very conclusively the influence exercised by the thickness of the plate upon the phenomenon in question.

It would appear that Dr. Stolze's new "retouching paper" gives remarkably pleasing effects, especially the coarser paper. Dr. Stolze treats his paper in a somewhat complicated manner, as follows:—He developes with a mixture of 1 part saturated iron solution and 5 parts saturated oxalate solution, to which the same volume of water is added, and 5 drops of bromide of potash solution, 1 : 10 to about 100 c.c. of the oxalate solution. After this the paper is immersed in the acid bath, washed, and

fixed, and finally given a bath of 200 parts water, 1 part chrome alum, and 1 part quillaja saponaria, in which it is left to stand for half an hour and then filtered.

A PHOTOGRAPHIC handbook, or rather treatise—we believe the first of its kind—is now appearing in Sweden. The author is Mr. A. Dahlstrom. The first part of the work, which has already appeared, deals with the history rather elaborately, and with the collodion processes. As Sweden has hitherto been comparatively destitute of photographic literature, this book will probably supply a want, and we wish it every success.

THE LANTERNSCOPE.

SINCE noticing the lanternscope of Mr. William Tylar in our last ALMANAC, the instrument has been much improved. It has now a jointed attachment to its stand, as shown in the figure, and is altogether better finished. It is backed up with two plates of ground glass, and being directed against the light, a lantern slide placed opposite to the eyepiece is seen evenly illuminated.



Our Editorial Table.

BRUCE'S RETOUCHING MEDIUM.

A GOOD retouching medium, easily applied, is a boon to photographers. A sample of such, which we have received from Mr. T. S. Bruce, 6, Villas-on-Heath Vale, Hampstead, N.W., seems really excellent. Following the directions given, we moistened a rag on the tip of the finger with it and rubbed it lightly over the surface of the negative; this caused the pencil to "bite" in an effective manner, and the retouching was not disturbed by subsequent varnishing. It proves equally good for landscapes and portraits.

AGENDA DU CHIMISTE.

(Paris: LIBRAIRIE HACHETTE ET CIE.)

THIS *Agenda*, which bears as its authors, or compilers, the names of MM. G. Salet, Ch. Girard, and A. Pabst—who are all of them competent to speak with authority—contains much information on chemistry compacted in small space, being, as implied by the title, a chemical memorandum book. It contains numerous tables brought up to date, and what is of great use—a copious index. It is printed in the French language.

THE PHOTOGRAPHIC QUARTERLY.

(London: HAZELL, WATSON, & VINEY, Limited.)

THE April number of this quarterly embraces contributions from Captain Abney, Messrs. G. Davison, P. G. Hamerton, C. H. Bothamley, and others. It contains two illustrations—Mr. H. P. Robinson's *He never told his Love*, and a portrait of Mr. George Davison, of the Camera Club, and which scarcely shows this gentleman under the happiest aspect. In an article *On the Optical Lantern as an aid in Teaching* Mr. Bothamley gives some interesting particulars respecting the uses made of this instrument in the Yorkshire College, Leeds. Captain Abney discourses about *Photography of the Sky at Night*, and Mr. Davison on *The Limits and Possibilities of Art Photography*. Mr. A. Paterson asks, *Is Retouching Immoral?* and claims for it that it is only objectionable when instead of improving it spoils, or immoral when used—as any art may be—for an immoral purpose.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 14	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 15	Great Britain	5A, Pall Mall East.
,, 15	North London	Myddelton Hall, Islington, N.
,, 15	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 15	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 16	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 16	Bury	
,, 16	Hyde	
,, 16	Manchester Camera Club	Victoria Hotel.
,, 16	Edinburgh Photo. Club	5, St. Andrew-square.
,, 16	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 17	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 3,—Mr. W. Bedford in the chair.

Mr. H. M. Hastings showed two photographs of the Oxford and Cambridge boat race printed in platinum. They were made on different commercial plates, one of them being a Paget sixty times. This one was well exposed and showed a good natural sky. It was also noticeable that two of the Cambridge men were not in stroke with the others in the boat.

Mr. J. J. Briginshaw showed a "Facile" hand camera. The sheaths for holding the plates were thought to be an improvement on the somewhat similar ones previously seen.

Mr. A. HADDON said that some time since the Editor of THE BRITISH JOURNAL OF PHOTOGRAPHY had written an article on the electricity that might be generated on celluloid films. Mr. Fry had thereupon written to say that in the whole of his experience he had never found any effect of electricity on celluloid films. He (Mr. Haddon), however, with the third film that he had used found it marked with the beautiful ramifications of electrical discharge. The film was exhibited, and showed along the centre a set of lines resembling those seen in photographs of lightning discharges. Mr. Haddon accounted for the generation of electricity by the friction against the back of the film of the finger of the left hand whilst unrolling the celluloid with the right hand. The liability to damage of this kind constituted in his mind a very serious obstacle to the general use of celluloid for films. Guncotton stood lowest in the scale, and was negatively excited by all other substances. He suggested coating the back of the celluloid with plain gelatine before coating the other side with the sensitive emulsion.

Mr. W. COLES, referring to Mr. W. K. Burton's recent article, in which he had stated that with some plates, and not with others, he had found eikonogen to possess an advantage over pyro as a developing agent, said that in his own experience he had not found any advantage with eikonogen for plates inclined to under-exposure; for such cases he would use pyro and ammonia.

The CHAIRMAN remarked that bromide had been found to possess much greater restraining effect with eikonogen than with pyro; perhaps the presence of a little free bromide from less complete washing of the emulsion in some plates and not in others would account for the difference in the action of the two developers referred to by Mr. Burton.

Mr. R. P. DRAGE inquired whether any of the members had tried mixing eikonogen and pyro.

Mr. A. COWAN had done so; the result was satisfactory, but ammonia must not be used.

Mr. PASK inquired whether there was any way of knowing if any given sample of sulphite of soda was fit for photographic use.

Mr. HADDON said that there were several ways of testing. The first was to add to a solution of the salt a small quantity of acid; if the first addition caused effervescence it indicated the presence of carbonate of soda; continued addition should cause liberation of sulphurous acid. Another portion should be tested with a solution of barium chloride. A dense white precipitate would indicate that there was a large quantity of sulphate present. A slight milkiness might be expected with all commercial samples.

CAMERA CLUB.

MARCH 27,—Captain Abney in the chair.

Mr. W. WILLIS read a paper entitled *Platinotype Possibilities*.

Previous to the lecture Mr. H. CHAPMAN JONES exhibited and described his Memorandum camera, and Mr. E. Ferrero showed a convenient apparatus he had constructed for reducing to lantern-slide size.

Mr. Willis's address covered the following points:—1. A mixed oxalate and phosphate developer for the hot bath process, and the quality of image resulting therefrom; 2. A developer for sepia paper, to give a warmer colour; 3. Hints

as to washing prints; 4. Effects to be gained by the use of papers of various surface and texture; 5. Application of the cold bath process to fabrics. Some of these heads were illustrated by examples, more especially that relating to fabrics and rough-surfaced paper.

A discussion followed, in which various members took part.

APRIL 3.—Lantern slides by members and friends were shown, the contributors to the exhibition being Messrs. Ferrero, Cembrano, Wellington, Webber, and Greenshaw.

On Thursday, April 17, Mr. W. Adcock will open the subject *Amateur and Professional* for discussion.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

APRIL 1.—It was agreed that the first excursion should be to Bolton Abbey and Wharfedale.

In reference to the late exhibition for the benefit of the Sheffield Hospital Building Fund, it was announced that the net amount to be given was 10*l*. 10*s*., along with 5*l*. 2*s*. 9*d*. given by Miss Dora Taylor.

Mr. T. Hulbert laid on the table some prints produced by the new Kallitype process, which gave very satisfactory results, after which Mr. R. J. SHEARS, of Mexborough, read a paper—*Notes on a Tour in Norway*.

LEWES PHOTOGRAPHIC SOCIETY.

APRIL 1.—The President in the chair.

Mr. E. Mayer had promised to open a discussion on *Pinhole Photography*, but owing to indisposition was unable to be present, and Mr. G. J. Wightman took his place. A discussion ensued, and specimen negatives and prints were submitted for inspection.

The Society is about to commence a photographic survey of Lewes and environs, to be carried out as far as possible during the coming summer, and it is intended to produce a set of lantern slides which can be sent to any other Society in exchange for a similar set.

The first excursion of the season will be to Newhaven, on April 24.

At the next meeting, on May 6, Mr. J. J. Hallway will read a paper on *Cloud Photography*.

BOLTON PHOTOGRAPHIC SOCIETY.

APRIL 2.—Mr. Edmund Nash, A.I.B.A., in the chair.

Mr. E. Harwood gave a lecture on *The Hand-Camera and the World*. Many of the pictures described by Mr. Harwood were, by the aid of the optical lantern, displayed to view.

Mr. Walter Knowles exhibited an apparatus actuated by clockwork for automatically rocking the plate during development.

BEECHIN PHOTOGRAPHIC ASSOCIATION.

APRIL 2.—Rudolf Lavenstein in the chair.

Mr. W. S. Allardyce, of Cromarty Castle, President of the Association, gave a paper on *Hand Cameras*, describing those by Sands, Marshall, Lancaster, and others, all of whose apparatus were on view. Mr. Allardyce strongly recommended the Expanding Wide-angle Lenses, and recommended Ramsay's "Rapidus." A number of views were taken throughout the session, taken by Sands's "Rollfilm" camera and Ramsay's "Express," consisting of landscape and coast views, which were greatly admired.

The SECRETARY then exhibited and described Hume's cantilever enlarging apparatus.

A suggestion was thrown out that ladies might be admitted members of the Association, which was favourably received.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE NEW LIMELIGHT.

To the EDITOR.

SIR,—The tests which were applied to his warm-air saturator by the Rev. T. F. Hardwich were certainly severe, and as they failed to burst the vessel it may fairly be assumed that the saturators are incapable of explosion so long as the wool is in them. There is no chance of the wool being burnt if the oxygen supply is cut off promptly after the pop, this being the only point which requires attention. When ether or gasoline is used in the saturator it is not possible to produce a pop or explosion in the tubes so long as the fairy light is burning, and whilst there is an ounce of fluid left in the vessel. The saturator will maintain a supply of vapour for four hours or longer with the limelight, and there is, therefore, no fear of the fluid running short during an exhibition if the saturator is fully charged at the start.

Mr. Baker, in a recent article, says that there is no advantage gained by using a saturator instead of a cylinder of coal gas. So far as cold ether tanks are concerned I have nothing to say against his statement, but he has not, so far as I know, had any personal experience with a warm saturator, for which the following advantages are claimed:—

1. A saving of from 1*s*. to 4*s*. on every exhibition.

2. A more brilliant light, especially when *pure* oxygen is used.

3. Automatic adjustment of vapour to the supply of oxygen. When once started a saturator will work for an hour without altering the taps, whereas the use of coal gas in a mixed jet requires constant readjustment.

4. No anxiety about the supply of coal gas running short; one charge of the saturator is equal to fifteen cubic feet of coal gas.

5. Saving of weight and cost of carriage; less trouble than filling gas bags; not liable to leak like cylinders, and absolute safety ensured; only one gas being used, mixture of different gases is impossible.

Mr. C. I. Burton advances the novel theory that since steam is decomposed at 2000° C., therefore the oxyhydrogen flame cannot be any hotter than this point. This is like saying that because water is decomposed into steam at 100° C., therefore steam cannot be made hotter than 100°.

Before steam can be decomposed it is evident that the steam must first be in existence. The act of turning oxygen and hydrogen into steam is necessarily accompanied by a temperature of, let us say, 6500° C.; if we assume that this steam is decomposed, we assume the presence of an outer zone of flame of a lower temperature, say 2000°; when this cooled to 1900° the gases would *combine again*, producing another zone of flame having a temperature of 1900° + 6500°, namely, 8400° C., far hotter than at first!

Bunsen, who studied the subject experimentally, estimated the temperature of the oxyhydrogen flame to be 8061° C.—I am, yours, &c.,

Ashcombe-road, Weston-super-Mare. ALBERT W. SCOTT.

To the EDITOR.

SIR,—I have read with interest Mr. Albert Scott's voluminous communications on the subject of an alleged "new limelight," and although I have found nothing new in them, and some things to condemn, I refrained from making any comments. Now, however, Mr. Scott (p. 159) specifically claims as original with himself a feature which was not only invented and introduced by myself years ago, but which I even took the trouble to patent, and it is time for me to protest. Mr. Scott says, "Mr. Ives's vessel contains a roll of flannel, with a straight horizontal air-passage through the centre," and that in his own (?) "warm bath," the air passage is "in the form of a worm or coil in the upper half of the vertical cylinder."

Now Mr. Scott, if he read the JOURNALS, would know that I had abandoned the "straight horizontal air passage" years ago and used and patented a zigzag or other crooked passage in the upper surface of the cotton roll. Mr. Scott ought also to know that I was the first to use benzine or gasoline in the porous saturator, and that I abandoned it because,—first, it varied in quality so much that although sometimes giving a light equal to sulphuric ether, it oftener gave an inferior light; and second, it always deposited a gummy substance in the interstices of the saturator, filling and eventually ruining it. Mr. Scott should also know that I overcame this difficulty by introducing a chemically purified gasoline, known here as petroleum-ether, which is free from these defects, and that with this light, purified hydro-carbon the use of heat is an unnecessary and useless complication, except it be in a cold room or out of doors in cold weather, and that it was long ago recommended that artificial heat be applied to the Ives's saturator under such circumstances. Also, that the Ives's ether light has been used almost exclusively at the Franklin Institute for three years past (more than one hundred times), single tube for single light, and double tube for dissolving, without ever a single "pop" occurring, although the lanterns have several times been running an hour and three-quarters at a time.—I am, yours, &c.,

907, *Filbert-street, Philadelphia, March* 22, 1890. FRED. E. IVES.

FOCUSSING SCALES.

To the EDITOR.

SIR,—Referring to an editorial article in THE BRITISH JOURNAL OF PHOTOGRAPHY of February 28, 1890, I beg to say that the "focussing scale for detective cameras" printed in connexion with it is not, as stated, the first that has ever been published to scale. In this year's *American Annual*, in connexion with an article which I wrote on this subject, there is a scale which is accurate as printed, to use which it is only necessary to lay a card across the scale so as to coincide with the scales (at the side of the page) which represent the focal length of the lens, and to note where the curved lines intersect the edge of the card, which will give the required focussing scale. Being anxious to have the scale embrace as long a range of lenses as possible, I condensed it in lengths (the scales at the sides being only three-quarters of an inch to the inch) but this does not affect the accuracy in the least.

My impression is that you have noticed that the diagram only measures three-quarters of an inch to the inch on the side scales, and have concluded that the entire diagram was reduced to the same extent. In making this diagram I figured every intersection to the one-thousandth part of an inch, then made a diagram four times as large as was required, and had it reduced by photography so as to have it correct.

Excuse my troubling you in so small a matter, but as I read THE BRITISH JOURNAL OF PHOTOGRAPHY regularly, I do not like to see in it any mis-statement, especially when, as in this case, it refers slightly to my own work.—I am, yours, &c.,

WILLIAM T. WINTERINGHAM.

168, *Hicks-street, Brooklyn, New York, March* 27, 1890.

IMPROVED BURNISHING ROLLER.

To the EDITOR.

SIR,—We notice in your JOURNAL of March 26 an article upon an "Improved Burnishing Roller," manufactured by Mr. Lentner, of Vienna. Will you kindly allow us to state that the heating arrangement is identical with the one invented by us, and applied to all "Rolling Machines" of our make since October, 1887, with this exception, that we supply an air burner, and taps to regulate the heat.

We may add that Mr. J. H. Whitlock, of New-street, Birmingham, was supplied with the first machine having this form of heating arrangement, and that Mr. Jonathan Fallowfield exhibited two machines at last year's exhibition held at the Crystal Palace. Hoping you will kindly insert this in your next issue—We are, yours, &c., MOSS & MITTON.

Alfreton-road, Nottingham, April 5, 1890.

A DISCLAIMER.

To the EDITOR.

SIR,—In yours of 28th March, *re* enamels by Lafon de Camersac and F. Joubert, one is liable to construe that they are given by me. In justice to others, I beg to say they were presented to the Photographic Club by Messrs. Haes and A. Cowan. I only placed them in a suitable cover in order to preserve them; this is stated on the outside.—I am, yours, &c.,

J. W. ZAEHNSDORF.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Two large gasometers; will exchange for backgrounds and good accessories.—Address, G. B. BRADSHAW, Altrincham.

I will exchange 12×10 camera (one single slide) with tripod for same, also silver chronograph watch, opera glass, and forty-two parts of Virtue's *Imperial Shakespeare*, for good 15×12 camera and tripod.—Address, F. C. O. HURD, Photographer, Shepton Mallet.

Two ebonised showcases, twenty-two inches by thirty-one inches, thick plate glass, deep, lined with cloth, and a forty-inch by fourteen-inch ebonised frame with glass and back; want half-plate or larger camera, or enlarging lantern.—Address, W. C. CHIPPER, 39, Highgate-hill.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

Mr. T. S. Hicks, Sheffield.—*One photograph of Venerable Archdeacon Blakeney, Vicar of Sheffield. One photograph of Mrs. Martha Blakeney.*

WARWICKSHIRE.—Send a few examples and fuller details of the manipulations.

A. KNIGHTON (High-street, Kettering) wishes to communicate with Mr. Ford Smith. Will this gentleman please note?

R. A.—If the slides of your new camera affect the plates in manner stated, send them back to the maker for rectification.

R. H. THOMAS.—The only remedy will be to sue the firm for the value of the goods and the money sent in the County Court.

C. C.—Better throw the solution away and make fresh. It is so very inexpensive that it is not worth expending time upon it.

ATKINSON.—Formulæ for the preparation of paper by the iron processes (blue prints, &c.) are given on page 358 of the ALMANAC for last year.

GEO. BANKART.—On making inquiries respecting the new light spoken of in the *Court Journal* we cannot learn that it really exists, especially in the form alleged.

AN EMPLOYÉ.—You have a perfect right to make use of all the information you received in your last place unless there is a special proviso regarding any trade secrets.

H. BRAGGINTON.—So far as we know, transfer paper ready prepared is not an article of commerce. Most workers of the process have pet formulæ of their own, and prepare it for themselves. Some even use transfer paper as made for carbon printing.

METRIC.—Metric weights and measures may be obtained at any of the dealers in chemical apparatus. They are not more expensive than the ordinary ones. Some photographic warehouses now stock these weights and measures. The measures are to be had graduated by both systems if desired.

R. COX.—The paper as used for Woodburytype printing is, we think, not an article of commerce. Perhaps, however, the Woodburytype Company, or Messrs. Waterlow & Sons, or the London Stereoscopic Company, may supply it. We believe the Stannotype Company has ceased to exist.

W. A.—Imperfect fixing is the cause of the stains. The remedy consists in the negatives, through the medium of a transparency, invoking the agency of the retoucher.

J. F. PEASGOOD writes: "Will you please announce in next week's issue that the award in Section 4, Lantern Division, Crystal Palace Exhibition, was made to Mr. Fred. H. Evans, and that Mr. Wade's initials should have been J. W.

C. FORBES.—The blurring round the white objects is halation from the back of the plate. It may be obviated by backing the plate, as your tutor suggested. In all cases when taking very white objects in juxtaposition with dark ones which require a prolonged exposure the plates should always be backed.

G. H. A.—Without seeing the interior of the church you wish to photograph, and knowing the quality of light at the time the exposure is made, it is impossible for any one to tell you the exposure necessary. The best way will be to expose a trial plate. The development of the image will at once indicate the proper exposure to give.

A COUNTRYMAN.—The yellow stains on the prints are not what is known as fading; they proceed from carelessness in the manipulations. The prints have been allowed to stick together while in the fixing bath. Do not be surprised at prints becoming spotty if mounted on such cards as that enclosed. Mounts printed in bronze should always be avoided.

J. W. PERRY asks how to proceed in obtaining an appointment as photographer under Government.—We do not know, neither are we aware that the Government employs photographers in the sense our correspondent means. Nearly all the photographs required by Government are produced by the military. The Royal Engineers do the major portion of the work. The only suggestion we can offer is to enlist in this corps.

B. A. put in pawn two years ago a valuable lens, and having had to go to a foreign country he is told on his return that the lens was sold after the expiry of a year. He inquires whether he has any redress.—Yes; he has the right to inspect the pawnbroker's books and receive any surplus produced by the sale. This surplus the pawnbroker must pay on demand to the holder of the pawn-ticket. Section 22 of the Act provides for this.

MONOCULAR.—The erosion may be removed by polishing with oxide of tin ("putty powder") made into a paste with water and applied either by the finger point or the ball of the thumb. For your purpose it would be more convenient to fix on the spindle face of a small turning-lathe a few thicknesses of well-compacted calico sunk in a wooden chuck having a hollow approximating in shape to the surface of the eye; this must be charged with the putty powder and water. After trying this let us know how you succeed.

W. ADCOCK.—Our correspondent says: "In the front rooms of thirty good labourers' cottages I am building I am putting a square bay window the front of which will contain four large panes of white glass, and a row of smaller ones over these (Queen Anne fashion) I propose to fill with 12×9½ photographic transparencies. These I shall, of course, protect with additional glass, but I am desirous of knowing whether the putty with which both will be glazed up may be considered a sufficient protection against atmosphere, or whether a quarter-inch indiarubber or other solution between the two would seem desirable."—We advise a coating of spirit varnish of good body in addition to the indiarubber, which will act as a preventive to the oil in the putty from spreading.

LENTIL inquires: "1. What function has the size of a lens? Should all lenses of the same focus be of the same size?—2. On what does the covering power of a lens depend?—3. Have all lenses of the same focus used with the same stop the same covering power? that is, of two lenses of the same focus, can one of them cover a larger plate than the other?—4. Does the speed of a lens depend on anything besides the size of its greatest working aperture?—5. Will a single lens of the same focus as a rapid rectilinear work as quickly with the same aperture?—6. Does a so-called rectilinear lens possess any other advantages over a single lens in addition to its rectilinearity and the greater aperture with which it can be worked?—7. In what publication can I obtain the fullest information on photographic lenses?"—In reply: 1. Not necessarily.—2. On its form and the position of the stop.—3. A lens of large diameter will cover a larger field than a small one, the stops being alike in both.—4. If a lens be made of discoloured glass it will be slower than one of colourless glass, otherwise rapidity depends upon the working aperture.—5. Yes.—6. No.—7. In our ALMANAC for 1870 and JOURNAL for 1883. Note that a landscape lens of large diameter will give better marginal definition with a large stop than will a small lens of same focus with a stop similar to the other.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, April 16, *Printed-out Opals*; April 23, *The Development of Instantaneous Exposures.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Tuesday, April 15, at eight p.m., at the Gallery, 5A, Pall Mall East, when a paper will be read by Mr. C. H. Bothamley, F.C.S., F.I.C., *A Standard Method of Development.*

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—Optical Lantern Evening.—On Monday next, the 14th inst., an entertainment will be given at the City Hall, Eberle-street. Part 1. *The Hundred of Wirral*, the completed survey, with descriptive lecture by Mr. John Hargraves. Part 2. The New Boston (U.S.A.) set, entitled *The White Mountains*, with full descriptive matter, supplied by the Boston (U.S.A.) Photographic Society.

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WANTED A WORD.

It can scarcely be expected that photography should possess as exact and definite a terminology as, for instance, that of electrical science, but that many of its terms and modes of explanation are capable of improvement cannot be doubted, and our present purpose is to draw attention to one instance where improvement is needed, and to bring forward a suggestion we have received for an amended phraseology. It is in all such cases very difficult to steer clear of theoretical entanglements on the one hand and of outraging the sensitiveness of philological purists on the other. Most of our readers may remember the storm of abuse which the unfortunate word "telegram" received at its birth; it was scorned, derided, and disowned; but as the very simplest word-invention that was suggested in its place as being pure in form was telegrapheme, the ignorant little upstart "telegram" held its own, and is now little likely to be displaced. The last year or two has witnessed the introduction of very many new, and variations of old, developers, and countless have been the experiments made with them in their many aspects. These experiments, with scarcely an exception, have had in view the obtaining of comparative, rather than absolute, results, and it is in describing them that the difficulty that we speak of arises.

It is easy to speak of the colour, or absence of colour, in the solution, before and after use, when freshly made or when weeks or months old; so, also, whether fog is produced or not, whether the development is completed quickly or slowly, and so on. But there is one—the most important—quality which is not so easily described, and which, when it is attempted to be placed on record, leads too frequently to slipshod modes of expression foreign to all scientific accuracy, or to a periphrastic, not to say prolix, mode of expression that is as irritating as it should be unnecessary. The difficulty will best be seen by a few extracts which we cull from articles by a gentleman of whom no one would say he was an incapable writer:—

"It had little or no effect in increasing the actual power of the developer, that is to say, in bringing out more detail, or, in other words, in permitting a reduction of the time of exposure."

"Development that will admit of particularly short exposure."

"Extent of reduction of exposure permissible by the use of eikonogen."

"With most kinds of plates it needs a longer exposure than is necessary with, say, pyro and potash."

Here is the difficulty: In comparing negatives developed by various modes, to be able succinctly to describe the effects produced, and connecting them with the producing agent as regards evidence of under, over, or correct exposure, we have most carefully avoided any reference whatever to the character of the image, whether deficient in, or full of gradation, whether dense or weak, whether foggy or clear in the shadows. Fortunately among photographers of experience there is little difference of opinion in the absolute quality of correct or faulty exposure, while as to the meaning attached by any one person to each expression there is no possibility of misconception whatever. A number of plates, for example, are exposed by one experimenter for equal lengths of time, and developed by different methods: there is no trouble in describing the results and saying that any particular plate was correctly or incorrectly exposed, and in what direction, *i.e.*, whether under or over; the difficulty lies in expressing the character of any particular developing agent as regards its power to produce these results. An electrician, when he speaks of the power of a current, speaks of its electromotive power, and has usually a knowledge of what he means, but photographers have no similarly concise words or phrases, and the expression we quoted, "effect in increasing the actual power of the developer, that is to say, in bringing out more detail, or, in other words, in permitting a reduction of the time of exposure," prolix though it sounds, is, perhaps, about as near an approach to conciseness as our present terminology permits.

The suggestion made to us by Mr. Watmough Webster is that we use the term "exposure equivalent" to meet the case, and that the meaning of the phrase be "the relative, visible, developed effect indicating the extent of the action of light." The sentence above quoted was then read—"It has little or no power in increasing 'exposure equivalent.'" Or again, in discussing, say, the relative effect of ammonia, soda, or potash in the pyro developer, we might describe how one or the other gave greater or less exposure equivalent, and then, the use of the term adopted, no one could possibly misunderstand the meaning, periphrasis would be avoided, and descriptions of procedure would gain in simplicity of language and clearness of conception. With this introduction we throw our contributor's suggestion into the arena of discussion. It certainly possesses elements of usefulness, though perhaps his proposition may have to wait a decade before its adoption, just as had the principle of the method of diaphragm numbering now adopted by the Photographic Society of Great Britain, but originally proposed by him in these columns. We shall be glad to receive suggestions from any of our readers on this by no means unpractical subject.

VIGNETTING ENLARGEMENTS.

Most amateurs—and for that matter a great many professional photographers—make a great deal of trouble over the operation of vignetting enlargements, though they may be thoroughly *au fait* in all that concerns the apparently equally difficult task of vignetting direct pictures. The fact is, that the latter operation has been, in the case of the professional, a life-long study,

a part of his education in fact, and the amateur has at least had instilled into him some sort of idea of the care necessary; but when it comes to enlarging it seems to be supposed that any makeshift system will answer, and that all that is needful is a card with a hole in it. What wonder then that we meet with busts and figures that look as if they had had their limbs trimmed off in about as artistic a manner as a butcher trims his joints.

But after all, it does not require a great deal of labour to be expended in making the necessary arrangements for an almost perfect system, though we confess it is rarely, except in the workrooms of some of the professional enlargers, and not often there, that any trouble at all is taken in the matter. It is time that in practised hands the ordinary system of keeping a sheet of cardboard or metal—provided of course with a suitable aperture—in motion between the lens and enlargement during exposure fulfils all requirements and yields the most perfect results. But unfortunately it is not all photographers who will take the needful amount of trouble in the first place to provide a suitable vignetting mask, or in the second to manipulate it properly when provided.

The operation of moving the mask to and fro during exposure, so as to produce as soft a graduation as possible, is in itself easy enough of performance, but becomes irksome in the case of long exposures; there is, moreover, no sort of record to guide the operator as to the effect of his work, and it may prove on development that an otherwise good picture has been spoilt by irregular or one-sided out-of-centre vignetting.

Then again, with regard to the mask itself. The aperture generally employed is one of oval shape, with serrated edges to soften the gradation; and so effectively can this latter operation be performed, that for most purposes and in careful hands this is all that is required. But the oval form does not suit every bust, though it is no doubt the best for general purposes. Yet very few operators think of departing materially from that shape for fear of trouble in suiting any other form of aperture to the individual negative. This trouble is, however, quite illusory, as will be seen when it is pointed out that at one point between the lens and the enlargement precisely the same size and shape of aperture may be employed as if the vignetting were to be done in the printing frame. Thus an aperture made by tracing the exact outline of the figure and fixed in the proper position—as far behind the lens as the negative is in front of it—should exactly mask out all else in the enlargement, and any amount of "softening" can be got in the usual way. There need be no difficulty then on the score of special-shaped masks.

To replace the troublesome hand work, some more or less automatic arrangement is desirable, and fortunately this is not a difficult matter to devise. A very simple contrivance which we saw in use in an establishment where a large amount of work is done, and a modification of which we have ourselves had constructed, consists in the main of a suspended screen carrying the mask, and swinging pendulum fashion to produce the softening effect. Roughly speaking, that is the principle; but a few points may be noted in connexion with the details as adding to the utility of the arrangement.

In the first place the dimensions of the screen, or to be more accurate—for the size of the screen itself is comparatively unimportant—the length of its effective swing should be studied, as this affects not only the graduation obtained, but also the length of time the apparatus will work without attention. If the swinging arrangement is to be constructed under fixed conditions, the effective swing should be moderately long, and the various effects of gradation will be obtained chiefly by varying the mask and the position of the screen with regard to the work.

But it is preferable to have the "vignetter" made adjustable in all its parts, which may be done with very little trouble. The screen itself may consist of a very light framework of wood of suitable dimensions, covered with canvas strained tightly over it and subsequently papered. When dry, an aperture is cut in the centre sufficiently large to admit of considerable variation of the position of the smaller aperture actually employed as mask, as we shall describe. The actual mask may consist of thin cardboard or opaque paper, and be attached to the screen by pins. A couple of cords attached to the corners of the screen serve to suspend it.

If to be used in a constantly fixed position the screen may be hung from hooks in the ceiling, but as we have said the apparatus should be capable of adjustment in all respects, it is preferable to provide a moveable stand to carry it. This need only consist of an upright or heavy foot, with a number of half-inch auger holes bored in the upper portion at distances of three inches, to carry a horizontal and adjustable rod of hard wood or iron from which to suspend the screen. If the cords already mentioned be slipped on to the rod and the screen be sufficiently weighted, it will swing with great regularity if carefully set in motion; but clearly so primitive an arrangement is far from being free from fault.

A better arrangement for suspension, and one that will add little to the cost and much to the utility of the affair, consists in substituting light but rigid iron rods for the cords, which stiffens it and prevents any side motion or departure from the accuracy of the swing. If the upper ends of the rods be bent into hook form and pointed, the points may be made to work in depressions in the horizontal supporting rod, and the friction will thus be reduced to a minimum.

The capability of adjustment of the height of the swinging point is important, inasmuch as it provides a ready means of varying the amount of graduation to suit circumstances. Obviously, the greater the distance between the centre of oscillation and the axis of the lens the longer will be the swing and the wider the gradation, and *vice versâ*; so that according to the precise effect desired, taken in conjunction with the shape of the aperture and its distance from the enlargement, the degree of swing most suitable can be arranged by adjusting the height of the swinging point.

Every alteration of the latter will, of course, necessitate a corresponding change in the position of the mask aperture, hence the necessity for a large permanent aperture in the screen. A considerable improvement in the rough screen we have described will be found in providing it with two vertical guides in which a moveable front slides freely, being clamped in desired position by a thumbscrew.

The effect of the relative positions of point of oscillation and axis of the lens or centre of picture has been mentioned. Upon the total length of the effective swing will depend the stability or lasting power of the pendulum's motion. It is desirable that this be as great as possible; therefore, if the screen be small in dimensions—which it may well be—a weight can be attached to its lower extremity by means of a cord or wire, and reaching as near to the floor as convenient. The cord or wire should, preferably, be attached at both corners, so as to hang in V form with the weight at the apex. By these means a steady swing of long duration will be obtained.

This apparatus, which occupies almost as long in description as in construction, relieves the operator of most of the trouble of personal attention to the vignetting during exposure, and, with a little study, enables him without the least trouble to produce the very best results. A few remarks on the effect of varying the position of the vignetter must be reserved for another occasion.

THE CHOICE OF SUBJECTS.

Weather conditions, especially at this time of the year, have often more to do with picture making and picture choosing than the mere outline and grouping of the objects. The lighting of the subject is, in fact, the first point, adding beauty to the scene by bringing into prominence its most picturesque features, subduing those which are of less value, and by the play of light and shade developing the charms of form and outline inherent in the picture. But the best of weather and of lighting fail to stir the uneducated eye to a perception of natural beauty. On one of the holidays of the past Easter we encountered four or five cameras and stands in a picturesque Surrey village abounding in the typical "bits" for which Surrey is famous. The cameras and stands were in full evidence, being carried shoulder high, ready for instant use, though their bearers must have travelled at least three or four miles over a comparatively uninteresting road; but now, at any rate, they had come upon a "land of plenty."

Had they? We are, of course, not aware what class of scenery the party expected to encounter in mid-Surrey—possibly snow clad mountains, precipitous rocks, or seething cataracts—but they seemed disappointed. On one side of the road entering the village stands a picturesque cottage covered with trailing plants scarcely yet in leaf, but still, sufficiently so to further enhance the beauty of the structure itself, which is overshadowed by a stately elm. Opposite stands a roadside inn with its old-fashioned swinging sign, and looking between them in one direction a gracefully curving sweep of country lane; in the other, the village green backed by trees and cottages, such as only our southern counties can show—a subject, in fact, that has been painted hundreds of times, and would probably have had an artist or two at work on it then, only it was "holiday time," which "real artists" don't like. Perhaps if there had been an easel or a sketching pad in sight our "artists" of the camera might have taken the hint. As it was, they merely stopped to "refresh," and as they passed on at a good four miles an hour pace, without even looking at the cottage or the "picture" generally, we heard one remark to a companion, "——, who persuaded you there was anything to take in this beastly hole?" We had the satisfaction of feeling that one of our pet haunts had so far escaped, and was likely to escape the encroachments of the "profane vulgar."

THE SHAPES OF PHOTOGRAPHIC PLATES.

Writing anent our remarks *re* square plates for landscape or pictorial purposes a week or two back, a correspondent suggests that that shape is, at least, superior to the circle which is being introduced at the present day, and asks what advantage can possibly be gained in this form of picture. We are quite at a loss for a reply, unless the circle be adopted in order to give a fictitious idea of covering power to a lens deficient in that respect. A lens that will just cover a *circle* of three inches diameter will only cover a plate a trifle over two inches square, so that even for lantern slide purposes it is practically of little use. But a three-inch circle sounds, at least, far larger than a two-inch square.

The circular form is, in fact, the very worst to adopt for general purposes, for it is bound to be cut out of a larger *square* of glass or film, and consequently compels a large amount of waste. Besides this, comparatively few subjects "compose" perfectly for a square picture, much less for a circular one; and though it is often possible to cut a pretty circular subject out of a portion of a larger picture, it is very seldom indeed that the composition is not, at least, as good as if the form be left square. Makers of lantern slides are aware how very few of their subjects *demand* a circular mask, and what a small proportion even will admit of one; and though the circle may be occasionally useful to hide defective corners, the subject is almost invariably better shown as a square or cushion. Even for purely lantern slide cameras, therefore, it would seem preferable to leave the whole of the square that must be used available for actual pictorial purposes.

Very charming pictures are seen occasionally in circular form, not only as photographs, but as paintings or etchings; but, for the matter of that, the same may be said of any odd or unusual shape, though such are not in consequence suitable for general purposes. We recollect years ago, when the panta-scopic camera was introduced, the enthusiasm exhibited by an amateur friend, by no means a new hand at practical photography, and how impatient he was to obtain delivery of the instrument he ordered as soon as he saw the description of it. But alas for human hopes! we never saw a picture produced by it, nor indeed was the enthusiasm of long duration, for the difficulty arose of finding subjects that would make panoramic pictures—pictures, that is, in the artistic sense. It is one thing to possess the power of taking both sides of a street on the same plate without moving the camera, but it is quite another to make a picture of it. Panoramic pictures judiciously made may have a certain value from a topographical or scientific point of view at times, but we only remember one subject in nature that we should have cared to plant a panoramic camera in front of with a view of evolving a *picture* out of it, and that was a view of the Vale of Llangollen, in North Wales, from a point on the railway between Cefn and Chirk.

GELATINE AND THE LATENT PHOTOGRAPHIC IMAGE.

In his paper read at the Camera Club Conference, Mr. Bothamley mentioned one point in connexion with the superior sensitiveness of gelatine to collodion, which has never, we think, been sufficiently emphasised previously. We allude to its capability of absorbing and forming combinations with the halogens. In this respect it differs entirely from collodion, which possesses very little such affinity; indeed, one of the functions supposed to be performed by the "organifier" in the old dry plate days was that of bromine or iodine absorber.

But is it by any means proved that in the dry state in which gelatine plates are at the time of exposure such combination does take place? It is one thing to produce a precipitate by the direct addition of one of the halogens to gelatine in the liquid state, but quite another to secure combination between infinitesimal portions of bromine vapour and solid dry gelatine. The combination should naturally ensue more readily in the presence of moisture, for which reason a gelatine plate should

be more sensitive when wet than when dry. But is it? We fancy not.

Mr. Bothamley further says that we have direct evidence of this combination in the fact that gelatine is less soluble after exposure than before. This, we think, is scarcely stating the case accurately. Ten years ago Warnerke pointed out the fact that a gelatine negative *after development* was found to have become insoluble, or nearly so, in those parts where the light had acted and the image formed, and he attributed the effect to the "*combined* action of light and development," since, if the action were that of light alone, as Mr. Bothamley asserts, a picture might be developed by warm water alone on the principle of the process which Warnerke based upon his discovery. Such, however, is not the case, for which reason we think that Mr. Bothamley's "evidence" is not sufficient.

Collodion, in addition to being a non-absorber of bromine, possesses the unfortunate tendency to give off by decomposition an agent—nitrous acid—that is most destructive to the latent image. Every one who has made, used, or kept pyroxyline is aware how rapidly it undergoes decomposition, especially those kinds most suitable for photographic purposes, and how destructive are the emanations to materials of a far more robust character than the invisible photographic image. Warnerke again, years ago, tried to combat this unfortunate peculiarity, and we believe partially succeeded, by impregnating the dried film with an absorbent of nitrous fumes, the substance selected by him being ammonium carbonate.

It is a well-known fact that a few months will often suffice to entirely obliterate an image impressed upon a dry collodion film, while so far as gelatine is concerned, if the plate be properly prepared, there seems to be no limit to the time the image remains. Here we have evidence in abundance of a great difference, if we cannot directly trace it to its absolute cause.

Dry plate manufacturers are already beginning to complain of the rise in price of the materials they employ. Some qualities of glass, we are informed, have risen to the extent of nearly thirty per cent. during the past few months. Nitrate of silver, too, has advanced several pence per ounce, and the silver market has still an upward tendency. When the present popular prices for plates were adopted it was considered that they were "cut very fine," and would leave but a small margin for profit to the makers. If that were the case when the raw material was cheap, it is manifest that any considerable permanent increase in its cost will render the business decidedly less lucrative. One thing, however, is certain, and that is, the amount of silver on some commercial plates cannot well be reduced, neither can the quality of the glass be lowered beyond the present point to be at all serviceable.

Chemical substances generally have much increased in value of late. An eminent statesman, now deceased, used to say that a rise in price of these commodities augured well for British commerce. Therefore, we hope that the photographic profession will experience its full effect by an increase of business, even if they have to pay a little more for their chemicals.

Now that the evanescence of photographs is once more to the fore, it may be well to direct attention to the fact that a process which is beyond reproach may suffer, indeed is suffering, in reputation from the downright carelessness of its workers. This somewhat strong remark is called forth from the circumstance that we have recently seen several examples—and from different sources—of platinotypes that have become decidedly yellow in the lights within a very short time, simply from the iron not being removed after the development of the image. We are not here referring to amateur, but to professional work. In one of the show-cases of a well-known firm we have in our mind are some ten or a dozen excellent pictures which have only been exposed a few weeks, and the greater number of them have already acquired a decided yellow tint. The presence of this tint, it may be remarked, is by no means so objectionable as the sickly yellowness of a fading albumen print, but its being there at all is indicative of perfunctory work. Simple as are the operations in the platinum process, there is evidently a tendency in some quarters to shirk them. It would almost seem that the extreme simplicity of a method, and the credit of its undoubted permanence, may really in some instances beget negligence.

It is quite possible by any photographic process, notwithstanding that it may be a permanent one, to produce results which will undergo a marked alteration within a brief period. Take, for example, the carbon process, which has a very high reputation for permanency. If the pigments employed for the tissue are of a fugitive character—and some are—the pictures will undergo a marked change by exposure to light; so they will if they are transferred to those kinds of paper which become discoloured by the light's action. We have seen yellowness in carbon pictures arising from a trace of the chromium salts being carelessly left in the paper through insufficient washing. Again, with bromide paper, unless a moderate amount of care is bestowed on the clearing and fixing, the pictures are liable to acquire a yellow tint as time progresses.

Mechanical prints, which are usually classed as being above suspicion, are frequently far from being permanent, that is in the sense of being unalterable. It follows necessarily if, say, in the Woodburytype, as in the carbon process, evanescent pigments are used a similar result will accrue. In the collotype process, where the image is in fatty ink, a large number of the prints are far from being unchangeable, though the fact is scarcely recognised. Many of them are printed on paper which, with exposure to light, becomes discoloured. Some of the pigments—particularly those used to give the tone of silver prints—of which the ink is composed are of the most fugitive kind. Furthermore, collotype prints are frequently glazed with a varnish that in time becomes yellow, and thus, aided by the altered pigment in the ink, confers upon the picture the appearance of a fading albumen print.

From the above it will be seen that any of the processes of photography, even if they are such as will yield results which are unquestionably permanent, may be, and often are, worked in such a negligent manner that the pictures will quickly undergo a marked change. It does not follow that this change is actual fading, in the true sense of the term, but it is nevertheless one of decided deterioration. No matter how simple a process may be to work, or however durable may be its results, certain conditions have to be fulfilled, and unless they are the issue will be abortive. Hence the reputation of a really perfect process may be seriously jeopardised by careless workers, as in the instances just cited.

The new developers, hydroquinone and eikonogen, appear to be making more rapid progress in public favour on the Continent and in America than they are here. For negative work—especially amongst professionals—pyrogallic acid still stands "first favourite," notwithstanding the advantages claimed for the newcomers. To some extent this may be accounted for from the fact that abroad, what may be classed as the wet plate standard has always retained its supremacy; hence the favouritism so long shown for the iron developer. That character of negative is, however, no longer looked upon as the standard of excellence in this country.

Cameras which have lain by during the winter months—particularly those of the common kind—and have been stored in a damp, or even in an abnormally dry place, are often found to work stiffly when again taken into use. The usual lubricant in such cases is plumbago, and very good it is for the purpose, but it is not agreeable to use. It is not generally known that French chalk is nearly, if not quite, as good

as blacklead as a lubricating material for woodwork, and it is far more pleasant to deal with. The uses of French chalk in photography are many. It has pretty generally superseded wax for preparing glass from which films have to be stripped. In handling sensitive paper in hot weather, if the fingers be at all moist with perspiration, a little French chalk rubbed over them will prevent the paper becoming marked. Indiarubber focussing cloths, the bellows of cameras, &c., sometimes have an inclination to become tacky or adherent, but if some French chalk be applied to them occasionally this tendency will be entirely obviated.

LIMELIGHT AND PRESSURE.

Is it safe to use the two gases at great differences of pressure in a mixed gas jet? This question has been asked on more than one occasion, and I think can be answered in the affirmative, under certain given conditions. First, in a single lantern, or where the jet is *not* connected with a dissolving or secondary system of supply, the pressure may be as varied as that from the ordinary house supply (say one to four inches of water pressure) for the hydrogen, to two to three feet (twenty-four to thirty-six inches) of water pressure for the oxygen, the safety being in the proper burning of the flame, and the orifice of nipple not being too large. While the light is burning properly, and there is no check between the taps of jet and the gas supply (cylinders, bags, or tanks), the light may be taken as the index of safety; but if a dissolving tap or cut-off cock is interposed, then great care must be exercised in selecting the nipple, and a small one of not more than $\frac{1}{8}$ inch bore should be employed, for it is not considered safe to go beyond this size, and $\frac{1}{16}$ would be better.

It is a good plan for experimental work and for special purposes to have an extra nipple or two for various pressures, it being fully demonstrated by experiments I assisted at some time ago "that the size of orifice must be regulated by the pressure," and the maximum light to be obtained without noise could only be determined by actual trial, for no matter how carefully the nipples were made, or what form the nozzles took—short, medium, or swan neck—"the moment the orifice passed a given aperture with a certain pressure the hissing commenced." The greater the pressure the larger the nipple could be, the maximum being $\frac{1}{8}$ inch bore. With dissolving view lanterns there may be a considerable difference in pressure with *safety*, providing the minimum on either bag or holder is *not less* than six inches of water pressure, at the same time it must be distinctly understood that for the *best* effect they should be as near as possible alike, so that no *decided* variation affects the cutting off when dissolving, or causes the light to go up or down. With two automatic regulators having similar strength of springs this is absolutely secured, and so, of course, is it with two bags under one pressure board properly weighted, say with one cwt. pressure. I have used without safety valves, or pumice chamber, or any intervening obstruction other than the regular dissolving taps (six-way and four-way forms) on a triple lantern, jets supplied by gas from bag and holder where one was weighted at three times the pressure of the other.

With respect to Ether saturators (and I have had varied experience with them) I certainly would recommend in *every* case of their being used that a safety pumice chamber be placed immediately below the nozzle of jet, or pumice tubes connected immediately behind *each* tap of jet, and not between the dissolver and the bag or cylinder. These pumice chambers must be occasionally seen to, that the powder is not affected by the sulphuric ether, and, if necessary, a little fresh powdered pumice added to make good the fine particles blown through the gauze that confines it in the tube or chamber.

With a jet constructed on this plan I have used the Broughton-Hardwich Ether Tank Saturator with the most perfect success for a single light, and I know gentlemen who satisfactorily use it *abroad* in triple and other dissolving view lanterns (the dissolving taps being specially constructed) before large audiences; but I say, as I said before, if I can or could get both gases under pressure in separate cylinders I would never use Ether or any other saturator in a private house or at a public exhibition, except for special demonstration. Lanternists must remember that it is *imperative* for the dissolvers to be specially adjusted for use with the Ether light, the ordinary grooving to the plugs not being suitable. Then again, the ether must be of very good quality, and for those using the light abroad it is better to order the sulphuric Ether (·719 sp. gr.) from England, and have it sent as deck cargo, if they cannot thoroughly rely on the supply they are able to obtain locally. I believe most of the difficulties and accidents with the oxyether light have occurred through indifferent or bad Ether, and having improperly adjusted dissolvers and jets. The orifice on nipples of the latter must be small, proportionately to what would be used for similar pressure with hydrogen, say not more than $\frac{1}{32}$ inch ($\frac{1}{64}$ of an inch answers well).

Regarding the subject which has again been mooted of making the oxygen at the time of use, I think, except for very special purposes, this will seldom be employed for the limelight at lantern entertainments, for it means additional work and anxiety for the operator at the time, when, as a rule, all his attention is required in manipulating the light and showing the slides. The form of gas-making retort and gas holder, as described in the *Magic Lantern Manual*, has been tried on several occasions, but after getting one's fingers burnt, or failing to generate sufficient gas to time in order to keep up the supply, as consumed, the apparatus has been put on one side for simple laboratory experiments, or sold for what it would fetch at the sale. Now that the steel cylinders have been so satisfactorily tested and proved to demonstration that they are perfectly safe, I don't think (at least for Great Britain) that anything better than the two condensed gases (oxygen and hydrogen) could possibly be desired for the limelight when projecting photographs or dissolving views.

G. R. Baker.

SELECTING A LENS.

[A Communication to the Dundee Photographic Association.]

To the old hands of the Society the subject of my paper must suggest well-worn ground. It must not be forgotten, however, that since optical matters were touched on, many new members have been added to the Society's list.

The early spring and fine weather we have had have stimulated photographic matters, and old kits are being turned out and new ones are being devised, so as to get to work immediately again. I have myself been repeatedly asked this reason already by beginners to assist them in the selection of apparatus, and in no part of the armamentarium does a beginner stand more in need of assistance than in the selection of his lens or lenses. In the remarks which follow I hope I may be spared the fierce light which has beaten upon ideas contained in a paper read before you not long ago. Although I may not be able to acquiesce in the views propounded by my friend Mr. Macdougald, I think it cannot be denied by any one who has read the whole correspondence, that no one has been able to prove that he is holding an absurd or illogical position. He claims to be able to see certain arrangements of photography with a certain degree of stereoscopicity without the aid of a stereoscope, and I for one cannot see how he can be ousted from that position. It certainly is no gift of mine to do this, still I have no means of determining his powers, and would certainly never dream of measuring any one by myself in this or any other talent. This, however, is an "aside." It will be well to remark at the outset that the task I set myself is to give a few simple hints to the beginners only. The older hands of the Society, amateur and professional, need no advice on the subject, although I know one or two who have paid pretty dearly for their experience, as I also have.

In order to come at the optical aids which the average amateur requires, let us consider what will be the probable work he will undertake. First, then, landscape pure and simple will probably be the chief item. Secondly, he will ere long want to do a little instantaneous photography. Thirdly, architecture, including interior work. Fourthly, portraiture, either in a common sitting room, or perhaps out of doors. Now the problem to be solved is this: How to provide one's self with the necessary lenses at the least cost, and at the same time with no sacrifice of efficiency. Let it be understood that the arguments to be advanced hold equally well, whatever the size of plate.

In order, however, that it may be easily followed, let us say that a half-plate kit is in view. For a half-plate, opticians generally advise a rapid rectilinear of about nine inches focus, that is if only one lens is to be supplied. This, to my mind, is a very absurd proceeding, and for the following four reasons:—First, while of course it is rectilinear for a half-plate, or any other plate it can cover, a cheap single lens is also rectilinear on a half-plate, that is if it is about nine inches focus—the same focus as the rectilinear—that is, second, a

rectilinear is much more expensive than a single lens. Third, a rectilinear of nine inches focus is made up of two achromatic combinations, each of them so long in the focus that they cannot be used singly in any ordinary camera; add to this that they are generally symmetrical, that is of the same focus, and even if you can use one the other is never of any service. And the fourth reason is that the focus is too long for wide-angle subjects, and you need another lens to take them.

A much better bargain (so to speak) can be made than this; but before propounding my own ideas on this matter, it might be as well to explain to the uninitiated why lenses have to be of different lengths of focus. If you look at the diagram on the blackboard you will see that since light travels in straight lines, a certain size of plate being given, the focus of the lens directly determines the amount of subject included; or, to use the proper expression, the focus of the lens and size of plate together give the angle included by the lens. A short-focus lens includes a wide angle, and a long-focus lens a narrow one. A lens which would give a wide angle for interior work would be of little use in the great bulk of landscape work, for it would include too many objects at the expense of the *size* of these objects. A lens of long focus, first class for sea or hill subjects, would be useless for interiors, for a long-focus lens renders the various objects of such a size that but few of them can be represented, and in place of getting a representation of a whole room one would barely get in the whole of the end wall. One could do with a great many lenses of different foci, but practically in landscape work generally, including exterior and interior architecture, a choice of three lenses of different foci is sufficient.

Granted, then, that the necessity for different lenses is allowed, what does experience suggest as to the focus for each of the three lenses, and is it possible to get one combination to give the whole three? We have seen that to have a nine-inch rectilinear as an *only* lens for a half-plate ties you down to having only one focus, for the two halves of the lens cannot be used singly on account of their extreme length of focus, therefore this does not fulfil the required conditions. If, however, we substitute a wide-angle rectilinear in place of a rapid rectilinear, we will have attained our object almost at a single step. Let a wide-angle rectilinear of, say, four and a half inches focus be chosen for a half-plate, and the following advantages immediately accrue.

1st. Used just as it is, that is both combinations together, it makes a first-class short-focus lens for a half-plate, including a wide angle, with great depth of focus and perfection of detail all over. In this shape it is the very thing for interiors and cramped exteriors, such as buildings in closes or narrow streets, and of course it is strictly rectilinear. The two halves used separately (and the mount is always arranged so that they may be) give other two foci of about eight and ten inches. Now, on a half-plate an eight-inch and a ten-inch single lens are to all intents and purposes rectilinear, so that we have in this one combination a choice of three different foci, all of them rectilinear on a half-plate.

A glance at the blackboard will show how a single lens can be practically rectilinear if a small enough portion of the field be used. But, it may be said, what are the disadvantages of this system, for, surely, everybody would adopt this were there no equally powerful drawbacks? It has only one drawback, and that is its want of rapidity. I have two answers to this: first, the double combination is rapid enough for all ordinary instantaneous work; and secondly, even if it were not, a single lens can be purchased for a mere trifle capable of taking up the instantaneous and portrait branch of the subject. All the finest professional instantaneous work has been done with lenses working no quicker than this, and I myself find that for street views, including moving figures, the lens is amply quick enough. For certain optical reasons a small stop, that is a comparatively small stop, has to be used with wide-angle lenses, and this prevents them being the most rapid form of lens, but their other good qualities far more than make up for any loss of rapidity, that is, always supposing the very highest degree of rapidity is required.

Assuming, however, that it be allowed that this wide-angle combination is the best for landscape and architectural work, but that a quicker lens is necessary for portraits and instantaneous views, what lens should be recommended? During the winter that is past I have been much pleased with the working of plano-convex lenses. Those who have not experimented somewhat have no idea how interesting a field this is. Through the kindness of Mr. Birnie and others I have had quite a number of lenses through my hands recently of the plano-convex type; and what with ransacking the journals and my own experience, I am in a position to say that this excellent form of lens is by far too seldom made use of. Compared with the meniscus form, which is the usual form of single lens, I find that the plano-convex works with a much larger aperture, giving excellent definition, but this through a somewhat restricted field. Given a meniscus and a plano-convex, I find that if they are of the same focus the plano-convex will give me crisp definition for a certain space, while the meniscus will give me a far blunter image, but not falling off in defining power so rapidly towards the edges.

But in these days of enlarging from small negatives, the plano-convex is just what is wanted, for it matters little what size the negative is if it is very good what there is of it. The moving object in instantaneous work generally occupies only a very small part of the field, and the plano-convex is the very thing for this. Again, in portraiture, what though the shoulders and draperies be a little blunt, if the head, the centre of attraction, be faultlessly rendered.

A good plano-convex lens will work as rapid as ninety-nine per cent. of the rapid rectilinears, while the cost is not a fourth part.

It is perfectly astonishing to me why this most excellent form of lens has been in abeyance so long, unless on the assumption that its narrow angle has prejudiced workers against it. Of course, it must be understood that I only strongly uphold it in such cases as are of narrow angle naturally, such as portraiture and instantaneous work.

But it might be argued that by this system the wide-angle lens in its double form would be but rarely used, while one would constantly be working with a single lens. This, of course, is quite true, but there is no determent in this. Lantern work which, necessarily, requires negatives of the highest degree of sharpness is a good test for any lens, and the whole of my very finest slides are from negatives taken by a single lens and leave absolutely nothing to be desired in fineness of detail.

To recapitulate then, I think that an amateur who would have a thoroughly reliable battery of lenses requires nothing more than, first, a wide-angle rectilinear with a focus of about two-thirds the long diameter of the plate, and secondly, a simple achromatic plano-convex lens with a focus about one and one half times the long diameter of plate. The wide-angle lens will give him three different foci, all practically rectilinear, and as good as can be made for all kinds of photographic work except the fastest instantaneous and portraiture. The plano-convex lens will give him a fourth focus for landscape, and at the same time be an instrument second to none for the quickest instantaneous work and portraiture.

While it is, I am afraid, not to be hoped for that those who know little about it will lay aside their fetish in high-priced instruments and makers' suggestions until they have bought their knowledge through practical experience, it is earnestly to be desired that makers should desist from misleading those who take their advice in such matters. I would be slow to impute mercenary motives to any one; at the same time, the temptation to advise three separate costly instruments in place of one equal to the work of the three is very great.

I am not advising a system which has been imagined but never tried. The arrangement described is precisely the one which I have used myself for years, with the exception of the plano-convex lens, the splendid properties of which I have only been acquainted with for the last six months past. With regard to everything else proposed, I may say that with a photographic experience ranging through every branch of the subject, I have never once failed through not having a proper lens. I have since got a plano-convex suitably mounted, and feel now quite at ease whatever kind of work I determine to undertake, although I must say I never had any difficulty in instantaneous work when using my wide-angle lens at full aperture, which is about *f*-16.

It must not be understood that I advise cheap lenses from second-class makers, nothing is further from my purpose. I wish rather to point out that a suitable choice of *one* first-class lens will do all the work of three equally expensive instruments; that the economy comes in in carefully choosing one good lens that is capable of overtaking all the work rather than being at the expense of three separate instruments that can do no more than the one, provided it be intelligently chosen.

A few words may be said as to the more material side—I mean the actual workmanship of a lens. It would lead us too far to enter into the many points which go to make up a good lens, or even to point out what qualities *may* be found or expected as against those which we know cannot be (whatever the makers say), certain good qualities being incompatable with certain other good qualities.

It may be useful, however, to consider a few minor points. The brass work should be first class. In second-class lenses this is frequently defective. Threads of screws should be clean cut and not too fine. The diaphragm or diaphrams should fit the slot accurately, neither too tight nor too easy. If the diaphragms be the ordinary Waterhouse ones there should be guides to the very bottom of the slot, so that the diaphragm when pushed home may be properly

centred. I have a lively recollection of a summer I had with a cheap lens not provided with guides. I am safe to say that the language employed during that one season gave rise to more pious horror on the part of my photographic friends than any other hundred acts of my life, even at its most foolish time.

The Iris diaphragm is better than Waterhouse, but inferior to rotating, where this form can be used, which is not always. I have no special objection to Iris diaphragms when dealing with larger apertures, but when the light is shut off from *f*-32 to *f*-40, a very trifling error in the adjustment may seriously increase or diminish your exposure.

A wide-angle rectilinear, such as I have recommended, is invariably fitted with rotating diaphragms, and in having it screwed to the camera, care should be taken to have the diaphragm slot on the *under* side (not the *upper*), so as to prevent or lessen the chance of light getting in where it is not wanted. When the lens is not in its place in the camera it should be kept covered at both ends—a screw cap being generally provided for the one end, and the ordinary exposing cap for the other.

J. K. Tulloch, M.B.

THE MATHEMATICAL CALCULATION OF EXPOSURES, AND A NEW EXPOSURE METER.

(A Paper read before the Hereford Photographic Society.)

In the whole range of photography, perhaps there is nothing so difficult for a beginner to overcome as the requisite duration of the exposure, and even the most experienced hand will find himself puzzled if several of the conditions affecting the exposure should vary much from those under which he has been working.

In recent years many attempts have been made to place the matter on a more accurate basis, and the resulting exposure tables have proved of considerable use to many workers, and at the same time a subject of much derision to a class of experienced photographers who have never followed any other guide than that of finding out by experiment the proper exposure under certain conditions, and then—as these conditions vary *one at a time*—varying the exposure in accordance with what their experience teaches them to be advisable.

I have laid stress upon the words "one at a time," for herein lies the weak point of the method, which has held its own for nearly half a century. For example, a photographer finds by experience that with a certain plate a sun-lighted landscape requires at mid-day in June, with a lens stopped down to *f*-22, an exposure of one second. Now he has no difficulty in estimating that if he tries the same subject at five in the afternoon, the exposure must be doubled (other conditions being alike); or that it will take half a second if he uses a diaphragm of *f*-16 (other conditions being as at first); or that with a certain slow brand of plate five seconds will be required. But give this photographer a class of subject, say an interior, to which he has not recently been accustomed, and introduce one or two other variations in the conditions, such as the use of a rapid brand of plate and a September light, why, he is compelled to make a rough guess and "try a plate;" in other words, he is more or less at sea in the matter.

In order to keep this somewhat obtuse subject within limits, I shall name throughout this paper a few axioms, which I believe to be standard truths. These, if collected together, I would call a grammer of the subject.

Axiom I.—Five primary factors, each quite independent of the others, govern a photographic exposure. They are:—

A. The actinic force of the light falling upon the worst lighted part of the subject.

P. The sensitiveness of the plate used.

S. The capacity of the subject, or its most non-actinic part, for reflecting sufficient actinic light to the lens to form a photographic image of suitable intensity.

D. The size of diaphragm (its ratio to the focus of the lens).

5. The distance of the subject from the lens.

Now I think the way is cleared to investigate the attempts which have been made to tabulate these factors, as I intend to prove the truth of my next axiom in each case.

Axiom II.—The value of each of the factors (as affecting the exposure) may be expressed in numerical terms:—

Factor D.—*Size of Diaphragm.*—This has long ago been expressed in numbers bearing a direct relation to the exposure. The size of diaphragm is expressed by a fraction, made by dividing the focus of the lens by the diameter of the stop, and the square of this fraction expresses the light intensity passing to the plate, and therefore (other conditions being equal) the proportionate exposure. Thus an eight-inch lens is used with a half-inch stop: divide the latter figure into the first, and you get *f*-16 as the size of the stop. This number squared is 256. Use a quarter-inch stop with the same lens, the fraction will be *f*-32, and this squared is 1024. This last number is four times 256; and therefore when using with any lens a stop which is marked *f*-32, four times the exposure must be given than with *f*-16. The Photographic Society of Great Britain have adopted a uniform standard of numbers which express the relative exposure. These U.S. numbers are found by dividing the squared fraction by 16. Thus, *f*-16 is U.S.-16, and *f*-32 is U.S.-64.

Factor A.—*Actinic force of Light.*—There is not yet any adopted standard of value for this factor, although, as I shall try to point out, there is no great difficulty in making one. I need hardly explain to photographers that the rays of light which are most luminous, and therefore have most effect upon the human eye, have by no means the greatest effect upon the sensitive plate, and, indeed, some of the rays (violet and indigo) which appear quite dark to the eye have the most intense chemical effect of all. (Diagrams showing the difference between the visible scale of colours and their chemical effect were thrown upon the screen.)

In a word, it is the *actinic* force, and not the *visual* force of the light which has to be estimated. Any means, therefore, of judging light for photographic purposes in which the eye is used to estimate it must be most delusive. Every old photographer will tell you that in judging the light by the eye you must also take into your consideration whether the wind is in the east, if the atmosphere has lately been cleared by rain, whether the light is red or yellow in character by reason of sunset being near, or a foggy atmosphere prevailing, and so on.

This fact disposes of all photo-meters (such as Decoudun's, Taylor's, Tylar's) as being unreliable for the purposes; in fact, it is an *actinometer* in which the chemical force of the light is gauged that is wanted.

Before, however, describing the best form of such instrument, I will allude to efforts which have been made to tabulate the value of light at different times of the year and day, and under different circumstances.

Vogel was, I think, the first to attempt this. He published a table showing the *average* actinic force of light for each month in the year at different hours of the days. Dr. Scott's tables on the same plan are now in general use. These tables would be conclusive were it not for two unfortunate circumstances. The first is that the light varies very greatly from this average; for instance, on November 24 last I tested the actinic light in the open (sky overcast) at 12.45. It was represented by the figure 35 (Stanley actinometer). At 2.30 of the same day (the clouds having cleared away), when the light, according to the tables, *ought* to have been one-half of what it was at 12.45, it was actually *three times as great*, being represented by the figure 11. This serious difficulty is attempted to be met by the compilers of tables requiring the users to estimate whether the light is "sunshine," "diffused light," "dull," "very dull," or "gloomy," thus again referring the matter to that most ineffectual instrument for the purpose—the eye.

The other difficulty is this: All would be well if every photograph taken were of a subject fully lighted by the open sky; but, as a matter of fact, the majority of subjects have a large proportion of light cut off by overhanging trees or buildings, or by being in a studio, or even inside a building lighted only by windows. The exposure tables again attempt to classify the position of subjects as "interiors," "woods and badly lit river banks," "portrait near window," &c.; but as an interior may vary from twenty to one hundred times the exposure of an open landscape, and one part of it may be ten times as well lighted as another, it may be judged how near a novice is likely to be in classifying his subjects. All this points to one simple solution of the difficulty, that the best way to gauge the light for photographic purposes is to test it, *where it falls upon the subject*, by means of a chemical actinometer.

There is no need to enter into the various means by which an actinometer may be constructed. There are many substances which are changed by the action of light; but, as Captain Abney has pointed out, it is well to use a sensitive surface as nearly resembling the photographic plate as possible. Early in the days of carbon printing, Johnson devised a useful actinometer in which a strip of chloride of silver paper was exposed to the light until it matched in depth of colour a standard tint placed alongside. The time taken to do this was noted, and these figures indicated the relative actinic force of the light.

Captain Abney advises the use of bromide of silver instead of chloride paper, and in order that it may discolour quickly in light, he treats it beforehand with nitrite of potash. The actinometer thus formed is all that can be desired in practice; the observation takes but a short time (two to thirty seconds), and the results are practically

uniform. The standard of tint to be used is the only thing that requires settling, and Mr. Burn in his able paper on the subject (*Photographic Society Reporter*, November, 1889) advises that this be settled by exposing the paper to the "best light" (clear sunshine about mid-day in May or June) for a settled time (one, two, or three seconds).

Stanley is at present the only maker who sells such actinometers; but their general principle was a free gift to the public before his patent was taken out. A light which darkens the paper to the tint in four seconds is obviously double in intensity to that which would take eight seconds to do the same thing; and therefore the task of expressing this one factor (actinic force of light falling on the subject) in numerical terms is accomplished. It will be noted that the light must be tested at the subject, however much that may be in the shade.

Factor P.—It is obvious that if one brand of plate—say a Kingston Special—takes one-tenth the exposure that a Kingston Ordinary does under precisely similar circumstances, and the sensitiveness of the latter plate is expressed by the figure 1, the figure 10 will accurately give the relative sensitiveness of the Special plate.

To form a table of sensitiveness of plates a standard must be adopted, and I have taken the hint from Messrs. Hurter & Duffield (inventors of the actinograph) and adopted as a convenient standard for the figure 1 a plate which, exposed for two seconds with *f*-8 in May or June sunshine about mid-day, on an object of average colour twenty-five feet from lens (average distance of a foreground), will give with the developer the photographer is in the habit of using the class of negative most suitable for his purpose. Space does not permit me to go deeply into this point, but in practice I find that each worker (in using mathematical calculation of exposures) must once for all find out for himself, by test exposure, what number represents the sensitiveness of the plate he is using; for this factor really includes the method of development adopted, and the class of negative required. I, for instance, could not get negatives suitable for platinotype printing with the exposure an hon. secretary finds sufficient for his negatives suitable for bromide printing; and therefore I should probably use a different plate number to what he would.

At present there is no satisfactory standard for the sensitiveness of plates; Warnerke's sensitometer, which is most in use, is not suitable for the purpose of which I treat, because the numbers used have no uniform mathematical relation to each other, and cannot well be used for calculation. Nor can the "30 times" and "60 times" label on the boxes be relied upon.

The method of ascertaining what number on my arbitrary scale represents any particular plate is for the photographer to expose plates for two or three different plate numbers, calculating by means of my instrument (the instructions of which give approximate numbers for different plates), and after developing with his usual developer in one dish selecting the negative which suits his purpose best.

Factor S (capacity of subject for reflecting actinic light to the lens) now claims attention, and it is strange that previous workers have all mixed up this factor with the entirely separate question of lighting. This, I think, arises from the way in which Burton, in his table of exposures—intended only to be a guide to beginners, and not a basis of calculation in connexion with actinometer observations or light tables—has classified his subjects. All compilers of exposure tables seem to have adopted Burton's classification, and hence arises the absurdity that in tables (such as Ackland's) compiled for using with an actinometer, or with a table of light values, the photographer about taking an interior is asked to gauge his light in the open air, and then estimate how much light reaches his subject, instead of gauging the actual light falling upon the subject. Experience shows that to preserve the light and shade in a white or light-coloured object a much shorter exposure is required than for one of average colour; and, on the other hand, to get detail in objects of dark, non-actinic colour an increased exposure is necessary. Hence the need for a scale of subject numbers.

Here is mine, the first, I think, published in which the factor of light is left entirely out. The standard is an average-coloured object, such as the foreground in a landscape.

White, or black and white objects	S$\frac{1}{4}$
Light-coloured objects	S$\frac{1}{2}$
Objects of average colour	S1
Objects of rather a dark, or red, or yellow tint	S2
Very dark, or non-actinic objects in which detail is required	S3

(Three lantern photographs were here shown, each being a group of white, medium-coloured, and terra-cotta vases, exposed respectively as S$\frac{1}{2}$, S1, and S2. The shortest exposure was quite insufficient for the dark vase, while the longer obliterated all detail of shades in the white one.)

The fifth factor, that of distance, affects the exposure in two ways. First, when objects are a considerable distance away, say 100 yards and over, the light reflected from them is very considerably added to by the light reflected from the particles of moisture, &c., in the atmosphere; hence the necessary exposure is lessened. As a rule, however, the shorter exposure cannot be given on account of having to expose for a foreground, &c., in the same picture.

Distance affects the exposure in another quite different way. When the object is brought so near to the lens that the camera has to be racked out for a lengthened focus, the exposure increases in exact proportion to the increased square of the focus; this does not affect ordinary work, only enlarging or copying.

To avoid too many factors I have thought it best to combine this one of distance to that of the subject, and the following must therefore be added to the foregoing scale of subject numbers:—

Sky and sea	S$\frac{1}{10}$
Objects a quarter of a mile away	S$\frac{1}{2}$
More distant objects	S$\frac{1}{4}$

I have also formed a scale of subject numbers for white, light, average, dark, and very dark subjects at various distances from the lens from twenty times its focus down to one and one-tenth its focus (enlarging ten diameters). This enables the exposure meter which I am about to describe to be used for enlarging or copying near objects.

I have now investigated the factors which control a photographic exposure; you will notice how entirely different in character they are, and that quite different means must be taken to ascertain the value of each. I am aware that photographic dealers and unthinking amateurs are expecting to be provided with an exposure meter which will point out the exposure without the photographer making himself acquainted with these different conditions. It is easy to make such an instrument to *sell*, but not to give correct results, as I claim mine will do. Now for the means of using these factors.

ALFRED WATKINS.

(*To be continued.*)

THE LATENT PHOTOGRAPHIC IMAGE.*

ALL the decisive evidence at present in our possession points to the fact that the formation of the latent photo-image is a process of photo-chemical reduction, the effect of which can be undone by treatment with halogenising agents, or with certain substances generally believed to exert an oxidising action.

About three years ago† Carey Lea showed that latent images, capable of development and reversal in the same manner as the latent photo-image, can be obtained by treating sensitive films of silver salts with a solution of a hypophosphite, or an alkaline solution of grape sugar or milk sugar. Nitric acid and solutions of the haloid salts of the alkalies had the same effect as on latent photo-images. Carey Lea's experiments were made with the silver salts on paper. I have repeated them with ordinary gelatine plates with precisely similar results. The reducing agent (sodium hypophosphite, or a solution of milk sugar made alkaline by caustic potash) when brushed on the plate produces no visible effect; but a dense deposit can be developed. These latent images thus formed are destroyed by potassium dichromate, but not by dilute nitric acid or by alkaline bromides. Potassium iodide affects them in the same way as the latent photo-image. (Examples shown.)

Latent images, capable of development, are also formed as a result of a shearing stress applied to the sensitive film. This was observed by Carey Lea‡ in the case of wet plates, but was first carefully investigated by Abney.§ The effect is easily observed by writing on the surface of an ordinary plate with a clean glass rod, using moderate pressure, and then placing it in a developer.—Abney found that the material of the rod used for writing has no influence on the result; the effect, if sufficient pressure is used, is transmitted through paper. Sensitive and less sensitive forms of silver bromide behave similarly; the latent image formed is destroyed by potassium dichromate; the effect is not so much on the surface of the film as lower down, or near to the glass, for if the film is moistened, superficially melted, allowed to set, and then developed, the sharpness of the image is scarcely effected; but if the film is completely melted, the

* Concluded from page 236.

† *American Journal of Science*, 1887, and English photographic journals of the same year.

‡ *American Journal of Science* [2], xlii., 198.

§ *Photographic Journal*, 1883 and 1884; THE BRITISH JOURNAL OF PHOTOGRAPHY, xxx., 418; xxxi., 167.

developed markings are blurred. He also was unable to observe anything of the nature of phosphorescence when the writing was done.

Several points in connexion with these phenomena seemed worthy of further investigation. Details of the experiments I shall describe in another place. I found that with one and the same plate the effect gradually increases with the pressure, but that there is no connexion, as might have been supposed, between the sensitiveness of the plates to light and the minimum pressure required to produce a developable image upon them. (Examples shown.) At present I have not been able to trace any connexion between the minimum effective pressure and the hardness of the film. I confirmed Abney's statements that the material with which the writing, or "shearing," is done is without influence on the result, provided that it is a sufficiently hard substance; that no phosphorescence can be observed when the film is scratched; and that the latent image is destroyed by potassium dichromate. I also examined the action of various other reagents, such as bromine, and potassium bromide, and iodide, and found the results to be identical with those given by the photo-image. Independent confirmation of Abney's statement that the effect is greatest in the lower part of the film was obtained by a method quite different from that which he used. After some plates had been subjected to various degrees of shearing stress, they were exposed to light for a very short time. One half of each plate was then dipped in a very dilute solution of potassium dichromate for a short time, washed, and developed. It was found that the superficial latent image produced by light had been completely destroyed, whilst the deeper-seated effect of stress was only slightly affected.

Latent images which behave in a precisely similar manner with various reagents, and are therefore presumably of very similar, if not identical, composition, can be produced in, at least, three ways: (1) by the action of light; (2) by the action of chemical reducing agents in the dark; and (3) by shearing stress. The second mode of production is easily intelligible; the production of chemical change by shearing stress at first sight seems difficult to understand. The researches of Spring have shown, however, that many chemical changes in solid substances can be produced by the application of great pressure. As a rule, pressure promotes combination, but there are certain cases where a compound decomposed when strongly compressed. According to Spring, if the volume of the compound is less than the sum of the volumes of its uncombined constituents, pressure tends to produce combination; if, on the other hand, the sum of the volumes of the uncombined constituents is less than the volume of the compound which they form, pressure will tend to decompose it. The effect of pressure on chemical changes is, in fact, strictly analogous to its effect on the melting point of solids. At present we do not know the relation between the space occupied by the materials of the latent image and that occupied by the original gelatino-bromide. If the former is less than the latter, the formation of a latent image by stress is only a special example of Spring's second law, and the apparent difficulty disappears.*

The composition of the material composing the latent image is as yet an unsolved problem. It is generally regarded as being identical with the dark products obtained by the more prolonged action of light, and this view is supported by the fact that they are affected in the same way by many reagents. Carey's Lea's observations (*loc. cit.*), that a brief action of reducing agents on silver compounds produces invisible but developable images, whilst prolonged action produces visible images, and that in both cases the images are identical in behaviour respectively with the invisible and visible latent images produced by light, is also very strong evidence in favour of the same conclusion, but their identity is not yet proved. The resistance of the latent image and of the darkened products to the action of nitric acid render it highly improbable that they consist of metallic silver; and it was for a long time supposed that they were sub-salts of silver corresponding with a sub-oxide, Ag_2O, described by the chemist Wöhler. According to this view, the latent image consisted of a minute quantity of silver sub-chloride Ag_2C, or sub-bromide Ag_2Br, or sub-iodide Ag_2I, containing half the quantity of halogen present in the ordinary salts. Attempts to obtain Wöhler's sub-oxide have been made without success by Newbury, Muthmann, Von Pfordten, and Bailey & Fowler, and, of course, attempts to make the sub-chloride from it have failed also. The methods used for the purpose of obtaining the sub-oxide were, however, not such as, reasoning from analogy, were likely to be successful. They all depended on the possibility of stopping the reduction of an ordinary silver salt when half the chlorine had been removed, without at the same time producing any metallic silver. Even in the case of well-known and stable compounds this is a matter of much difficulty; and when dealing with a substance such as ordinary silver oxide, itself extremely easily reduced to the metallic state, the difficulty of definite partial reduction becomes enormously greater. Moreover, chemists are acquainted with many cases in which the haloid salts of an element are much more stable than the corresponding oxide—the mercurous salts which are analogous to the silver salts afford an excellent example—and therefore the non-existence of a silver sub-oxide is no proof of the non-existence of silver-sub-chloride, sub-bromide, or sub-iodide. This question remains for further investigation.

Carey Lea found (*loc. cit.*) that by the action of reducing agents, such as ferrous hydroxide, alkaline milk, or grape sugar, &c., on silver salts, he obtained products very similar in properties and composition to the dark products produced by the action of light. They are very slowly attacked, even by strong nitric acid, but more rapidly by potassium iodide, and are decomposed by ammonia sodium thio-sulphate, &c., with separation of metallic silver. He regards the two sets of compounds as identical in character, and considers them to belong to the indefinite class of compounds known as "lakes," or, in other words, as compounds of silver sub-salts with varying proportions of the ordinary salts, the compounds having a much higher stability than the sub-salts themselves. In order to recall the mode of formation of the dark products, which vary in composition according to the conditions of their preparation, but always contain less halogen than the normal silver salts, Carey Lea proposes to call them photo salts of silver, thus, photo-chloride, photo-bromide, photo-iodide, &c. We do not know, however, that these bodies are really "salts" in the usual acceptation of the term; and although the names are very good, it would be better to speak of them more generally as photo-compounds or photo-products.

Hunt stated† that when silver chloride darkens in presence of air and moisture, half the chlorine is replaced by oxygen, and researches by Hodgkinson,‡ the details of which are not yet published, lead him to the conclusion that the darkened silver chloride is an oxychloride of the formula Ag_2Cl_2O, formed from four molecules of silver chloride AgCl. AgCl. AgCl. AgCl., by the substitution of an atom of oxygen for two atoms of chlorine, thus AgCl. Ag. O. Ag. AgCl. Experiments, the details of which have not been published, cannot, of course, be criticised or properly appreciated; but it is very difficult to believe that a silver oxychloride could form in presence of strong nitric or hydrochloric acid. It is also important to observe that the supposed oxychloride is not a reduction product of silver chloride, but a substitution product, the quantity of chlorine and oxygen in the formula given being sufficient to neutralise all the combining power of the silver. Silver oxide is known to be readily reduced to the metallic state by developers; and if we assume that this reducibility of the oxide is transferred to the oxychloride, which would be the case if the compound had the constitution represented by the formula given, the formation of the oxychloride would certainly explain the production of an image on development. On the other hand, it is equally well known that silver oxide is very readily attacked by acids, and it is not easy to see how an oxychloride could retain the instability of the oxide in presence of reducing agents, and yet offer so great a resistance to the action of acids. If further experiments prove that the darkened products are really an oxychloride and an oxybromide respectively, it is not at all probable that they will have the constitution which has been suggested;

It seems quite certain that the presence of oxygen is not essential to the formation of a dark photo-product from a haloid silver salt. Dry silver chloride darkens readily when exposed to light under benzine § or in hydrogen,‖ or apparently in presence of any substance which can take up chlorine, whether the particular substance contain oxygen or not. It is obvious, however, that we are not entitled to assume that the products formed are identical, and the behaviour of a substance out of contact with air and moisture gives no direct evidence as to its behaviour when oxygen and water are present.

It has not yet been definitely proved—indeed, from the nature of the case, absolute proof is almost, if not quite, impossible—that the material composing the latent image is identical in composition with the visible products found by the more prolonged action of light, although the various facts previously referred to furnish very strong evidence that this is the case.

The exact point which we seem to have reached is this, that the latent image is a photo-chemical reduction product containing a lower proportion of halogen than normal silver chloride, or bromide, or iodide, and much

* I gave this explanation of the effect of shearing stress in a lecture before the Leeds Photographic Society and in 1888, but the full explanation is Professor Meldola's system of spectrum comparison of the same name, but less specifically, in his Chemistry of Photography, page 102.

† *Researches on Light*, 2nd edit., p. 89. ‡ *Photographic News*, xxxi., 371.

§ Hodgkinson, Clark, and Meldola, *Chemistry of Photography*, p. 56.

‖ Guthrie, THE BRITISH JOURNAL OF PHOTOGRAPHY, xxxiv., 393. Carey Lea, *American Journal of Science* [3] 28.

¶ Letocnik, *Liebig's Chemical Journal*, xi., 474; THE BRITISH JOURNAL OF PHOTOGRAPHY, 1889, p. 8.

more easily reduced to the metallic state; but the problem of its composition and constitution still remains to be solved.

DISCUSSION.

Mr. SPILLER: It is a well-known observation that plate manufacturers call it bromine that is being given off when plates are exposed to the sun and are undergoing decomposition. The time a plate has been kept in exposure before development has an important bearing upon this subject. I have kept a plate twelve months and then developed it. Other developers have done more than that.

Captain ABNEY: I should properly sum up, but Mr. Bothamley will say what I am about to utter. The smell of bromine I have nothing more to say about; you want more than nasal proof. Nitric acid is a most doubtful destroyer of image. There are two or three papers on that subject. It will be found that bromide of potassium will destroy the image. I have myself tried all the usual destroyers. I may say I am very familiar with the experiments Mr. Bothamley has shown us. I do not agree at all with Mr. Hodgkinson's theory, although there is this to be said for it, that you have oxygen present. I have, in fact, almost proved that there is found in an image an organic compound which is destroyed by the action of the heat. It is a very difficult subject, this latent image, and I am glad Mr. Bothamley has taken it up. There is one thing I must say, that is, that Mr. Bothamley should not call his subject "latent image," but "photographic image." There is no such thing as "latent image."

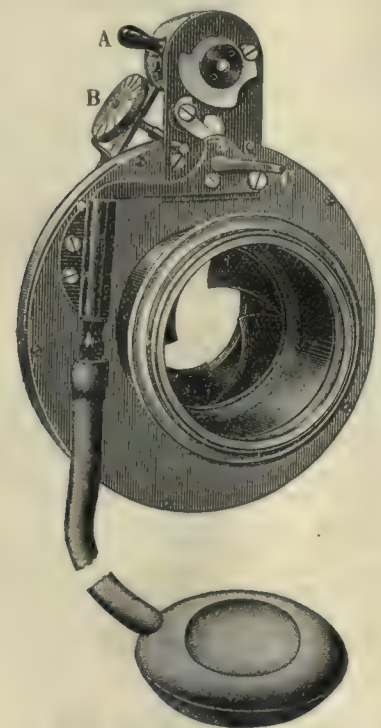
Mr. BOTHAMLEY: I do not doubt that Mr. Spiller smelt something like bromine, and that something is given off when silver chloride is approached to the light. It may be hydrogen peroxide that is given off. What I contend at present is that we do not know what is given off. With regard to silver chloride, I did not say that it was a preventive, but that its action retarded. A great deal of doubt exists as to the question of hydrogen peroxide and ozone.

SUMMER NOVELTIES IN APPARATUS.

SPRING brings "Spring fashions," and the advent of summer brings photographic novelties for the coming season.

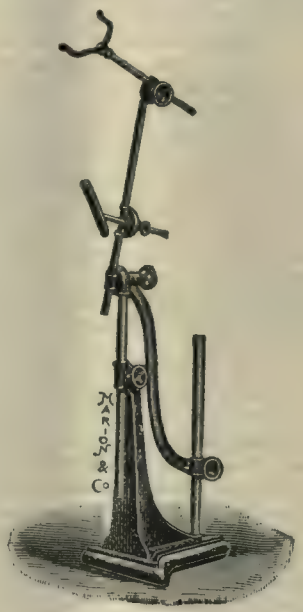
Among those who are never backward in providing for the requirements of the times is the firm of Messrs. Marion & Co.; and responding to an invitation to see certain novelties, we visited their well-appointed showrooms in Rathbone-place.

What we first noticed was a lens shutter by Messrs. Voigtländer, shown in the cut. In this, the principle of the Iris diaphragm is



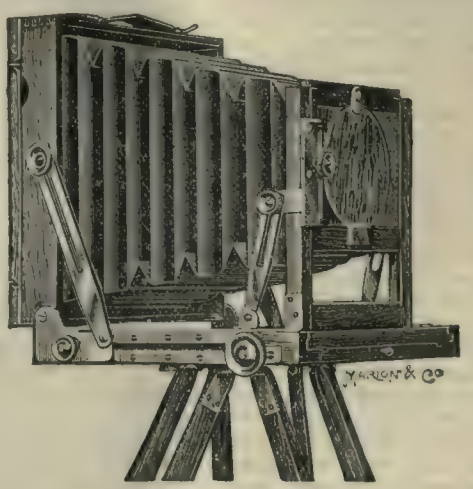
introduced, but with a modification in carrying the principle into effect, viz., that by its eccentric form of opening and closing a portion of the whole lens is exposed to the rays of light during exposure.

The "Firm" head-rest has its special features so well shown in the cut as to render description unnecessary. It will be seen that the



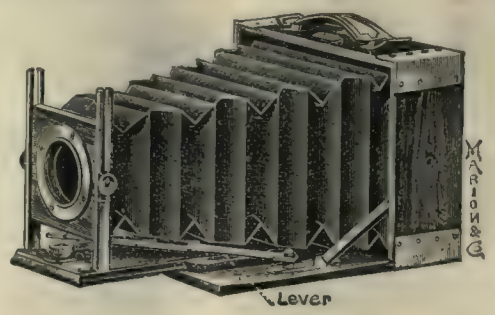
back support is itself backed by an adjustable extension from behind, ensuring great stability.

The "Perfection" camera is a strong yet light camera. Several patented improvements on the cameras of former periods are embodied



in it. For instance, it has a turntable by which it connects with the stand; a means of bringing the back up close to the front for including a wide angle without the tailboard interposing to cut off the vertical view in front; a double rack and pinion system to provide for extension, with other things of an advanced nature.

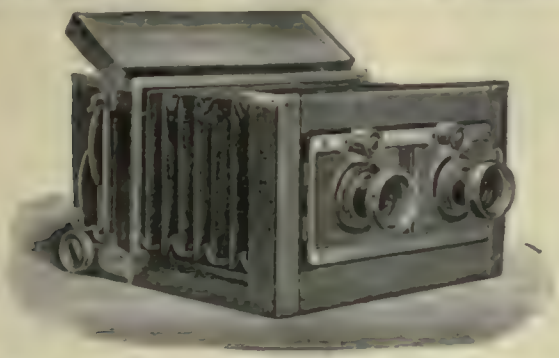
In a camera constructed under one of Samuel's patents there are certain features of great utility and convenience. The focussing is



effected by a lever, instead of a rack-and-pinion movement, and the

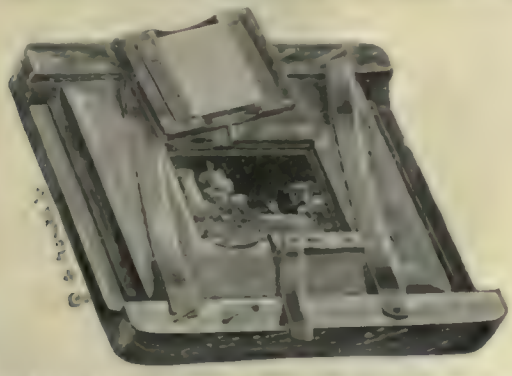
peculiar construction of the front or lens-carrying frame permits the lens to be directed either vertically or laterally, and raised or lowered with singular facility.

The Ransom's combined stereoscopic camera and stereoscope is



constructed to make stereoscopic and lantern-slide negatives. By reversing the focussing glass it is no longer a camera, but a stereoscope, the ground glass of focussing frame forming a diffusing medium for viewing transparencies; or if paper stereoscopic slides are used, the frame on top of the back can be adjusted so as to reflect the light down on the picture, as in an ordinary stereoscope. The frame for this purpose has a mirror on the under side. For the convenience of viewing, the lenses can be moved horizontally so as to suit different sights; the rack and pinion serving the double purpose for focussing the subject to be either photographed or viewed.

Cowan's lantern-slide printing frame is a means by which any portion selected from a 12 × 10 negative (or one of smaller dimensions) can be printed by contact as a lantern slide. It often happens that a



small portion out of the centre of a large negative would make a good lantern slide, but there has always been a difficulty in printing out this portion—risk of breakage of large negative, scratching, &c. Mr. Cowan has ingeniously got over this difficulty in the printing frame shown in illustration—an ordinary 12 × 10 polished mahogany printing frame is converted into a lantern-slide printing frame, by being fitted with a glass bed masked to the lantern size, 3¼ × 3¼. A solid back having a small inside frame, which carries the lantern plate by means of a spring catch, takes the place of the ordinary hinged back, and the frame is ready for printing lantern slides from the centre of either 12 × 10, 10 × 8, whole-plate, or half-plate negatives. When desired it can be used, with the hinged back, as an ordinary printing frame.

This firm also has on exhibition among their novelties a new Kershaw shutter adapted for time as well as instantaneous exposures. The original shutter of Kershaw is well known as being an *instantaneous* one: the thing wanting to make it a perfect shutter was an arrangement for giving *time* exposures. This has now been achieved. For time exposures, move the pointer from the position shown in the woodcut upwards to the letter T. Wind up the shutter in the usual way until U appears in the centre of circle, then take the winding bar between the forefinger and thumb of the left hand and lift the release arm so as to allow of the pin on this arm dropping into the left-hand slot in the crank T. The shutter is now set for time exposure; press the pneumatic ball, when the shutter will open; release the pressure, and again press the ball, and the shutter will close. It will of course be understood that for instantaneous exposures



the pointer should be turned down to "inst.," and the pin on release arm must be in right-hand slot of crank.

We saw also several other novelties, not the least interesting or useful of which is Slingsby's lamp stand, an arrangement by which four flash lamps erected on cross bars on a light stand are fired simultaneously by pressure on a pneumatic ball. Five grains of magnesium at first formed the charge for each, but this has now been reduced to two grains of the powder, which is all consumed. Several admirable portraits and groups, some of large dimensions, attested the success of this system of lighting.

Foreign Notes and News.

Dr. Eder, in the pages of the *Photographische Correspondenz*, and in the last chapter of his communications from the Vienna Photographic Laboratory, devotes a considerable amount of space to the subject of "Natural Colours in Photography." From what he communicates it is decidedly doubtful whether Herr Verescz has as yet secured any results very markedly superior to those obtained by Becquerel and Niepce, but a possible improvement seems to have been reached in regard to the time of exposure required, which has come down to three hours for glass, and three days for paper. Progress seems also to have been made in rendering the colours more permanent, an alkaline fixing bath being spoken of, which is said at the same time to render the colours more intense.

It will be remembered that the lay press spoke about exposure for weeks in the camera, and other eccentricities of the kind. This was probably owing to a confusion between Herr Verescz's experiments and those of earlier investigators, for Herr Verescz's experiments were not carried out in the camera at all, but consisted of prints from a coloured transparent drawing. The colours obtained were a bright ruby-red and bright orange, and a passable violet and blue; green was not obtained, according to the accounts.

The process employed differs, according to Dr. Eder, from the earlier experiments in consisting of the employment of gelatine or collodion *emulsion* of sub-chloride of silver instead of the silver plates formerly used, and Dr. Eder attributes what he considers Herr Verescz's noteworthy results to the employment of this preparation. It is especially owing to the use of this emulsion that Dr. Eder considers the increased rapidity to be due. But collodion emulsion was employed in this country and for this purpose many years ago.

As regards the permanence of the colours, Dr. Eder states that the photographs were left about in a brilliantly lighted room for several hours, and even inspected by daylight by a number of persons, without being injured in the least. But it is on record that one of Becquerel's heliochromes was in this country exposed to light for several days without sustaining injury.

The Emperor Francis Joseph has bestowed the cross of the Franz-Josef order of knighthood on Herr Friedrich Ritter von Voigtländer, head of the firm Voigtlander & Son in Brunswick.

The death is announced of Herr Ferdinand Beyersdorff, a well-known contributor of the *Photographische Correspondenz*. The deceased was in

many respects a remarkable man, beginning life as a sailor, and ending as one of the principal photographers of Vienna.

THE "Photochemische Gesellschaft of Berlin" is offering a prize of 200 marks for the best instantaneous photograph; both amateurs and professionals are invited to compete. The subjects are persons or animals in motion, street scenes, military and naval manœuvres, races, sporting meetings, &c. The size is to be 6×8 or 9×12, with preference given to the latter. Competitors must send in their works by August 31.

LIESEGANG'S *Archiv* has for some time past been collecting the opinions of practical photographers on the question of what developers prove themselves the best. Of the opinions given 50 per cent. favour iron oxalate, 25 per cent. eikonogen, 15 per cent. hydroquinone, and 10 per cent. pyro.

THE supporters of oxalate praise especially its simplicity and reliability, as also its regular action and capability of being controlled. Eikonogen is recommended for the delicate, clear, and powerful negatives it produces, and hydroquinone principally on account of its capacity for keeping.

ACCORDING to A. Einsle ferric chloride supplies an excellent method of saving over-exposed plates. A plate that has been exposed five times too long, if immersed for two minutes in a ten per cent. bath of ferric chloride, washed, and then developed, will give a good negative.

DR. SCHNAUSS gives a suggestion for focussing for flash-light photography. He recommends that the subject should hold a small light—*e.g.*, a candle—close to the face, which can be focussed on the back plate of the camera with great accuracy. The light can be blown out and removed before exposure takes place.

INTERNATIONAL PHOTOGRAPHIC EXHIBITION AT NEWCASTLE.

THIS exhibition, which is fast approaching order and completion, will be formally opened by the Mayor and Sheriff at the Central Exchange Art Gallery on Friday (this) evening. A detailed notice will appear next week. In the meantime we may say that this promises to be by far the largest and best exhibition held in the North of England, there being about 1200 pictures and over 100 exhibitors hailing from all parts of this country, to say nothing of America and other countries.

At the conclusion of the opening ceremony Mr. Paul Lange is to deliver his lecture on a "Tour in Norway," illustrated by lantern slides. On the following Monday Mr. W. Lang, jun., lectures on "Fifty years of Photography," and on Wednesday, the 23rd inst., Mr. W. D. Welford on "My Experiences with a Detective Camera." Other lectures are to be arranged. Mr. J. P. Gibson, of Hexham, has promised a lecture with lantern illustrations, entitled "Northumberland, its Antiquities and its River Scenery" on the 2nd of May. Special instrumental and vocal concerts are arranged for each Saturday, and several evenings with the lantern will fill up the programme.

Our Editorial Table.

ART PHOTOGRAPHY. By H. P. ROBINSON.
EXPERIMENTAL PHOTOGRAPHY. By C. J. LEAPER, F.C.S.
CAMERAS, LENSES, SHUTTERS, &c.

THESE form Nos. 2, 3, and 4 of the *Amateur Photographer's Library*, published by Hazell, Watson, & Viney. In the first of these Mr. Robinson discourses about art and composition in his usually easy and pleasant manner, and gives an illustration of how a combination print is made. In Mr. Leaper's essay he goes through the range of photography as popularly practised at the present day, although the utility of the little volume is somewhat marred by the absence of chapter divisions of the subjects treated. The last-mentioned of the series comprises competitive papers on the topics mentioned. In Mr. Corbet's paper on *Cameras* the author largely confines himself to the expression of his opinion regarding two or three makes of cameras and stands, paying them a "flying visit," as he expresses it, but concluding with the sensible advice to see that all interior parts of camera, lens, and dark slides are dead black.

BREEZY MARSHLAND. By P. H. EMERSON.

A TRULY magnificent photographic etching (etched by Walter L. Colls), the dimensions being 22×15 inches. The subject is a well-laden cart coming down a country road, which expands in the foreground to the width of the picture; a man is engaged in opening a gate. In this picture the special ideas of Dr. Emerson as regards focus are given effect to. Every part, from the foreground to the trees in the far distance, is sharp enough without any of that fuzziness that too often characterise photographs, especially those of large dimensions, in which an abnormal degree of sharpness is given to one part sadly to the detriment of others. At first we considered that the picture would have been improved had the road been curtailed by taking about two inches from off the foreground, but on second thoughts find that it is better as it is, conveying as it does the idea of a gentle downward slope. Taken all in all, *Breezy Marshland* is a fine picture.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 5046.—"An Improved Photographic Camera." Complete specification. W. B. LUCE.—*Dated April* 1, 1890.

No. 5075.—"Improvements in Change Boxes for Photographic Cameras." G. CLULOW and A. H. SALE.—*Dated April* 1, 1890.

No. 5158.—"Improvements in Apparatus for Holding Photographic Plates." C. H. STANBURY.—*Dated April* 2, 1890.

No. 5193.—"Improvements in Photographic Cameras." G. DICKINSON.—*Dated April* 3, 1890.

No. 5215.—"Improvements in or connected with Instantaneous Shutters for Photographic Purposes." F. BEAUCHAMP.—*Dated April* 3, 1890.

No. 5227.—"Improvements in or relating to Photographic Cameras." Complete specification. C. WHITNEY.—*Dated April* 3, 1890.

No. 5376.—"Improved Processes for the Nitration and the Denitration of Cellulose, and for Regaining the Acids Employed, and Apparatus Employed in connexion therewith." H. DE CHARDONNET.—*Dated April* 8, 1890.

No. 5406.—"Improvements in Photographic Sketch Making and Transferring for Engraving Purposes in Textile Printing." W. J. CHARLTON.—*Dated April* 9, 1890.

No. 5436.—"An Improvement in the Exhibition of Photographs." J. DEWÉ.—*Dated April* 10, 1890.

No. 5439.—"Improvements in Photographic Vignetting Appliances." D. WHYTE.—*Dated April* 10, 1890.

No. 5458.—"Improvements in Hand or Detective Photographic Cameras." H. R. HUME and E. W. PARFITT.—*Dated April* 10, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 7007.—"Cameras." STUDDERS and KOHL.—Price 6*d*.
No. 7939.—"Cameras." DANIELS.—Price 8*d*.
No. 8054.—"Cameras." SKINNER and LYTH.—Price 6*d*.

PATENTS COMPLETED.

IMPROVEMENTS RELATING TO SCREENS USED IN PRODUCING IN CAMERAS PHOTOGRAPHIC NEGATIVES SUITABLE FOR MECHANICAL PRINTING PROCESSES.

No. 7007. CHARLES STUDDERS and GEORGE KOHL, Leipzig Reudnitz, Germany.—*March* 15, 1890.

THIS invention relates to the production in a camera of photographic negatives suitable for mechanical printing processes, and especially to the process in which said negatives are produced by arranging before the sensitive plate a transparent screen having a number of opaque parallel lines or cross hatchings. Heretofore it has been usual to place the screen and plate in the dark back and expose the same in the camera for a certain period, and then to remove the dark back and replace the screen by another screen, the lines of which stand generally at an angle of ninety degrees to those of the first screen, and again expose the plate in the camera for the remainder of the necessary period of exposure. This twofold insertion of screens occupies more time and trouble, and the sensitive plate is liable to be shifted in the process, so that the negative is doubled and therefore useless.

The object of this invention is to enable one screen to be used and to be moved into the second position without removal from the camera.

To this end I support the said screen in a circular frame, providing the latter with a fixed bead and with a moveable bead adjusted by set screws for holding the screen. This circular frame is supported in a circular hole in a suitable carrier adopted to be placed in the camera so that the frame may be moved for an angle of ninety degrees (or for a greater or less angle if desired) in its plane. Suitable stops are provided for accurately limiting this movement, which may be effected by hand by means of a cord connected to the frame and led out through a suitable hole in the camera. The screen being set in one position and the sensitive plate inserted, the lens is uncovered, a half-time exposure given, and the lens is again covered. The screen is then revolved by the cord into the second position and the remainder of the exposure given.

IMPROVEMENTS IN COMBINED INSTANTANEOUS AND TIME SHUTTERS FOR PHOTOGRAPHIC CAMERAS.

No. 7939. JOHN THOMAS DANIELS, 14, Smith-street, Northampton-square, E.C.—*March* 15, 1890.

THIS invention relates to improvements in shutters for photographic cameras, the object being to combine simple instantaneous shutting mechanism with equally simple devices whereby the shutter can be kept open and the lens exposed for any desired length of time.

The shutter which I propose to use consists of a rectangular piece of sheet metal mounted in vertical guides fixed in front of the lens or object glass. On

the outer face of the shutter is a stud or button, and on each of the vertical guides is a similar stud or button, these latter being placed horizontally opposite each other and vertically above the stud in the shutter, so that the three studs represent the three corners of a triangle, of which the apex, represented by the stud in the shutter, is the lowest. For a reason which will be afterwards explained, the upper studs project further from the guide pieces than the lower one in the shutter. Around the three studs is stretched an indiarubber ring, which, when free to act, raises the shutter and exposes the object glass. The shutter is however controlled by a notched lever pivoted below the lens tube, the notch spanning a pin on the bottom of the shutter, in which position it is retained by a flat spring. The releasing motion can be effected by pneumatic pressure or other device, and the contraction of the indiarubber ring jerks the shutter quickly upwards and retains no further hold on the stud in the shutter, as the latter falls in consequence of the lower stud lying in a deflected plane from the two upper ones, and the tendency of the ring to long ceases when free to do so. Thus released, the shutter would fall under the influence of gravitation, but its downward motion is accelerated by a second indiarubber spring which is stretched across the upward path, and with which the stud in the shutter comes in contact, whereby its upward course is checked and a rebounding motion imparted to it. For "time" exposures a vertical lever is pivoted to the shutter slides or other convenient part, the upper end of which is turned towards towards the shutter. To the lower end of this lever is hinged an arm, which can be connected to the catch lever which retains the shutter in its raised position. As soon as the latter is disengaged by the pneumatic or other appliance, the shutter flies upwards, but before it can descend the turned in end of the side lever has advanced sufficiently to intercept its downward motion, and the operator can thus obtain any desired period of exposure.

It must be understood that the details above mentioned may be modified without departing from the main features of the invention.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS.

No. 2051. JOHN HENRY SAUNDS and EDWIN JACKSON LYTH, East Dereham, Norfolk.—*March 15, 1880.*

THE object of this invention is to provide photographic cameras with means whereby they can be quickly extended or closed as desired.

The extension apparatus of photographic cameras at present in use consists of a pinion gearing into a rack, the said pinion being actuated by a milled-headed screw.

According to this invention we dispense with the pinion, and provide a cog wheel of suitable size gearing into the rack on the frame. This cog wheel is provided with a handle or turn for actuating the same.

[But (and we ask the question merely as a matter of mechanics and not as cavilling at the patent claim) where is the line to be drawn in the matter of the number of teeth in the pinion or motor? When a driving motor has ten, twelve, or eighteen leaves, it is usually called a pinion. The question is, at what number of teeth will the legal authorities draw the line as separating a pinion from a wheel motor? Mr. Mothersill, of 6, Southampton-row, has, as agent for Messrs. Skinner & Co., kindly



favoured us with a back illustrating this special mechanical feature. For a means of rapid adjustment, it is undoubtedly highly advantageous. —Ed.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 22	Great Britain (Technical)	5a, Pall Mall East.
,, 22	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 23	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 24	Bucknell-on-Trent	The Institute, Union-street.
,, 24	Halifax Photographic Club	Mechanics' Hall.
,, 24	Liverpool Amateur	St. George's-crescent North.
,, 25	Oldham	The Lyceum, Union-st., Oldham.
,, 24	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

APRIL 13.—The President (Mr. J. Glaisher, F.R.S., &c.) in the chair.

MR. C. H. BOTHAMLEY, F.I.C., F.C.S., read a paper on *A Standard Method of Development*, in the course of which he said that no one would venture to propose a uniform system of development for all subjects; in ordinary practice the nature of the subject and the intention of the photographer must both be taken into account. To develop all subjects in the same way would be to reduce photography from the level of a fine art to that of a merely mechanical one; at the same time there was an advantage in being able to adopt some definite standard by means of which results could be compared. In the selection of a standard developer attention might be directed to two things—In the first place there was the sensitiveness of the plate, which might be measured by the time required to produce a certain image with a given illumination, and, in the second place, there was the amount of gradation obtainable. In the author's opinion it was not practicable to form any standard for a developer when gradation was the chief thing to be observed, as, independent of difference of subject and of plates, there would have to be one standard developer for a photographer who liked softness, and another standard for the man who wanted what was called "pluck." Gradation depended upon a great many factors—the quality of the gelatine, the time of exposure, and the method of development, all had to do with it. The problem, then, became narrowed to the question as to a standard method of development which would yield the maximum amount of detail without fogging the plate, to get, that is, a printable image wherever light had acted, whilst enjoying to the utmost the selective action of the developer in reducing the silver only where light had acted. It must be remembered that photographers had to rely upon dealers for the purity of the chemicals they employ. A standard developer must fulfil several conditions. It must be simple; it should resemble as much as possible what is done in ordinary practice; it must require only such chemicals as can be procured in a fairly pure state. Ferrous oxalate developer fails to fulfil several of these conditions. Potassium oxalate could be obtained tolerably pure, so could ferrous oxalate, but ferrous sulphate, even when originally pure, was liable to oxidise rapidly, and the ferrous oxalate solutions oxidise very rapidly, forming ferric oxalate, which is not only a powerful retarder but is actually a reducing agent. Lastly, it is now rarely used for ordinary negative work, although it is largely employed for developing positives. Ekonogen at present could not, he thought, be relied upon for purity. We are therefore reduced to pyrogallol and quinol, and of these the first is preferable. Pyro is the developer most largely used; the great solubility of the substance made it very convenient for the preparation of solutions, and in the dry state it keeps good for a long time. With pyro, caustic soda and potash are not available, and if these alkalies are used they must be in the condition of carbonates. With caustic ammonia a restrainer is generally employed, which may be an alkaline bromide or an alkaline salt containing an organic acid. If a bromide is used it may be of potassium or ammonium, but the latter is to be preferred. Bromide of potassium usually contains a small quantity of bromate, and not unfrequently some caustic potash. Alkaline salts are unstable, and there is a difficulty in obtaining them in a pure condition. Of the carbonates, ammonium carbonate is not to be recommended on account of its great instability. Potassium carbonate is not readily obtainable pure, and its hygroscopic character is also against it. We are therefore reduced to liquid ammonia and sodium carbonate for our alkalies. Carbonate of soda is easily obtainable of sufficient purity, but it exists in various states as regards water contained in it. There is the decahydrated variety, of which the ordinary crystals consist; the monohydrated, obtained when the former salt is exposed to the air; and the anhydrous, which is obtained by heating the ordinary salt. In using these forms it is useful to know that one part of the anhydrous salt is equal to 1·68 of the monohydrated, or to 2·899 of the decahydrated kind. As a matter of practice it is very difficult to obtain these salts perfectly pure. The difficulty is less with the anhydrous variety, which therefore it is best to use when compounding a standard developer. The anhydrous salt when obtained should be kept in a bottle closed with an indiarubber stopper; a glass stopper is very unsuitable for keeping out air and for keeping vapour in. The strength of liquor ammonia varies continually when a bottle containing it is frequently opened, and in making up a standard developer the strength of the ammonia should be ascertained by titration—specific gravity was not to be relied on. Titration with a standard acid does not involve much apparatus or greater skill than is likely to be possessed by any one desirous of conducting such work. Oxalic acid is the most convenient to use, and the best indicator to use with it is aurine, which may be dissolved for the purpose in dilute alcohol, one in five hundred. 37·06 grammes of oxalic acid are dissolved in one litre of distilled water, and one cubic centimetre of this solution will neutralise one centigramme of real ammonia, NH_3. For standard development the pyro should be dissolved in distilled water immediately before use; no acid should be added. Sulphites are not admissible in standard developers. It is practically impossible to obtain them in a state of purity, and moreover they are liable to change. An approximation to purity can only be obtained with meta-sulphites or anhydrous sulphites. Further, we are without information as to the effect of sulphites on development. The standard developer, then, will consist either of pyro with ammonia and bromide of ammonium, or of pyro and sodium carbonate. Messrs. Lyonel Clark and Ferrero have rendered great service by reducing various developing formulæ to a table in which they may be compared. The preparation that was used as a standard is composed of pyro, two grains; ammonium bromide, one grain; and strong liquid ammonia, three grains to the ounce of solution. As this is equal to about one grain of real ammonia, NH_3, the former may be put into parts as follows:—

Pyro	5	parts.
Ammonium bromide	2·5	,,
Real ammonia, NH_3	2·5	,,
Water	1000	,,

For some time this standard had been employed, but he had thought it desirable to see if any improvement could be made for average purposes, and so had made various experiments with a sensitometer, exposing the plate at a certain distance from an aperture one centimetre square placed in front of the brightest part of the flame of a Sugg's Argand burner. He had found that all the detail obtainable came up in five minutes, and that development might be continued for an hour without much fogging. When, however, carbonate of soda was used, it required ten minutes to get up the same amount of detail, whilst if the development was continued for an hour the image was seriously damaged by

chemical fog. He had also tried doubling the amount of bromide in the pyro-ammonia developer, and had found that very little longer time was required to develop, whilst the shadows were preserved with greater clearness during a prolonged development. In all cases where development is continued for more than ten minutes the air should be excluded by the use of a vertical bath with an indiarubber cover. The experiments had been conducted at a temperature of 60° Fahrenheit.

Captain W. DE W. ABNEY said that the sensitometer method of testing by noticing the last readable number was not reliable. He recommended the observation of the density of deposit.

Mr. W. E. DEBENHAM thought that more reference should be made to the variation of result, and of the proportions of the constituents of the developer, according to the temperature. It was common even for experienced photographers to find, on a sudden access of cold weather, that development was so slow that the plate was at first thought to be under-exposed.

Mr. JOHN SPILLER welcomed the scientific bases laid down for experiment. He could quite corroborate what Mr. Debenham had said about the effect of temperature. A few weeks since he had been surprised to find the immense difference in the action of the developer due to differences of temperature.

Mr. T. SEBASTIAN DAVIS was glad to find formula put in parts of 1000, which he considered better than percentage or than reference to particular weights.

The CHAIRMAN, in thanking the reader of the paper, referred to his own experience as regarded the great difference caused by difference of temperature.

Mr. E. G. Amphlete and Mr. Walter Symon were elected members of the Society.

Mr. Friese Greene showed a camera for photographing phases of motion. A long roll of sensitive film on celluloid was unwound and rewound by the turning of a handle, and kept stationary for a minute interval of time, during which the exposure was made. It was stated that it could be worked to take ten successive photographs in a second of time. Developed strips of the celluloid negatives many yards in length were exhibited, as well as prints therefrom.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 10,—Mr. A. L. Henderson in the chair.

The CHAIRMAN said that whilst in America he had read an article on the ground glass effect sometimes found on the cover glasses of lantern slides. Having whilst over there met with a similar specimen, he had brought it over to show at this Association. The glass being removed, it was found to be covered with a crystalline deposit which was removed by wiping, leaving the glass clear.

Mr. A. HADDON said that in this case the deposit was very like that which occurs on glass tubing, and was probably sulphite of ammonia.

It having been arranged that on this the last lantern night of the season a feature should be made of any specialities in carriers for lantern slides, Mr. Cembrano brought down one that had been shown previously, constructed on a model of Mr. Cowan's. In this the slide appears to be curtained for a second, and whilst curtained another is substituted and immediately uncovered. The mechanism was greatly admired, but the weight was considered rather a drawback. It was mentioned, however, that the price of aluminium had recently been so much reduced that there would be but little difference in cost of material if made of that metal instead of brass, and that, as the fitting was by means of screws and not by soldering, there would be no difficulty in manufacture. A carrier by Mr. Davenport was also shown, and one produced by Mr. Austin C. Edwards, which latter was used for a portion of the exhibits of the evening, and was much admired for the simplicity, ease, and rapidity of its working. In this carrier the design is quite different from that of carriers previously exhibited. Between the objective and the condenser is a wooden frame, open back and front, and to the top and bottom of this frame is pivoted a holder in the form of a segment of a circle. At the back, close to the condenser, this segment is furnished with two recesses or grooves, into each of which a slide is dropped vertically. By turning the segment on the pivots one or other of the slides is brought into position, and the one not on view is charged with a fresh slide ready for use. Mr. Edwards also showed some *carte-de-visite* size photographs of the boat race taken on isochromatic plates.

The CHAIRMAN inquired what was the sensitometer number of these plates.

Mr. EDWARDS said that the sensitometer was absolutely no guide to the sensitiveness of these plates.

Mr. J. B. B. WELLINGTON had found isochromatic plates exceedingly fast in practice.

Mr. A. C. Pemberton inquired how he should varnish celluloid films.

The CHAIRMAN said that a mixture of beeswax and turpentine should be rubbed on to the film. He placed some films that had been thus protected in water for days and they were not injured.

Mr. F. A. BRIDGE recommended gold size thinned with turpentine.

Slides were shown in the Association's lantern by Messrs. Atkinson, Cembrano, Drage, Edwards, Everitt, Freshwater, and Teape.

WEST LONDON PHOTOGRAPHIC SOCIETY.

APRIL 11,—The President (Mr. Charles Bilton) in the chair.

There was a goodly attendance of members, some of whom had brought with them various objects of interest.

Mr. Selby showed Rouch's detective, which led to a discussion upon hand cameras in general. One member who worked with a Rouch had found the lever would not always raise the plate; this, however, he had managed to set right. Other speakers testified to the capabilities of the camera.

Mr. C. WINTER kindly offered to allow members to test his Giah camera. He considered that all instruments should be practically tested before being issued to the public.

A discussion also arose as to the comparative effect of printing in platinum in the sun and in the shade, in which several members took part.

Mr. C. WHITING showed a home-made view finder, and advocated the more general use of that instrument. Whenever he went for a walk he put it in his pocket, so that if he came across a pretty bit he looked through the finder and ascertained how it would look as a picture, and if he thought it worth taking he visited the spot subsequently with a camera.

Dr. F. H. Low passed round blue prints, some of which had been toned by a process described in a recent ALMANAC; and the Secretary showed aristotype prints from negatives taken by flash light of wine vaults in the Minories.

Mr. W. Rickford exhibited negatives, some of which had intensified, and showed a number of prints from the same by a variety of processes, showing the comparative results which might be obtained.

The PRESIDENT then announced that the Secretary would read a paper upon *Lenses* on April 25, and that the annual smoking concert would be held at the Richmond Hotel on May 9. He trusted that the members would do all they could to render it a success, and render all the assistance in their power to the Executive—Dr. F. H. Low, Mr. Selby, and the Secretary.

CAMERA CLUB.

APRIL 10.—There was an exhibition of lantern slides, eight or nine members contributing towards the show. Mr. Gambier Bolton exhibited a new set of animal slides; Mr. Elder, some Dutch scenery; Mr. Ferrero, landscape work; and Messrs. Grimshaw, Howson, Robertson, and Noel-Cox, pictures of various kinds. An interesting set of Arctic subjects lent by Messrs. Fry were also shown and described, and a variety of slides by the Woodbury process.

During the evening proofs of his recent pictures, *The Haysel* and *Breezy Marshland*, presented by Dr. Emerson to the Club, were exhibited.

On Thursday, April 24, there will be a discussion upon Mr. Dallmeyer's paper read at the Conference, the subject being *The Treatment of Subjects by Focus*.

HOLBORN CAMERA CLUB.

APRIL 11.—Annual general meeting.—Mr. T. O. Dear in the chair.

The Treasurer's report showed the Club to be in possession of a nett balance of 11*l.* 19*s.* 7*d.*, which, considering the Club had been run for the last fifteen months with twelve months' subscriptions, was considered eminently satisfactory.

The Secretary's report showed that the Club had nearly doubled itself in the last year, as it now consists of eighty members. Twenty members attended the Southern Counties' Cyclists' Camp at Godalming last August. There were thirty at the Club supper, and one hundred members and friends at the Club exhibition and dance. The Club is also proud in the possession of ten lady members.

The following officers were then elected:—*President:* Mr. T. C. Hepworth.—*Vice-Presidents:* Messrs. S. Chang, T. O. Dear, and F. W. Edwards.—*Committee:* Messrs. R. Luxton, A. Plumbridge, H. Thompson, F. J. Cobb, F. Brocas, E. Benest, and H. Beckford.—*Librarian:* Mr. H. C. Gay.—*Treasurer:* Mr. Bell.—*Hon. Secretary:* Mr. J. E. Smith, 100, High Holborn.—*Assistant Hon. Secretary:* Mr. E. H. Bayston.

A most hearty vote of thanks was given to Mr. Brocas, the retiring Hon. Secretary, to whose hard work and untiring energy the Club mainly owes its present prosperous position.

On Saturday eighteen members, including three ladies, assembled at Highgate for the first Club outing this season. About ninety-five plates were exposed, and an enjoyable afternoon spent.

Friday, April 18, lessons to beginners.

HACKNEY PHOTOGRAPHIC SOCIETY.

APRIL 10,—Mr. Dean in the chair.

After the minutes had been confirmed the SECRETARY reminded members of the annual *soirée* to be held on the 24th inst., and announced that the Society's orchestra would play then.

Mr. CARPENTER then read a paper on *Lantern Slide Making*, which was a speciality of his. His flower studies had recently obtained prizes at the Crystal Palace, and prior to commencing his paper, by request, he showed the slides in question. He stated he used isochromatic plates to make the negative, using brown paper as a background. After exposing plates, which, as a rule, he did to gaslight for about thirty seconds, he developed them (by yellow light) with the following formula:—

Eikonogen	¼ ounce.
Sulphite of soda	½ ,,
Bromide of potassium	8 grains.
Carbonate of potash	½ ounce.

For use, take one part as above with two to four of water.

In answer to a question about safety of light, he said he used a cover over the edges, so that if there was any fog it would show when developing. He always used two fixing baths.

Messrs. Cocks and Benree were elected, and Mr. E. H. Jones nominated.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

APRIL 8.—General meeting.—Mr. J. D. Cox in the chair.

Excursions were arranged to take place on May 21, The Trossachs; June 28, Lochearnhead; and the date of a third was left open.

The PRESIDENT (Dr. J. K. Tulloch) read a paper entitled *Selecting a Lens* [see page 245].

Specimens of "Kallitype," a new printing process, were on exhibition, and a demonstration of the process was promised to be given at the May meeting.

PHOTOGRAPHIC SOCIETY OF VIENNA.

MARCH 4,—Herr O. Volkmer in the chair.

After the introduction of new members had taken place, and various exhibits had been described by Herr Kramer and others, Professor EDER delivered an address illustrated by experiments. He first of all discussed the question of photo-metric units, of so much importance in settling the relative sensibility of plates, in which connexion he exhibited the Siemens platinum lamp, which is used in the Vienna Photographic Society, and consists of a thin sheet of platinum rendered luminous by the electric current, and also the amyl-acetate

lamp of Hefener, which was so frequently alluded to at the International Congress in Paris. He then passed to the discussion of irradiation phenomena: a number of photographs in illustration of the various aspects of the question, by himself and Herr von Gothard, were laid before the meeting. Other objects of interest exhibited by the learned Professor were a number of platinum prints, entirely the work of pupils of the Vienna Photographic Institute, and Krugener's and Busch's finders for landscape and detective use, which he highly commended.

After some discussion relative to photography in natural colours and microscopic work, Herr LUCKHARDT entertained the Society with an account of some experiments carried out by Herr Lehner, scene painter of the Burg Theatre, which consisted of tracing figures life-size in profile on copying paper by means of magnesium flash light, which Herr Luckhardt regarded as likely to be of much assistance to painters and sculptors.

The meeting was brought to a conclusion by a paper from Herr PUTZ, accompanied by demonstrations in platinotype, with both hot and cold development.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

LENS STANDARD COMMITTEE.

To the EDITOR.

SIR,—Opticians and all interested are invited to a meeting to be held at the Mona Hotel, Henrietta-street, Covent Garden, on April 25, 1890, at seven p.m., to discuss the desirability of adopting and further defining "The Lens Standards" of the Photographic Society of Great Britain. By order of the Committee.—I am, yours, &c., A. HADDON.

April 14, 1890.

FADING.

To the EDITOR.

SIR,—I beg to thank you for so ably taking up the subject of the increased fading of photographs. The inference I draw is this: The matter being of such vital importance to the profession generally, that a council of the leading photographers should be formed to thoroughly investigate and confer as to the best course to take under such trying circumstances. It strikes me this would be a wise move. But as you say, with all the advice in the world, as long as "downright carelessness" is the order of the day, it will be of little avail. From long experience I can fully endorse these three graphic words, "downright carelessness." The only wonder is that prints last so long as they do in too many instances.

Some years since I had a printer who produced splendid prints to all appearance, but at the end of twelve months I had them back by the hundred—I may say thousands—covered with minute white spots. Of course I had to make them all good. My remedy was to go and stand over the fixer and see that they were kept in the hypo at least double the time. I had no more *spots* after this. Unfortunately, those who have the working of one of the *most important* duties do not do it as a labour of love, but as a piece of miserable drudgery—showing how important it is to have the eye of the principal upon them.

No doubt there are two *prominent* causes for fading: the thin, quick printing negatives now in vogue, and the inferior chemicals now used. To obtain a solid print you must have a strong resisting negative to allow time for the silver to *penetrate* the paper. Then our old enemy, hypo, is to be had, as you say, for about eight shillings per cask; query, about half the strength. All this should be taken in hand and be well investigated.

For myself, I have retired from the art some years. I have a son who is just commencing; it is on his account I feel anxious, for I do consider it painful in the extreme—the present state of photography. I firmly believe no man, however conscientious he may be, can promise durable prints with the *adulterated materials* he has to work with.

I will not venture on your kindness further, merely remarking, if you press this to the "better end" good must come of it.

Cheltenham, April 15, 1890. A PHOTOGRAPHIC ARTIST.

THE ART OF DRAWING AND PHOTOGRAPHY.

To the EDITOR.

SIR,—I thank you very much for printing in full Mr. A. M. Rossi's communication to the Camera Club, and I should not trouble you further about the matter as Mr. Davison's reply exactly comes to the point; but a few sentences besides, I think, want an explanation.

Mr. Rossi says that "an Overbeck, a Kaulbach, a Cornelius, a Tancrede, threw the brush away." I know Cornelius was a great antagonist of the modern realistic tendencies in art, but I never heard that he ceased to use the brush. I was living in Munich from the year 1849 to 1857, and I have been well acquainted with Kaulbach's studio as a pupil, but I never was aware that he "threw the brush away," and I am unable to find a reason why they both should have done so.

Mr. Rossi tells a story about Titian and M. Angelo. Granted the story to be true, does Mr. Rossi imagine that Angelo's remarks could have been relative to an imperfection of the outlines which perhaps a photographer or any good trained scholar could give, and of which knowledge every work by Titian tells enough to the world to-day? After having said "drawing, by which is meant *not only an outline*, but the inside accentuation," Mr. Rossi's answer to Mr. Davison's critic contains the following: "Let us suppose that I could not draw that hand from want of the necessary education, but I might be able to paint it." Is it possible that anyone can fancy some one could *paint* anything, but was unable to *draw* it? Just the same thing would it be if a person tried to speak a language, nevertheless unable to pronounce the alphabet.—I am, yours, &c., F. B.

A FIXED EYE.

To the EDITOR.

SIR,—It seems to me that Mr. Dallmeyer, as reported in your last issue, fails to state the case accurately when he says, "The eye in a fixed position sees nature under conditions of contrasted definition, and hence rigidly uniform definition throughout all planes must fail to be artistic." Who, I would ask, regards a view or a picture with a "fixed eye?" The general impression gained by the observer is the result of the rapid and unconscious movement of the eye over the whole extent of the view or of the picture, and it is certain that to whatever part in a view the eye is directed it will find the details in all parts equally well defined.—I am, yours, &c., C.

PICTURES AT THE CRYSTAL PALACE EXHIBITION.

To the EDITOR.

SIR,—I am requested by the Manager, on behalf of the Company, the Committee of Judges, and the Executive, to deny unequivocally the allegations contained in a letter signed by Mr. Edgar G. Lee and others, and published *in part* in your last issue, respecting the award of the National Photographic Club Challenge Cup; and to add that the Company is in a position to prove that such allegations have absolutely no foundation in fact.—I am, yours, &c., S. G. BUCHANAN WOLLASTON.

Crystal Palace Company, Crystal Palace, S.E., April 14, 1890.

THE OXY-BENZINE LIGHT.

To the EDITOR.

SIR,—I see that some of your space is now given up to the discussion of another original observation of Mr. Albert Scott, *i.e.*, that the oxy-benzine flame is hotter than the oxy-hydrogen. It is some years since I first called attention to the fact that the oxy-ether flame is smaller and hotter than the oxy-hydrogen. The Committee on Science and the Arts of the Franklin Institute have also stated, in a report dated October 28, 1889, and published in the *Journal* of the Institute, March 1, 1890, that the surface of incandescence is smaller with the ether limelight than with the oxy-hydrogen of equal illuminating power.—I am, yours, &c.,

Philadelphia, April 7, 1890. FRED. E. IVES.

THE RIGHT OF TAKING PHOTOGRAPHS AT THE CRYSTAL PALACE.

To the EDITOR.

SIR,—My attention has been drawn to a paragraph in your JOURNAL of the 4th inst. relating to the right of taking photographs in the building and gardens of the Crystal Palace; and for the information of any one interested I am requested to state that the exclusive right of taking photographs in the Palace and grounds is let to Messrs. Negretti & Zambra, whose rights are protected by the Company's bye-laws and regulations.—I am, yours, &c., W. GARDINER, *Secretary.*

Crystal Palace Company, Crystal Palace, S.E., April 10, 1890.

Exchange Column.

Will exchange whole-plate portrait lens by Lerebour for posing chair, balustrade, or good accessories.—Address, G. A., 94, Leaf-street, Hulme, Manchester.

7½ × 5 bellows-body camera, folding tailboard, three double dark slides (new); will exchange for detective camera (Facile preferred).—Address, MONTAGUE BEER, Photographer, Exmouth.

Wanted, modern half-plate camera, lens, three double dark slides, and accessories (Rouss' preferred); exchange, pigeons to value.—Address, CHARLES ROBINSON, King's-villa, Sedbergh, Yorkshire.

Will exchange enlarging lantern, four-inch condenser, bellows-body front, with front lens and paraffin lamp, complete, for three 8½ × 6½ double dark slides (good make), or quarter-plate camera complete.—Address, JOHN CHALMERS, 43, Campbell-street, Hamilton.

THE THOMAS EXHIBITION.—A trade competitive exhibition is at present open in Shaftesbury Avenue, opposite the D'Oyley Carte Theatre, consisting of photographs taken on the plates of R. W. Thomas & Co., Limited. It includes both transparencies and paper prints, some of them being remarkably, others fairly, good. The firm has awarded medals for the best exhibits as follows:—Gold—Edgar Lee and R. W. Robinson; silver—F. Dareis, G. Towler, H. Dudley Arnott, W. J. Harrison, A. A. Carnell, R. H. Lord, Auty & Ruddock, and J. B. B. Wellington, who carries off four silver and two bronze medals. Bronze medals are also awarded to A. H. Pool (2), Mr. J. Harding, H. Dudley Armour, H. G. Brierley, Edgar Lee, and G. Thompson.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

Mr. L. Varney, Buckingham.—*Three photographs of interior of Stowe House.*

W. GOODWIN.—Thanks. We hope the exhibition will be a success.

J. C. H.—You must write to Mr. Robinson for permission and particulars.

R. H. THOMAS.—The correspondence evinces a considerable amount of blundering.

ALIQUIS.—That lens which is catalogued at the higher price will prove the more useful of the two for your purpose.

INTERIOR.—Any of the makers of photographic lenses will supply a lens giving straight lines and including an angle of eighty degrees, or even more if required.

T. B. ALLANSON.—Messrs. Poulton's address is Lee, S.E.; Norman's, Tonbridge Wells; Frith's, Reigate; and Valentine & Son's, Dundee. Messrs. Elliott & Son, Barnet, supply portraits of celebrities on opals to the trade.

LONDON S.W. inquires how to make Eau de Javelle.—Mix two ounces of hypochlorite of lime with thirty ounces of water, next dissolve four ounces of carbonate of potash in ten ounces of water and add to the lime mixture, then boil and filter.

S. A. M.—If you have been using the bath continuously for sensitising paper without strengthening it there is little wonder that the prints lack vigour. Test the solution and make the strength up to what it was originally; the trouble will then disappear.

L. BINDON asks: "Where can I obtain Perry's ink pencils as mentioned by Mr. R. Barrett in his article on retouching published in March 28 number?"—The pencils in question may be had direct from Perry & Co., Holborn Viaduct. They are also kept by most stationers.

J. P.—The best plan of blacking the inside of the copying camera is to mix some fine lampblack with methylated spirit and then add a little negative varnish, but only just sufficient to prevent the colour from rubbing off when dry. It may be applied with an ordinary paint brush.

R. ROWSELL.—If the toning solution became turbid directly it was mixed, it shows that there was impurity somewhere. The water might be at fault, or, what is more probable, the bottle or the measure was dirty. It is no use expecting the solution to tone now, neither can it be restored.

SIX MONTHS' AMATEUR.—Over-exposure is the chief fault in all the examples. Why use extra rapid plates? They require more experience to work than slow ones. With all the subjects sent slow plates would have answered quite as well, and would have been easier for a novice to deal with.

C. BARKER.—The specks are small air bubbles enclosed between the print and the glass. They are only to be avoided by greater care in the mounting. Bring the print and glass in contact while under the surface of the gelatine solution, remove carefully, and afterwards apply the squeegee with some little pressure.

A. W. C.—We are sorry we cannot tell you the real colour of the lady's hair. Since you have called our attention to the fact we have noticed that, in coloured portraits of the lady published by different houses and shown in the shop windows, the hair varies much in colour. However, we are unable to say which, if any, is correct.

PUZZLED.—1. The brown spots complained of are due to the hyposulphite not being removed from the film before the negatives were varnished, hence contact with the silver paper in printing has produced the evil of which you complain. When hypo is left in the film, varnish will not prevent staining if the paper be at all moist.—2. In the case referred to the fading cannot be traced to the blotting paper used for drying the print.

W. A. W. writes: "On Bank Holiday I took six negatives, but the whole of them are useless on account of the peculiar wavy marks, as shown in the accompanying prints. The other six plates out of the same packet, used a week before, developed all right. Is it possible that the plates could have deteriorated to this extent in so short a time?"—The plates appear to be quite right. The markings are caused by the dish not being rocked while the image was being developed.

URANIUM asks: "1. What part does eosine play in a developer? Under the name 'Tondeur' a developer is sold by a good house composed of hydroquinone and eosine.—2. Is there any plain paper in the market suitable for Mr. Lyonel Clark's platinum toning process?"—In reply: 1. We are not able at present to say what, if any, part eosine plays in the developer. We have used the "Tondeur" developer and like it much.—2. Watson & Sons supply such paper. Other firms may perhaps do so, too.

A. H. HATCH says: "I shall be much obliged if you will kindly tell me, in your 'Answers to Correspondents,' (1) how to make enamel collodion—2. Is it cheaper than to buy it ready made?"—1. Ether, one pint; alcohol, one pint; pyroxyline, half an ounce; castor oil, one drachm. Methylated solvents will do, but the alcohol should not be of less strength than ·820.—2. All depends upon circumstances. If the consumption is small it will generally be found more economical to purchase ready made.

G. WILSON & CO.—The citrate restrainer was, as you surmise, introduced by Mr. G. W. Webster. It was first published by him in 1882. You will find articles on the subject on pages 344 and 457 of our volume for that year. Also an article by Mr. Webster on page 137 of the ALMANAC for 1883. It is made by simply dissolving one ounce of citrate of soda in four ounces of water. It merely takes the place of bromide as a restrainer, and is especially useful in cases of over-exposure. Then it is far more efficacious as a restraining agent.

E. MICHELL.—1. For a dark-room lantern burning gas two thicknesses of canary medium will answer quite well. If, however, orthochromatic plates be used, the medium should be supplemented with a thickness of ruby.—2. The firm in question are not makers of lenses, though you may rely upon what they supply.—3. Some of the older photographic warehouses may have some Daguerreotype plates still by them, though we rather doubt it. Try Horne & Thornthwaite, Strand; or Solomon, Red Lion-square. The plates are not made now, there being no use for them.

J. M. says: "I wish to make a plain background for portrait taking which would roll up into a small compass, and should be greatly obliged if you would inform me, through the JOURNAL, the best material to use, and also the most suitable colour and mode of colouring."—Take unbleached sheeting and strain it on a wooden frame, securing it firmly with tin tacks. Give it a good coating of common size. When dry apply two coats of ordinary paint of a dark grey colour. Next apply a coat of flatting colour, stippling over the surface as it is laid on with a dry brush. The flatting mixture is made in the same way as the paint, but omitting the oil, and in its place using a small proportion of japanner's gold size. When dry, the background is removed from the frame and nailed on to the roller. Instead of oil paint, distemper colour may be used. This is made with water, common size, and pigment, lampblack and whiting, with a little treacle added, to prevent the coating from cracking when the background is rolled up.

G. A. writes: "I have bought a building which has been used as a refreshment room which I am going to make into a studio. It is thirty feet long, twelve feet wide, seven feet six inches high at side. It has a ridged roof /\, and is varnished inside. Please answer the enclosed queries.—1. I think of putting twelve feet of glass in centre of roof. Is that enough?—2. How far down the side is it best to carry the window?—3. Are coloured or white blinds the best?—4. Will it do varnished as it is, or will it be better to have it papered or painted?—In rely: 1. If only twelve feet of glass be used, nine feet at either end will be opaque, therefore some of the length of the room will be sacrificed, inasmuch as the sitters must be placed several feet from the end of the room to obtain sufficient light upon them; but for this fact the proposed quantity of glass would be ample.—2. To within two feet six or three feet from the floor.—3. Unless the light is admitted only from the north, coloured blinds, green or dark blue, will be preferable.—4. Varnish will do very well if it is not too glossy.

MR. MORTON DAY sends us a nicely executed cabinet group of six members of the Eastbourne Royal Golf Club, containing *inter alia* a good portrait of the Right Hon. A. J. Balfour, M.P.

S. GUITERMAN & CO., Hart-street, Wood-street, inform us that, owing to improvements in the manufacture of the transparent celluloid film, the price is reduced to the important extent of twenty-five per cent. This is good news.

THE Annual Dinner of the *employés* of Messrs. William Watson & Sons, of 313, High Holborn, took place at the Holborn Town Hall on Saturday evening, April 12. Mr. T. P. Watson occupied the chair, and Messrs. Sanders and Worster the vice-chairs. After dinner, and the loyal and patriotic toasts had been duly honoured, the Chairman proposed those of the various departments and workshops, which were responded to by the Managers. In the course of his remarks the Chairman mentioned that it was usual for that dinner to be held at the beginning of the year, but owing to the prevalence of influenza, which rendered it impossible for many to attend whom they would not like to be absent, it had been deferred till the present, and he was very glad to say that, with only about two exceptions, all the *employés* were present, and that in no case, as far as that firm was concerned, had the epidemic terminated fatally. In proposing the toast of the cabinet workshop, the Chairman spoke in warm praise of the work it turned out, which had done so much to raise the reputation of the firm to the very top of the tree among camera manufacturers, but although they had made very great progress in that shop, he felt the microscope shop this year took the palm, for the instruments it had turned out were the very finest he had ever had through his hands, and he was confident would, with difficulty, be equalled, and, at least, could not be surpassed, by any other house in the universe. Later on these remarks were fully endorsed by Mr. Traill Taylor (editor of THE BRITISH JOURNAL OF PHOTOGRAPHY), who, on responding to the toast of "The Visitors," mentioned that he had lately obtained one of the firm's microscopes, and that he found it in every respect one of the very finest he had ever seen—or seen through; and referring to the optical glass shop (which the firm are just now very much enlarging), he said that he felt confident they would very soon obtain for lenses the high reputation they had gained for cameras and microscopes. Other toasts were, "The Australian House" (which Mr. Baker, in replying, described as, at present, a tail, but such a strong tail was it growing, that some day, instead of being waggled it would "waggle the dog"), "The Ladies," most humorously responded to by Mr. Hatch, and "The Firm." During the evening a capital programme of songs, recitations, &c., betoking the presence of considerable musical and elocutionary ability, was gone through, and at eleven o'clock the whole company, about 120 in number, joined hands and sang "Auld Lang Syne," separating in time to get home before Sunday morning, after having spent a most enjoyable and pleasant evening.

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A PROCESS FOR COLOURING PHOTOGRAPHS.

Not every photographer is an artist in the sense of possessing the ability to paint or colour his productions with a degree of skill sufficient to satisfy himself or his friends, and yet there are many circumstances and conditions under which, even to a photographer, a coloured photograph—it may be a portrait, it may be a landscape—appears preferable to an uncoloured one. There may, indeed, be circumstances under which the coloured photograph is undoubtedly superior in every way to the plain one—notably in the case of reproductions of works of art: we do not refer to paintings merely, as well as of many industrial objects.

Now photograph colouring is usually looked upon as a very low form of art. The practitioner, it is supposed, is neither one thing nor another; "neither fish, nor flesh, nor good red herring." He has nothing to do with taking the photograph, and in his capacity of painter is relieved of the not unimportant portion of the work comprised in the creation of the outline and detail, his function, in fact, being reduced to the simple task of smearing on certain more or less suitable colours to produce a more or less unsatisfactory result.

But we have known more than one artist—artist, that is, in so far as having gone through a series of classes, and being able to copy a painting tolerably well or even to paint a landscape in a less conspicuously successful manner, constitutes one—who, having blithely taken up photograph colouring as child's play, and a somewhat derogatory employment much beneath their "form," to give it up after a time in disgust, "because the results are so inartistic," but really because it is more difficult than they imagined, and their particular education has not been sufficient to help them out of the difficulty. Photograph colouring is in fact an art in itself that requires special training, and if the partially trained student is unable to master it, it is less likely that a photographer wholly uninstructed in the use of the brush can expect better success.

Some years ago a process known as "crystoleum" took a great hold on the non-painting public because it was supposed to enable a photograph to be converted into an elaborately painted miniature without the least expenditure of artistic ability. Splendid results were shown by the teachers and promoters of the process, but these were the work of experts, who would in all probability have done at least as well if they had had no photographic basis to work upon at all. The general public found that after paying a long price for the materials and instructions the process was tedious, messy, and uncertain, and the result—minus the artistic training—certainly not "all that *fancy* painted it." So crystoleum gradually fell into disrepute.

But a similar process, though in many respects superior, was devised by the late W. B. Woodbury over a quarter of a century ago, and shortly after improved by Ashton, of Manchester. In this a Woodburytype transparency was backed up with a sheet of paper upon which the details of the picture were traced, and the outlines filled in with the proper colours. When pressed into close contact behind the transparency, a surprisingly pleasing result was obtained, the minutest details of the photograph being shown with as much fidelity as in the ordinary manner, being, in fact, entirely uninterfered with.

But this process never came into general use for a variety of reasons. A Woodbury transparency in a particular shade of neutral black or grey was required to give the best result, and such transparencies were not producible by the ordinary photographer. Then again, as in photograph colouring, some little knowledge of art principles was required in the choice of the backing colours, and some skill in manipulation, in order to prevent patchiness of effect in the result. In order to avoid the latter result, the inventor proposed to lithograph the coloured backings, but this necessarily converted the process into one for use only on a large scale where long numbers were required.

Some twelve or fourteen years ago Woodbury still further improved the process in connexion with the colouring portion, but still the method never became a commercial success, nor is it, perhaps, ever likely to. But it is well worth working up on a small scale by amateurs desirous of producing coloured specimens of their work.

The advantages in favour of the modern photographer in this matter over his predecessor of twenty years ago are numerous. In the first place, the Woodbury transparency is no longer needful, as the modern dry plates, or rather the modern developers, give the needful tone or colour with the greatest facility. A gelatino-bromide plate, especially if of the "slow" or "lantern" type, developed with either hydroquinone or eikonogen, produces a tone that could only with the greatest difficulty and on rare occasions be secured by development formerly.

Then again—and this refers more especially to portrait work—the exquisite flesh detail now obtainable with the greatest ease, where formerly it required a really first-rate wet-plate negative taken under the most favourable circumstances, takes away the greater part of the difficulty of face colouring, which constituted the chief stumbling-block formerly in making portraits on this plan.

There are still of course some difficulties to contend against as well as precautions to be observed, and we shall return to

the subject in an early number, giving working details and hints that may be useful to any of our readers who desire to take up this style of picture.

SEASONABLE PRINTING HINTS.

Though April is nearly gone we have scarcely yet experienced much of the proverbial April weather, the "showers" remaining as yet in store for us. When they do arrive those amateurs who are compelled to do their printing in the open air will experience some difficulty, but they need not be discouraged. Where a conservatory, greenhouse, or even a cucumber-frame is available, of course everything is easy; but failing these, if the printing-frames be placed close together on a dry board, or other surface, and covered with a sheet of glass a little larger than the total area of the frames, no rain can possibly reach them. Or it may be more convenient to cover each frame individually with a sheet of glass a little larger than itself, taking care that the "bed" be a dry one.

"March winds," nowadays, are not unfrequently considerably mixed up with "April showers," and the sunshine of May usually comes in to temper them. When the winds prevail beware of placing printing-frames *carelessly* outside windows, and in similar insecure places. A frame poised on two corners at the proper angle to catch the light may be safe enough in a still atmosphere, but the same cannot be said during the progress of an equinoctial gale, for the most solid of frames presents a comparatively large surface to the blast, and are easily moved from the just carefully chosen position. The harm is done, however, not by the slight change from an inclined to a horizontal position, but rather by the rapid descent of perhaps twenty or thirty feet, which is almost certain to follow when the frame has been poised on a narrow window-ledge. Let all such frames then be properly secured.

Then again, though sunshine is not generally adopted by choice for printing purposes, a little of it does no particular harm to a good negative should it come out unexpectedly during printing, though it may altogether ruin the print from a thin image. Care should therefore be taken when printing is going on on a changeable day that, at any rate, all thin negatives should be placed with an aspect whence no direct sunshine can possibly fall on them.

But there is another danger in connexion with sunshine that necessitates constant watchfulness during showery weather, and especially when the frames are intentionally placed in the sun. Prints have frequently been sent to us for our advice which have been covered with a sort of small-pox eruption of dark spots, sometimes perfectly black and well defined, more frequently lighter and with softer edges. Direct information or collateral evidence generally shows that the prints have been produced in such weather as we have described, but in any case we should find very little difficulty in diagnosing the disease. It is simply the effect of a spell of sunshine following a shower, or, what is more likely to be the precise order of things, the intervention of one of the typical "April showers," for sunshine following a heavy fall of rain would scarcely produce the result.

The immediate cause arises in the formation of raindrops on the front glass surface of the negative or printing-frame, each of which semi-globules of water acts as a lens, condensing and bringing the light to a focus on the print beneath it. With ordinary diffused light the effect is inappreciable, but when the un comes out, then we have an altogether altered state of affairs. Not only is the light much more powerful, and the additional effect following concentration more noticeable, but we have also to deal with the *heat* rays, for the little aqueous lenses act as burning-glasses as well as condensers, and it will frequently be found where a negative has lain in sunshine for some time in these circumstances that the print is actually charred in spots or short lines by the heat of the sun so concentrated.

The only way of preventing this trouble, beyond the obvious one of closely watching the frames, is to arrange so that the globules cannot form in close enough proximity to the negative to do any harm, to arrange, in fact, that they shall be *out of focus* if formed. When a negative is printed in a frame its own size, without any front glass, the minute lenses are in their best position for injury, the light and heat being then most concentrated, and the spots are sharp and black. With an extra plate of glass, and that probably patent plate, intervening between the raindrops and print the degree of concentration is less, and the result more diffused. To altogether prevent the evil it is only necessary to move the cause to a sufficient distance to render it harmless, and this is easily done in the same manner as recommended for keeping the prints dry, namely, by covering the frames with a sheet of glass which will place nearly the thickness of the frame between.

One final hint to photographers—amateur or professional—who have not at present any established rain-water supply: Now is the time to establish one, and the proceedings are beautifully simple. These consist in obtaining or arranging a receptacle, which may vary from the humble "water butt" to a lead or slate-lined underground cistern, and placing it in communication with the pipe that drains the roof. We are fortunate in having a subterraneous receptacle said to hold "some hundreds of gallons," which collects and stores from a small roof surface during the wet months of the year sufficient rain-water to permit us to use it lavishly for all purposes, domestic as well as chemical, all the year round; indeed, in a hot, dry summer rain-water is with us more plentiful than tap.

For washing and toning prints, and for making many of the photographic solutions, rain-water, especially if boiled first, is far superior to that supplied by the companies.

AMATEUR PHOTOGRAPHY—PAST AND PRESENT.

"Amateurs appear to be made of different material nowadays from what the older ones were, for however light the apparatus may be, it is still too heavy." This remark was made to us the other day by the principal of an old-established firm of apparatus manufacturers. He had just been showing a customer a camera and slides of the lightest construction, and light as they were, the weight was an objection. Without for a moment suggesting that lightness, where it is not incompatible with rigidity, is not a very important desideratum, we may, without fear of contradiction, say that the one quality is too frequently sacrificed to the other in modern apparatus.

It will be interesting to many modern amateurs to know something of the conditions under which those of old had to work, and compare them with the facilities they themselves now enjoy in the production of their pictures.

Let us hark back to the earliest days. When the calotype and the wax paper were the only processes in vogue amongst amateurs, the worker had to prepare his own paper from the raw material—commercial paper. His apparatus was both bulky and heavy. The cameras used in those days for out-

door work were chiefly of two forms—the folding and the rigid. The former was bulky when folded; the latter was usually constructed so that the dark slides, lens, focussing cloth, &c., packed inside, and the whole fitted into a case, and, after all, did not occupy much more space than a modern kit. Although paper was used, it had to be exposed between two sheets of glass, consequently the slides when charged were quite as heavy as those containing two modern dry plates. When, however, a roller slide was used the weight was less. The lenses were of the old landscape form, about three inches and upwards in diameter, and were in heavy brass mounts. It may here be remarked that in the calotype days the favourite size amongst amateurs was ten inches by eight, and few used a size below the whole-plate. At that period there were no folding camera stands, hence the legs had to be strapped together their full length

In the matter of exposure, some surprise may be created when we mention that for a landscape, say of a woodland subject, it varied from fifteen or twenty minutes to, perhaps, three-quarters of an hour. With regard to the development, this was usually a question of several hours. It was no unusual circumstance for an amateur, after a day's outing, to be employed till the small hours of the following morning in developing and fixing his negatives. Yet he did not mind the work; to him it was a pleasure.

When the collodion process was introduced it quickly superseded the paper ones, notwithstanding that the weight and bulk of the impedimenta were immensely increased. This will be readily understood when it is considered that the plates had to be coated, sensitised, exposed, developed, fixed, and washed on the spot. This of course entailed taking all the needful chemicals, the means of obtaining a supply of water, as well as a portable substitute for a dark room. This was sometimes formed by converting the camera stand into a tent, in which the operator sat or "squatted" to work. Sometimes a portable folding chamber on a separate stand, with light-tight sleeves through which the worker's hands were passed, was employed, the plate being manipulated within, while the operations were viewed through a window from the outside. It was no unusual thing to see a photographer plodding through the country encumbered with twenty or thirty pounds' weight of impedimenta, even for stereoscopic pictures. An old enthusiast recently told us that his wet-plate outfit weighed twenty-eight pounds, and he used to enjoy a day out with it. With all these inconveniences there were amateurs in those days, and excellent work they produced.

When dry processes, such as the Taupenot, Fothergill, &c., were introduced, they superseded wet collodion for outdoor work amongst amateurs. The weight of the necessary outfit that had to be taken in the field was much reduced. But the plates the user had to prepare for himself, and this entailed a perfect knowledge of the wet process to begin with, there being several additional operations involved in their preparation. These plates were slow, the exposure for a landscape being several minutes even in a good light.

It was not until the collodio-bromide process was introduced that dry plates were to be had commercially, and then they had but a limited sale, as the amateur of the period would consider it *infra dig.* if he did not prepare his own plates. And as for the development of them by any one else, that was a thing unheard of. Not only had the amateur to make his own plates, but he had also to sensitise his own paper, for "ready sensitised" was unknown. As the paper would not keep more than a day or two, it had to be sensitised as required, and toned the same day.

From the foregoing allusion to the old processes practised for outdoor photography, it will be seen that the modern worker—who is furnished with the lightest and most portable of apparatus, and who not only purchases his plates ready for use, but possibly sends them to a professional to develop and print from—can scarcely realise the inconveniences under which his older *confrères* produced their pictures—and excellent ones, too. That the amateur of old was an enthusiast in photography will not be denied; and as he had to do everything for himself, it was essential that he fully understood alike the theoretical and the practical part of the subject.

There are many thousands of enthusiastic "amateur" photographers now, but we venture to say that their ranks would be very considerably thinned were any of the facilities they now enjoy any way curtailed. Many of the so-called amateurs of the present day do not follow the art so much for the love of photography as because it has become a fashionable pastime, and they can get others to do the actual work for them.

A week or two ago *La Nature* had an excellent illustration, showing the moon in her second quarter, the engraving having been made from a photograph taken by the Lick telescope at Mount Hamilton. The size of image given by a telescopic objective is governed by precisely the same laws that enable the photographer to calculate the size of his camera image, and hence, knowing the focus of that huge instrument, it is a simple matter to reckon how large a disc the sun or moon will give on a photographic plate placed in its focus. When the photographic corrector is employed, the focus being shortened about two yards thereby, the image of the sun is found to be 139 millimetres, that is, close upon five inches and a half.

In order to study the details of the configuration of the moon's surface, the Director of the Observatory has caused enlargements upon glass of some of the best negatives already obtained to be made. The results show the excellence of the instrument in producing detail, and it is anticipated that by taking a series of these negatives at varying phases of the moon, considerable additions to our knowledge of lunar structure will be gained.

It may be remembered that in the Paris Exhibition (American Section) last year photographs of the Observatory were shown at the same time with enlarged lunar photographs on bromide paper; these have been presented to the Paris Observatory, where they have been placed on public view by Admiral Mouchez, the Director.

The studious photographer frequently becomes puzzled by theoretical announcements which at first sight would seem to promise to demolish all preconceived theories, but which eventually leave practice and theory just about where they were. Thus quite recently we showed how, after the assumed simple nature of iodine had apparently been disproved, a new set of experiments showed that those ending in the proof of the binary nature of iodine were founded on false premises, and iodine still remained an element. The latest novelty (*Comptes Rendus*, March 31) is enunciated by M. J. Fogh. He states that on thermo-chemical principles iodide of silver is not soluble in thiosulphate of soda ("hypo") without the assistance of some extraneous energy. In proof of this he states that the double silver and soda thiosulphate is precipitated by iodide of potassium. With the knowledge photographers possess of the solvent power of hypo on a wet collodion film containing iodide of silver, this seems a singular statement, and we should require more details to be aware of the real bearing of this fact upon existing theories.

One of the most generally accepted theories as to properties of compounds of thiosulphuric acid and silver is that they are, one and all,

dangerous and unstable; but so far is this from being the case that we can point to a bottlefull of the old double hyposulphite of gold and soda which has been in our possession for upwards of thirty years, and which at this moment consists of beautifully clean white crystals as perfect as on the day they were placed in the bottle.

It may not have escaped notice that the meeting of the Royal Meteorological Society last month was almost wholly given up to photographic details. Mr. Whipple read a paper respecting "Photography in Relation to Meteorological Work," and the next paper read was the "Application of Photography to Meteorological Phenomena," by Mr. W. Marriott. The meeting was then adjourned, to enable the members to inspect the various instruments showing the application of photography to the purposes named. One of the most interesting features of the exhibition was the number of cloud pictures, those by M. P. Garnier, of Boulogne-sur-Seine, eliciting the warmest commendations of the members present.

In photographs of the stars the coincidence of the size of the star discs on the negative with their reported magnitudes is by no means a simple matter to explain; indeed, at one of the meetings of the Royal Astronomical Society, a speaker of note said it must be looked upon as a wise dispensation of Providence! But, from a paper read at that Society's meeting in March, it would seem that the reported magnitudes are by no means of the exact nature that might be expected from the mode in which they are repeatedly referred to. In an interesting and valuable paper by Dr. E. J. Spitta, respecting the Wedge-photometer, he described how he had devised a method for producing discs of light of one, two, three, up to eight units of intensity, and when he valued them with the Wedge-photometer and Abney's photometer respectively, there was a variation of fifty per cent. The result of these experiments indicated, said Captain Abney, that all Professor Pritchard's measures of the magnitude of stars would require to be altered.

Where a small quantity of oxygen is required for occasional use only, a handy means of producing it promises to be found by a method introduced by M. G. Kassner. He states that a mixture of solutions of hydrogen peroxide and ferricyanide of potassium rendered alkaline by potash or soda may be used for giving off a rapid and regular current of pure oxygen. We need scarcely remark that the cost of such a mode of producing the gas would be fatal to the possibility of its employment for the optical lantern; but there are many cases that would occur where such a clean and ready process would be valuable to the occasional experimenter.

THE ART OF RETOUCHING.

Chapter V.—The Face: An Exhaustless Study.

As it is for the treatment of the *face* principally that the negative is placed in the retoucher's hands, too much cannot be said about it. The whole success, as well as the beauty of the picture, may be truthfully said to depend upon its skilful manipulation. This being so, it is to be hoped that no apology will be necessary for my entering, more or less minutely, into the various details which bear upon the proper treatment of the face. We can solace ourselves with the thought that this, once mastered, the most important branch of the art of retouching is acquired, and all other details are easy of accomplishment. It is to be hoped that the reader will not become weary of the description, or be induced to pass hurriedly or negligently over these observations, as no points will be touched upon but those of absolute importance, and which will prove of value to the beginner in his studies.

As the pupil will easily understand, every face will require a special treatment for itself, from the fact (so wonderful and so easy of discovery) that no two faces are exactly alike. By this must not be understood that an entire and exhaustive study of *each* face is necessary, though such would be no disadvantage, but that each peculiar *type* or *class* should receive our special attention.

It will be found a very considerable help if the reader can procure a photograph of some well-marked and intellectual head, and try to apply the following remarks as far as possible to it, and thus help me in the rather difficult task of explanation without the assistance of plates.

The inspection of a well-lighted and, if possible, unretouched photograph of a man, say, about forty to fifty years of age, and features well defined, will show the muscles and lines to be found in almost every face. Although some of these markings will not be so conspicuous in one person as another, these same muscles and lines on close examination will be easily found—facial anatomy being alike in all. The balance of these features is very seldom, if ever, absolutely alike, and is greatly, if not entirely, governed by the mind, health, or disposition of the man. Naturally this fact is more observable in elderly persons, and in men still more so than in women. As one progresses in years, so the markings in the face become more and more defined—the result of natural causes. The *young* face *possesses* all the muscles as well as the most aged, but the natural plumpness of youth covers them up and largely hides their expression. As time rolls on, however, we see the traits develop, and the face becomes *lined*, as influenced by mind, disposition, or health, the movements and contractions to which they are subject accentuating these lines and markings, which constitute the major part of the troubles in the path of the aspiring retoucher.

Let us examine some of the changes that time and other influences may have worked upon the faces of those around us—we need not be too vain to take a quiet look at *our own* as well. What a study we have before us! In treating this subject it is my intention to eschew all classical phraseology as much as possible, and to content myself with the resources of the mother tongue, and so avoid, as well as I can, becoming in the least abstruse. For the buccinator of the intermaxillary group, therefore, I propose that *jaw* may be accepted as more expressive, and we will start by examining the space between the jaws and the circumference of the mouth, and that corresponding with the lower jaw. In youth these muscles are naturally very full and pronounced, but as years roll on the subcutaneous fat wastes away, until in time it entirely disappears. This leaves the outer integument, or skin, having lost its contractibility, to fall in folds or wrinkles so totally different from its form in youth, that all the shape as well as the expression originally belonging to this part of the face becomes completely altered. In some cases this alteration is so great that at the first glance it would seem impossible; for the very shape of the head appears to be quite different. These remarks apply also to that region which may be described as the circumference of the eye, eyebrows, &c., for here, if anything, the changes are still greater than perhaps in any other part of the face.

The furrow running downwards from the corner of the nostril towards the mouth becomes very marked when the flesh loses its firmness in the manner just described. These lines must never be totally obliterated; indeed, great judgment should be used in softening them. By softening these lines a person is made to look much younger, as thereby the appearance of loose flesh is considerably subdued and the original formation of the muscles more distinctly indicated. As the true character of the face may become more or less injured, if not altogether destroyed, by this operation, the greatest care and judgment should be employed while retouching these portions of a face. The wrinkles and folds in the skin, which are caused by such contraction of the muscles, run at right angles, or nearly so, to the muscles themselves, as, for example, in the forehead. In a child the frontal depression is scarcely visible, but as he or she advances in years, and the muscles over the eyes are constantly being contracted, a *furrow* is gradually formed across the forehead situate just above the nose, and continuing up to between the frontals.

To men whose foreheads become prematurely marked, through either close application to their studies, or physical and mental sufferings, &c., this wrinkle, if not sufficiently softened when retouching the negative, would give a much older appearance to the portrait than was possessed by the original in actual life. This marked difference is traceable to the fact before alluded to, that the light *crossing* the direction of the wrinkle would greatly accentuate it, and therefore make it appear more deeply set than in nature.

The skilful treatment of this frontal depression, or furrow, in the

forehead at the root of the nose may give or take away an expression of grief, pain, or frowning. In some it is only a *single* furrow, and but slightly marked, but men who are constantly employed in intellectual labours generally have *two* folds distinctly marked and full of character. At the sides of such folds are what may be described as two small protuberances, or ridges, which in *no* case should be obliterated: indeed, at times a certain amount of effect may be gained by increasing their size somewhat. We accomplish this by introducing a little light upon them, which imparts additional force. It is a rather delicate experience this, and should only be resorted to in the case of negatives of persons whose eyes are farther apart than the average, and whose foreheads may be low, flat, or receding.

Of course I need not say where the retoucher's standing orders are *flattery first* and *likeness after* these remarks do *not* apply. On the contrary, where flattery is the keynote whereby we regulate our retouching, such markings as the lines between the eyes, over the root of the nose, may be taken away almost entirely, and where the eyebrows may have a square shape, which carries a harsh expression, they may be slightly rounded, but with great discretion. Such treatment is quite usual with ladies' portraits, as any one connected with a fashionable photographer of the present day can testify. It is best, however, that we bear constantly in mind what is the correct thing to do, so that when we are obliged to do what is really wrong we may not be led too far.

The simplest way to carry on this description will be to begin with the forehead and work down the face, just as though we were working a crayon drawing.

The frontal eminences, which are always best as a starting-point, are two prominences on the upper part of the forehead or brow. I say *two*, which is correct, although occasionally the depression separating them, and which helps often to give them their formation, is so slight that they appear as one large protuberance. These eminences are often quite as strongly marked in extreme youth as in later years, although in the former the fresh, pulpy condition of the integument may prevent the depression between them being quite so observable. They must be softened and smoothed by very skilful retouching, and made to carry the most pronounced high lights of the face (excepting the judiciously placed high light on the nose). Considerable care must be taken to light them in proper perspective, and thus bestow a greater prominence upon the one nearer the source of light. Placing high lights demands great care and experience, and until fairly proficient the student had much better leave them alone. A head may easily be ruined by fixing the high light too near the centre of the forehead, or too high up and close to the hair, and so altering the entire formation of the features.

Rotundity, so essential to a really good portrait, is best preserved by placing the brightest lights in the centre of the *high lights*, and the deepest shadows in the centre of *shades*, and paying the strictest attention never to allow the edge of a light or a shadow to be sharp or too defined. Immediately surrounding these lights a delicate *half-tone* must be preserved—of course, assuming that the quality of the negative at our disposal will permit.

Having worked up the prominences in the upper part of the forehead and preserved as much of the delicate half-tone around as was possible, we come lower down to the arches over the eyes, or brows, and start working up to another high light, the intensity of which is altogether dependent on the shape of the head under treatment. I have known many cases where the *lights* on the brows were still more striking than on the frontal eminences at the top of the forehead; so in this treatment the retoucher's judgment must be largely exercised. The skilful working of this portion of a head gives life and form to the eyes. In muscular or very thin people a curved line or crest may be noticed; this must be so subdued by the retoucher as not to catch the eye of the observer, but on no account must it be obliterated.

Whenever the skilful operator may have been able to secure a delicate half-tone on the side of the forehead—where naturally there is a slight hollow—care must be taken to preserve it. All these little markings tend largely towards the production of truly artistic portraiture. The point of the cheek-bone must be lightened and led into the cheek, leaving the highest point of light under the eye, and immediately over the highest point of the cheek-bone. As the bone approaches the ear it should be but very slightly worked and made less pronounced, any half-tone being preserved as valuable to the rotundity of the picture. The entrance to the ear may be improved by the placing of a slight light upon the upper edge of the cartilaginous protuberance; of course, ever bearing in mind what has just been laid down about not placing lights too near the edge.

Many times a heavy and strong shadow may be found on the cheek, imparting a strange shape and appearance, for which you cannot account. According to the general lighting of the face it should not be there, nor does the formation of the head generally warrant it. Still there it is, and it is objectionable. To the experienced retoucher it is no worry; he simply takes it away, knowing it is the result of high colour, the appearance of which photography falsifies. Red being one of the colours that photography represents as deep in tone as a black coat, any one with what we may term a high colour will be sure to suffer until the retoucher makes amends for the libellous treatment received at the innocent hands of the operator.

Having thus worked up the forehead and upper part of the cheek, before going lower see that the frontal depression at the root of the nose be kept subdued, and, if the case will allow, remove the furrows running across the nose. Except in a very characteristic head these markings can be subdued very considerably, although not altogether obliterated. The upper lids of the eyes may be slightly worked upon, but, if so, great caution must be used lest any of the lines formed by the elevation of the lids should be destroyed.

REDMOND BARRETT.

DESICCATING AGENTS.

THE amount of moisture natural to the atmosphere of this country has very often to be taken into account as an objectionable and uncertain factor in many processes, either photographic or chemical. In the laboratory many devices are used for securing on a small scale a perfectly dry atmosphere, such as desiccators of all forms and sizes, in which articles intended for weighing may be kept. The photographer is not so much interested in the various devices for securing accuracy in weighing as in the practical methods easy of application for thoroughly drying a certain quantity of a gas or liquid. Carbonate of soda, which has been recently recommended in these columns, I certainly think is not a fortunate choice. It is true that the dry carbonate will absorb water, but the quantity is uncertain, and never very large; and the material gives no indication of when it is exhausted or saturated, except sometimes by turning into a block nearly as hard as stone. Potassium carbonate, on the other hand, is highly deliquescent, and it would be an efficient drying agent, but its use in most cases would be attended with serious objections. While it remains as normal carbonate it is caustic and messy, spoiling paint and many other things, and when it has absorbed carbonic acid from the air so as to become bicarbonate it gives up the greater part of the water which it absorbed while in the state of normal carbonate, acting rather as a source of water than a drying material. There is one operation of economic importance in which potassium carbonate acts as an absorber of water, and happens to be one of very few materials which are suitable, that is in the drying of alcohol, if the expression may be used. There are few practical problems which seem more simple, and are in reality more difficult than to free alcohol from water *completely*. This, however, is not especially relevant to the subject in hand, which is the application of carbonate of potassium to the partial dehydration of alcohol or methylated spirit.

If we have a mixture containing, say, nearly half its volume of water from which we wish to obtain the spirit, this may be very easily accomplished by adding a large quantity of dry (not necessarily anhydrous) potassium carbonate. This salt is perfectly insoluble in alcohol, it accordingly seizes upon the water of the mixture, dissolves in it, and forms a heavy layer, which settles down to the bottom of the vessel, leaving the spirit above containing only about five per cent. of water, if enough carbonate were used to begin with. The light layer of spirit may be poured off quite clean, or it may with advantage be filtered through a dried filter paper, and is then fit to use again for drying plates or for making up most kinds of varnish. The carbonate may be dried up in any iron vessel (say a fire shovel) and used any number of times, so that the process is an extremely economical one. For working on a large scale it would be easy to arrange an apparatus

for continuous action, so that all spirit residues might be thrown into a vat and the spirit withdrawn from a tap near the top, while the used carbonate could be removed from the bottom when necessary. This process can only yield a spirit of about ninety-five per cent., and to deprive alcohol of the remaining five per cent. of water is far from easy, and to remove actually all the water seems next thing to impossible. Distillation with quicklime, if plenty of lime is used, and the spirit allowed to stand over the lime for a day or two before distilling, may yield a ninety-nine per cent. spirit, and the remaining one per cent. of water may be almost entirely removed by distillation off anhydrous sulphate of copper, with proper precautions to exclude all contact with moist air, or any other possible source of water. Distillation, although not at all a troublesome or difficult operation in a laboratory, is beyond the resources of most photographers; for these, accordingly, I would suggest a method of dehydrating alcohol which has certainly the merit of simplicity. The spirit is placed in an open vessel under an airtight bell-jar along with a large quantity of quicklime, caustic baryta, or other drying agent which will not absorb the vapour of alcohol. The spirit and its contained water both evaporate slowly, but as the spirit vapour is not absorbed, the space soon becomes saturated and no more evaporates. The water, on the other hand, is taken up immediately, leaving room for more to evaporate from the liquid, and this process continues slowly until nearly all the water has been removed from the mixture. If the apparatus is placed in an exhausted bell-jar, the end will be attained much more rapidly, but the result is the same. As I have never tested the efficacy of this process, I cannot speak of it from experience. In drying alcohol it is clear that any substance which is capable of acting on the spirit must not be used, for this reason sulphuric acid, chloride of calcium, chloride of zinc, phosphoric acid, caustic potash, and caustic soda, are all excluded.

For drying air or other gases it would be hard to find any substance, on the whole, more to be recommended than chloride of calcium. It is cheap, fairly effective, absorbs a very large quantity of water, and its appearance indicates clearly when it is time to change it and use a fresh supply. Chloride of calcium cannot be used for drying ammonia, because it absorbs that gas in large quantities, nor will it dry hydrochloric acid gas, which seems to retain water with as much force as chloride of calcium itself. For some purposes the efficiency of chloride of calcium may be improved by rendering it anhydrous, which can only be performed by fusion in a metal crucible at a bright red heat. The ordinary granulated chloride of calcium still contains water, but the very large surface exposed by the porous masses is usually more than a compensation for the weakened affinity for water. I said that chloride of calcium is a fairly effective drying agent, and that is all that we may call it, for it is incapable of thoroughly removing water from air or any other gas. This is shown by a curious experiment of Fresenius: If air is first dried by passing over pumice soaked in strong sulphuric acid, and then through tubes containing granulated chloride of calcium, these latter lose weight very gradually, showing that really dry air takes up some water from calcium chloride. The amount of water contained in air properly dried with chloride of calcium is, however, insignificant.

Among other common drying agents quicklime is very effective and very cheap. Its most serious disadvantage is that its appearance does not change by the absorption of water; the material, however, is so cheap that it may be often changed. It has an awkward habit of swelling greatly during the process of absorbing water, and it may even burst tubes or other containing vessels. Slaked lime may, of course, be dehydrated and restored to efficiency by heating to bright redness for some time, but it is not usually worth the trouble. Caustic baryta, or barium oxide produced by the ignition of barium nitrate, is a very efficient desiccating agent for gases, only too energetic sometimes, for if much water be present a dangerous amount of heat may be developed. It is more effective than quicklime for dehydrating alcohol, ammonia, gas, &c. Its price is about four shillings per pound, and it cannot be restored after use. It is hardly necessary to mention that quicklime and baryta must not be used for drying carbonic acid gas, or any other acid.

Among acid desiccating agents the most effective of all is phosphoric anhydride—the light, snow-white material produced by the combustion of phosphorus in dry air. So intense is its affinity for moisture that it hisses like a hot iron when thrown on the surface of water. A tube two inches long packed with phosphoric anhydride suffices to completely dry a moderate stream of gas. Unfortunately the material is dear in the market, being priced at twelve shillings a pound. If the demand were considerable the price would soon fall, as it is easily made, and phosphorus costs only three and sixpence per pound. One pound of phosphorus yields more than two of the anhydride; but it cannot be restored after use, as no available temperature suffices to drive off the water which has combined with the anhydride to form phosphoric acid, so that it could never be a really cheap drying agent. Probably among all desiccating agents there are few, if any, better than anhydrous sulphate of copper, made by drying the ordinary blue crystals in a metal basin over a lamp. It is a white powder, which turns blue on absorbing water, so as to indicate sharply when it is used up. It is cheap, and it can be dried up and used over again indefinitely. I have already referred to strong sulphuric acid as a very energetic absorbent of water, and such it is; indeed, there are few better, but its acid and caustic properties render its use objectionable in many cases. For drying gases it may be brought into a solid form, and its efficacy much increased by using granulated pumice dipped in acid instead of the liquid itself. This material, however, gives by its appearance no indication of law, for it is exhausted by use.

The last class of drying agents to which reference may be made act by capillarity; that is, they withdraw moisture from the air by capillary attraction. Most very fine powders possess this property in some degree, but they are much excelled by fibrous materials, such as paper, cloth, felt, &c. Probably the most effective of all capillary dryers is asbestos, which can now be obtained in all sorts of convenient shapes, such as paper, millboard, rope, and so forth. Although a piece of asbestos paper seems to become very damp in moist air, the amount of water it absorbs is not large, only a little over two per cent. of its weight during fairly dry weather, according to some experiments which I have just performed. A piece of asbestos weighing 7·83 grammes weighed after drying on the stove 7·67 grammes, or a loss of two per cent. Water was, however, being re-absorbed with great rapidity during the process of weighing, so that the real loss would be somewhat greater.

C. I. Burton.

THE MATHEMATICAL CALCULATION OF EXPOSURES, AND A NEW EXPOSURE METER.*

Axiom III. — The proper exposure for any given conditions being ascertained, the correct exposure for every other possible combination of conditions (or factors) may be calculated by mathematical means.

But, some one will object, granted that you have all your factors expressed in numbers, which may be relatively correct in each scale, the zero point of each factor is purely arbitrary and has no connexion with the zero point of another factor; what basis have you then for a calculation?

My answer is, None whatever, except by a trial exposure; but when this is done (and in my system each worker does it in finding out the plate number) the calculation of every other exposure is easy. For instance, with A2, P1, S1, and D4 it is found by experiment that the exposure is two seconds (this, in fact, is the standard to which my instrument is set). Let there be a variation from this of A4 instead of 2 (this doubles the exposure), and P10 instead of 1 (this reduces the exposure by one-tenth); the result is one-fifth of the first result, or two-fifths of a second. All this is troublesome to calculate by ordinary means, but exceedingly easy with the aid of slide rules.

My exposure meter, the novel points of which I have patented, is a circular brass box, two inches long, and one and a quarter inches diameter; at one end is the actinometer, at the other a chain pendulum for counting seconds (useful for both timing the actinometer and the exposure).

Round the circumference are four moveable calculating rings, one for each of the factors A, P, C, and D. When the pointers are adjusted to the proper numbers for each factor—and this is very quickly done by means of a special contrivance—a fourth pointer gives the proper exposure. Mr. Ackland deserves the credit of bringing out first a circular slide rule for this purpose; but his is on flat cardboard discs, and mine are annular. I was not aware of his work until I had completed mine.

The instrument takes but a short time to use, and thus delays the

* Concluded from page 247.

exposure but little. (Mr. Watkins went through the necessary movements deliberately, and the total time taken was thirty seconds.) It is available for every class of camera work, even enlarging; and for interiors there is no need to wait to test the light, for it is easy to see by the instrument what diaphragm is needed to make the exposure number equal to the actinometer number, and then the actinometer may be laid down in the worst lighted corner and the lens left uncapped until the proper tint is reached. (Mr. Watkins handed round prints from six negatives of widely varying subjects, viz., cloud negative, house in sunlight, figure out of doors, copy of lithograph indoors, white porcelain group indoors, dark terra-cotta bust indoors, all negatives calculated by the instrument and developed together in one dish.)

Inventors and investigators into this question often argue on this line, "Would not the simplest instrument be one which would gauge the light actually proceeding from the object, or better still the light which actually falls upon the plate?" The fallacy of this reasoning is not at first apparent, and only appears on close examination. The fact is, that a photographic plate is not used as a gauge of the total quantity of light reaching it, but more as a gauge of the difference of action which the light reflected from different parts of the object has upon it.

Axiom IV.—The quantity of actinic light reaching the plate, reflected from all parts of the object, or even one part of it, is no guide to the duration of the exposure.

I throw on the screen a mountain scene; you know that in photographing it you would expose to get detail in the shadows of those rocks. I now show the same picture crossed with black bars; this picture would reflect much less light to the lens, but there is no reason why the exposure should be greater, for you do not wish to render any detail in the black bars. I again show the same picture, but crossed by bright white bars, and reflecting quite a flood of light in comparison with the other. But a little consideration will show that none of this white light will make any difference in the exposure required for the shadows of the rocks, for a lens carries the light from each part of the subject direct to its correct place on the plate, and does not mix it up with other light, however bright. Thus it will be seen that the exposure for these three pictures would be the same. But try and gauge the light reflected from these three pictures by any photometer or actinometer, and you will be entirely misled if you use the results as a guide to exposure.

Axiom V.—Two ultimate factors determine the duration of a photographic exposure on any plate, viz.:—

A. The quantity of actinic light reaching the plate reflected from that part of the subject which reflects least actinic light, and in which detail is required to be rendered.

S. The duration of this light necessary to impress upon the plate an image approximating as nearly as possible (in inverse intensity) to the visual image of the object in question is the correct exposure.

ALFRED WATKINS.

EXHIBITION OF PHOTOGRAPHS AT NEWCASTLE-ON-TYNE.

THE Newcastle Society is to be congratulated upon a very excellent collection of pictures. Several previous exhibitions have been held in Newcastle under the auspices of the Photographic Association, notably during the Jubilee year, but none have come up, in point of numbers and general all-round excellence, to the present display. The large and commodious and well-lighted Art Gallery enables each picture to receive its fair amount of space, and no picture can be said to be "skied." There are, of course, many which deserve that position, but on the whole the Hanging Committee have done their work well.

The Exhibition was opened by the Mayor and Sheriff of Newcastle on the evening of Friday, the 18th inst. Prior to this ceremony, the Mayor, Judges, and Members of the local and photographic press were entertained to dinner by the Executive at the Rooms of the Association in Mosley-street. The Art Gallery was well filled by 7.30, when, after the customary speeches, the Exhibition was declared open by the Mayor, and Mr. Paul Lange got well on the way with his lecture on *Norway*.

The following is the list of awards:—

OPEN TO PROFESSIONALS AND AMATEURS.

Class A. (*Series of three Landscapes above whole-plate.*) Silver, Green Bros., Grasmere; bronze, J. P. Gibson, Hexham.

Class B. (*Series of three Landscapes, whole-plate or under.*) Silver, J. P. Gibson, Hexham; bronze, J. E. Austin; bronze extra, J. G. Bullock.

Class C. (*For best Landscape printed on gelatino-bromide paper, direct or enlarged, both the original negative and the print to be the work of the exhibitor.*) Silver, Auty & Ruddock, Tynemouth.

Class D. (*Series of three Portraits.*) Silver, Lafayette, Dublin; bronze, W. J. Byrne, Richmond.

Class E. (*For best Portrait printed on gelatino-bromide paper, direct or enlarged, both the original negative and the print to be the work of the exhibitor.*) Silver, Auty & Ruddock, Tynemouth.

Class F. (*Series of three Architectural pictures, exterior or interior.*) Silver, R. Keene, Derby; bronze, W. Parry, South Shields.

Class G. (*Series of three Instantaneous pictures.*) Silver, W. Parry, and Lyd. Sawyer, Newcastle.

Class H. (*For best Genre picture.*) Silver, F. Whaley; extra silver, R. S. Redfield; bronze, W. W. Winter; extra bronze, F. M. Sutcliffe.

Class J. (*For best Enlargement—any subject except portrait.*) Silver, T. G. Whaite; bronze, Green Bros.

Class K. (*For best Cattle study.*) Silver, J. E. Austin; bronze, Ralph W. Robinson.

Class L. (*For best study to illustrate Scott's* "Lady of the Lake," *canto* I, *verse* 17.) No award.

Class M. (*For best Enlargement upon Ilford bromide paper. Gold and silver medals presented by the Britannia Works Company.*) Gold, W. W. Fry, Tynemouth; silver, H. Dudley, Arnott.

Class MM. (*For best series of three prints on Alpha paper. Gold and silver medals presented by the Britannia Works Company.*) Gold, F. W. Edwards; silver, J. E. Austin.

LANTERN SLIDES.

Class N. (*Landscape, best series of six.*) Silver, R. S. Redfield; bronze, G. W. Wilson & Co.

Class O. (*Instantaneous, best series of six.*) Silver, Henry Little; bronze, W. Parry.

Class P. (*Architectural, best series of six.*) Silver, G. W. Wilson & Co.; bronze, J. A. Sinclair.

Class Q. (*For best series of six made upon the Mawson lantern plates. Gold medal presented by Messrs. Mawson & Swan, Newcastle.*) Gold, J. E. Austin; silver, W. Parry; extra silver, E. G. Loe.

OPEN TO AMATEURS ONLY.

Class R. (*Series of three Landscapes, half-plate or under.*) Silver, C. Court Cole; bronze, J. W. Evans.

Class S. (*Series of three Architectural pictures, exterior or interior, half-plate or under.*) Silver, C. R. Pancoast; bronze, E. Beck.

Class T. (*Series of three Instantaneous pictures, half-plate or under.*) Silver, E. Beck; bronze, M. J. Harding.

Class U. (*Stereoscopic slides, on glass, series of six.*) Silver, H. G. Ridgway; bronze, F. Howard.

Class V. (*For the best Landscape by an Amateur member of the Association.*) Silver, J. Brown; bronze, G. Proud.

A GOLD MEDAL FOR THE BEST THREE PICTURES IN THE EXHIBITION, IRRESPECTIVE OF CLASS.—Lafayette.

From the above it will be seen that the Judges have been liberal even to prodigality in their bestowal of medals; but save for some half dozen instances of eccentricity, few people will be found to cavil at their decisions. We must confess to a preference for H. P. Robinson's *Gossip on the Beach*, Sawyer's *Moonlight*, the same artist's beautiful pictures of the *Castle Garth, Newcastle*, and more than one by Sutcliffe over the *Barber's Shop* of Whaley. The decision in Class E is also open to considerable question. In Class D Lafayette takes first place with portraits of *Mrs. Langtry* (211), *Miss Moody* (213), and of a *Lady and Child* (215), by no means the best in his exhibit; while the splendid studies by Crooke, of Edinburgh (238–9), remain quite unnoticed. This looks rather as if the Judges had walked up to the frames with eyes shut and dabbed the medal label on the wrong frame. In Class M is another instance of extraordinary imperception. Fry's enlargement, *Cullercoats Bay*—an enlargement of the most ordinary character, sadly in need of "working up, retouching, stippling, and general overhauling"—is awarded the gold medal, when on the other side of the room hangs such a *picture* as Auty's *Fishing Boats!* We come naturally to the conclusion that a day of eight hours, with intervals for refreshments, though all very well from a socialistic point of view, is quite incompatible with the proper examination of some eight hundred pictures.

An exhibition in the provinces often, in fact generally, consists largely of photographs which have appeared in London and at other exhibitions, and there are many here which have been noticed already in these pages. H. P. Robinson's *Lobster Boat* hangs first on the line, but does not apparently get the attention his *Gossip on the Beach* attracts. This latter is a fine picture, though the treatment is somewhat puzzling. It is noticeable that visitors look at this too closely, whereas a distance of six or eight feet improves matters wonderfully.

No. 2, *Falcon Crag, Derwentwater*, by E. Greaves, is a fine bit of

lake scenery. There is a dreaminess and atmosphere about this we like very much.

In the series 5 to 17, Mr. J. P. Gibson has collected enough cloud studies to last the average photographer a lifetime. In 21 the same artist has caught and rendered cleverly the autumn haze. In 29, 30, and 31 we have examples by Ralph W. Robinson which were at Pall Mall last year, and close by three old friends by H. P. Robinson, which in our opinion are the best in the class. The premier position, however, is occupied by Green Brothers with *Stybarrow Crag, Blea Tarn, Langdale*, and a view on the Derwentwater, which at first sight we took to be work by Payne Jennings. Class B (Small Landscapes) is a large class, upwards of a hundred pictures competing for the awards, forty-seven out of this number being by J. P. Gibson, who consequently has little trouble in securing first place. W. Parry's are well worth inspection—147 to 155. They are printed mostly on Whatman's drawing paper, sensitised and prepared by the Lyonel Clark process.

A beautiful landscape by Auty takes first medal in Class C—*View on the Irthing*. This has not, we believe, been exhibited before. The lighting of this landscape is very good, and the Judges here, at all events, had an easy task.

Class D (Portraiture) is also strongly represented, the frames numbering over 100. Lafayette evidently greatly impressed the Judges, but the medal slips are impressed on by no means the best of this fine exhibit; 224–5–6–7 are, in our opinion, superior in every way to those which bear the labels—211, *Mrs. Langtry;* 213, *Miss Moody;* and 215, *Portrait of Lady and Child:* these are commonplace by comparison.

W. Crooke's exhibit here is very fine, particularly 238, *J. Mackenzie, Esq.*, and 239, *A Stalwart Knight*, and bear the palm for artistic and effective lighting. The second medal is given to W. J. Byrne for two sets of three large portraits, and six *At Home* panels, which every one must be heartily tired of.

The fine work by Winter, 248 to 256, is conspicuous for size, tone, quality, and generally effective posing; and 258 to 269, by Lyd. Sawyer, are fine examples of this young artist's work. This same gentleman makes the best display also in Class E, in spite of the verdict of the Judges, any one of the four enlargements 285 to 288 being, we think, superior to 284, which bears the label. Mr. Sawyer puts *life* and *poetry* into his work.

In Class F we see some of the best and worst work in the whole show, fortunately the former largely predominates, but we are of opinion that No. 292* might well have been left out, or turned face to the wall, as doubtless there is more detail to be seen on the back; 291 is little better, but 290 and 293, *St. Mary's Cathedral, Newcastle*, show that this exhibitor can do better work.

A selection of English drawing rooms, by H. W. Reeves, are worth close inspection.

Richard Keene's *Monograph of old Moreton Hall* arrived too late for competition, but 318, by the same artist, six *Interiors of Derbyshire Churches*, take the first place (Judges opinion again) followed by W. Parry's *Chancel, St. George's Church*, 329, a fine photograph, full of detail, but by no means picturesque, the unwholesome effect of a wide-angle lens being very noticeable, and two others. Lyd. Sawyer's 321–2–3, *In the Castle Garth*, should be studied by those who want to make architectural *pictures*.

Class G (Instantaneous) contains forty-three pictures, which include Goold's fine photographs of *H.M.S. Victoria firing* 100-*ton gun*, and five others. Specimens by West and Symonds, some excellent studies of breaking waves by W. P. Marsh, and work by Wyrall, Redfield, and others. W. Parry and Lyd. Sawyer divide the honours here, the latter's medal pictures being 370, *On the River Tyne;* 372, *Foggy Weather;* and 376, *Penny Ferry*, which many visitors to the late Pall Mall Show will remember.

Class H is another strong collection, their being nearly one hundred frames competing, including examples by H. P. Robinson (*Gossip on the Beach*), Ralph W. Robinson, John Terras, Barnett, Austin, Redfield, Keighley, and others. Lyd. Sawyer's *Twilight* is here, and close by hangs *In the Moonlight*, one of his best works. The awards are to Whaley (389, the *Barber's Shop* picture), Redfield, Winter, and Sutcliffe, in the order named. The picture by the last-named—*Excitement*, 381—is a fine study of rents and patches and general raggedness. A dozen or two *ragged* urchins are leaning over a parapet watching intently some event of importance below on the quay. The *back view* obtained is particularly pleasing.

Class J (Enlargements) is remarkable for three fine examples by Green Bros., the best being 489, *Ytrifan and Lyn Ogwen, North Wales*. *Sunset on the Don*, 497, by F. Whaley, is here, and Auty's beautiful view of *Fishing Boats off the Tyne*, 504, perhaps the best picture this artist ever made. T. G. Whaite scores here with No. 500, *Dinant Cathedral and Market-place*.

Ralph W. Robinson sends a capital cattle study in 512, *Suspicious;* and H. R. Procter another in 516, *The Lost Sheep*, in Class K.

In Class L (Genre picture to illustrate a verse of Scott's "Lady of the Lake") the Judges wisely withheld the award.

In Class M (Enlargements on Ilford bromide paper) the valuable medals offered by the Britannia Works Company bring a lot of "fine and large" work. We have two very good enlargements by W. D. Welford, 522 and 541; F. Whaley's ever-welcome *Choristers*, 524; an amusing picture by Clarence James, 529, *Over the Garden Wall;* a good study of the *Patient Neddy*. H. Dudley Arnott is represented by two fine enlargements, the best of which is undoubtedly the *Somerleyton Main Entrance*, No. 538, to which the silver medal is given; it is a fine study of architecture, but one calling for the smallest amount of skill. The same remark applies to 539, by W. W. Fry, awarded gold medal, entitled *Cullercoats Bay*, which is a most *ordinary* view enlarged by the direct method to about 24 × 18. A fine view by Auty and Ruddock, 548, is better in all respects, *Lady and Child*—disqualified, so we understand, by reason of having been worked up. The same artists are represented by 544, *Beg for it*, a picture of a lad and dog, the latter sitting up in a wheelbarrow. The composition here is rather weak. *Early Morn*, No. 546, is much the best of this group, portraying as it does a sunrise. The effect is very good, and, as the only one of the kind in the show, deserves study.

Class MM (for prints on Alpha paper). F. W. Edwards has no difficulty in securing premier honours with his beautiful representations of panels, &c.; the *Sons of Codippe*, 555, bas-relief by George Tunworth, being perhaps the best, but there is little to choose between them.

The Amateur Section calls for little notice, the pictures in the Instantaneous Class being the best, and many of these should obviously have been in Class R, landscape. The class confined to members of the Association is very weak, with the exception of three by J. Brown, 640, and two others, and four good pictures by H. R. Procter, who is always a good and careful worker. The Amateur Photographer bronze medal has, we imagine, never gone to a poorer set of photographs than 631, by George Proud—at least, we hope not.

The Lantern Slide Section is very well filled, and the examples sent in very fine, with few exceptions. The extraordinary subdivision of this class makes it a general raffle, out of which seven prizes have been pulled. W. Parry scores his third and fourth medals here with the same good quality work this excellent artist always displays. E. G. Lee might also, we think, have been higher up in this class; his medal is well earned.

The "Stereoscopic" Class for slides on glass contains only three entries, H. G. Ridgway easily taking the first place. His slides are, with very few exceptions, the finest we have seen. Among the pictures not for competition are a series of forty-nine by the late O. G. Rejlander, specimens of the fine work executed by the Graphotone Company.

In the Water-Colour room hangs the Club exhibit of the Liverpool Society (from the Crystal Palace), a series which will no doubt be studied closely by the Newcastle contingent; specimens of photogravure from the Goupil Gallery in New Bond Street, London; samples of Dr. P. H. Emerson's work, including that much spoken-of production, *Breezy Marshland*, No. 851, which many will remember having seen at Pall Mall; also work by W. L. Colls, Barnes, London; Aitken Dott & Son, Edinburgh; the Autotype Company, who send upwards of forty-five reproductions and several frames by various members of the Society.

A capital show of apparatus is on view by Mawson & Swan, and similar smaller displays by Mr. Peter Hall, Grey-street, and Mr. Watson, Grainger-street, Newcastle. Mr. Brown has produced a capital catalogue, particularly free from errors, well printed, and illustrated.

On the whole, this is one of the best exhibitions we have seen, marred only by the bad *class* principle, which enables (though the Judges were allowed full discretion) several undeniably bad photographs to receive, so to speak, a certificate of excellence, that in any other case they would not have been awarded. An artist viewing these awards would come away with the impression that though the mass of photographers were doing their best to follow *art principles*, the Judges at all events knew little or nothing of it. These remarks are recommended to the notice of the Liverpool Society, and may aid them in framing the prospectus for their next year's exhibition.

* An interior, *supposed* to be *Durham Cathedral*, by A. Drysdale.

THE PAGET PRIZE PLATE FACTORY *REDIVIVUS*.

It is known to our readers that a calamity befell the Paget Plate Company some time ago by the destruction by fire of their premises at Ealing. History and personal experience inform us that one great result of a fire

is that the places consumed, whether these be cities, towns, or manufacturing premises, are usually rebuilt on a scale of magnificence vastly superior to their *status quo ante*; and this emphatically applies to the dry-plate factory in question. It has not only, phœnix-like, arisen from its ashes under circumstances of increased magnitude, but it has transferred itself to another and more desirable part of the London suburbs. The new factory is erected in Watford, on the bifurcation of the main line and the St. Albans branch of the London and North-Western Railway, and being close to the station is thus conveniently situated with regard to transit.

Passing through the office, the first room shown to us is one in the centre of which are two square tanks in which to mix gelatine emulsion. One of these is formed of slate, with a capacity of 120 gallons; the other is of porcelain, and contains 40 gallons. Around the room are a series of "cooking" tanks, heated by steam. Both hot and cold water are supplied to every recess for tanks. In this room, also, are kept the jars, holding one gallon each, for reserving the emulsion after it is made. These, it need scarcely be said, are so constructed as to render the admission of light impossible. This applies also to the shutters of the window, which, when closed, put the place in total darkness. The artificial light here, and throughout the portions of the premises devoted to the handling of emulsion or of plates up to their being packed in boxes, is gas, protected seemingly by two thicknesses of coloured paper, each in a large measure non-actinic in itself, but which when combined yield a perfectly safe light of a whitish character—such a light, in short, as might be obtained by transmission through layers of green and orange or red. It takes about ten minutes for the eyes to get quite acclimated to this light, but afterwards everything is seen with distinctness, and without fatigue to the eyes.

Adjoining is a room devoted to the dissolving or melting of the gelatine for which purpose it is fitted with all the necessary tanks and other requirements. The knowledge of the formula and *modus operandi* in connection with emulsion making, up to the stage of its being placed in the reserve jars mentioned, is confined to Mr. W. J. Wilson, by whom the Paget plate was first made under that name, and Mr. Whitfield, jun.

We may here say that those of our readers who may be interested in knowing the full details of the process, for which Mr. W. J. Wilson was awarded the prize of fifty pounds offered by Mr. Joseph Paget through the Photographic Society of Great Britain, will find a very full account of the same, with formulæ, notes, and explanations, in the number of THE BRITISH JOURNAL OF PHOTOGRAPHY for December 31, 1880 (Vol. XXVII., pages 631 & 6). But whether the process there described be the one now practised, we of course cannot say; but we can say that the possession of a good formula for the preparation of a dry plate is only one of several factors in the ability to manufacture plates on a commercial scale, and turn them out in large quantities, and of identity in quality under perhaps varying conditions of the state of the raw material. *This* is the rock on which so many plate manufactories have struck, and by which they have foundered.

The glasses are removed from the receiving room, where they are stacked in large quantities, and are then cleaned in a machine. This consists of a number of cylindrical brush rollers, which apply the requisite friction with a copious supply of soda and water. At a certain stage of their passage through the machine (they are fed in, one by one, at one end), they leave the soda solution and pass through plain water, and, after squeegeeing, each terminates its career of lixiviation by ablution with distilled water. The plates are then racked to drip and dry, and require no further cleaning. The rollers and brushes in this machine are driven by steam power, and the drying is effected in a cupboard holding a hundred dozen. They are passed into the coating room through apertures which close automatically—that is to say, when one door of the aperture is open to admit a quantity of plates, that on the other side of the partition is closed, and cannot again be opened until the first one is firmly closed. This ensures the impossibility of the entrance of light into the coating room, and this double door automatic system applies also to the door of admission to the coating room, the opening or closing of one door locking and unlocking the other.

Cadett's coating machine is employed. The plates are fed in at one end, and after being coated travel over the surface of a trough of cold water, by which the emulsion is set ere they reach the farther end, whence they are lifted and placed in racked receptacles and transferred to the drying room. The coating capacity of the machine is 200 dozen per hour.

The plates are removed from the drying racks each morning, and are cut into smaller sizes where necessary, examined, and packed. The examination is done by girls, who carefully scan them against a light, and reject any in which the slightest blemish may be found.

Inquiring as to what difference would be made between the higher and lower priced plates, we were informed that while equal care would be taken with them, the cheaper ones would not be quite so rapid as the others, would contain rather less silver, and would be packed in a cheaper form of box, but would be equally reliable.

There are two engines on the premises, one of them a steam engine of six-horse power, driven by a Marshall twelve-horse boiler, which charges the hot-water pipes by which the entire place is heated, and indeed supplies all the hot water required throughout the premises. There is also an Otto gas engine for such purposes as the driving of the fan by which air is circulated through the drying rooms, which we were told was done at the rate of seven thousand feet per minute.

The water, on admission into the premises, is purified and softened by the anti-calcaire system in general use for such purposes, but distilled water alone is used in the making of emulsion.

The factory is two stories in height. The upper one, consisting of two lofts, each 90 × 44 feet, was as yet unoccupied when we saw it.

NOTES FROM NEWCASTLE.

Business continues "varry canny" in this quarter. I have long known that the amateurs here were a numerous body, and the interest taken in the exhibition now progressing at the Art Gallery proves this. Never have the local craft had such a treat as has been provided by the Association, and all day long are they to be seen taking their fill and improving their minds (let us hope) by examination of the works of Robinson, *pere et fils*, Sawyer, Whaley, Gibson, Sutcliffe, Winter, and men of that ilk, to say nothing of the beautiful creations of Lafayette; those latter seem quite beyond the reach of ordinary mortals. An experience of several years in the Parent Society's exhibitions in London proves to me that they never got a collection of photographs at Pall Mall equal to the present show in the Art Gallery.

I heartily congratulate Mr. Lee and his colleague Mr. Brown upon the very gratifying result of their exertions. The whole district will benefit, and the Society's membership roll should increase by scores. It is pleasant to think, too, that this result is in no little measure due to the stimulants administered in frequent doses in these "Notes" during their first appearance; had they not appeared it is extremely doubtful whether an exhibition would have been held here at all, a motion to that effect having already been rejected and pooh-poohed. However, I am glad to think that better counsels prevailed, and am not a little astonished at the way in which the whole of the Committee have worked to bring about such a result.

The letter of the local men re the "Challenge Cup," though long, puts the matter in the proper light. As one who has seen the whole of the correspondence in the case, I can say confidently that never was evidence clearer. I would suggest now that the whole matter be submitted to a small committee of well-known photographers for their opinion. To those who know anything of the facts the replies of the Crystal Palace Executive are in the highest degree incongruous, puerile, and vacuous. I understand that the local men are now likely to take legal opinion as to the evidence at their disposal. The latest reply of Messrs. Peasgood and Wollaston implies, in effect, that not only the local men, but the best known and most eminent of their own judges, are liars! There is a "lying spirit abroad," but not in this quarter.

It is to be hoped *now* that we have arrived at the end of "class" exhibitions. That two men should carry off by this "hit or miss" arrangement *eight* medals between them is reducing awards to an absurdity. The plums have been distributed fairly well in this locality, therefore little grumbling will be heard, but there is no doubt that the system adopted by the Parent Society is by far the wisest, more reasonable for the Judges, and more satisfactory all round.

The weakness of the amateur section of the local Society is amply shown by a reference to the catalogue: the number of competitors is eight only. With the first award no one will grumble, but the award to No. 631 is a farce, particularly when we have 625 to 628 available. There may have been "dreams" where now are "disappointments" amongst the competitors. Let these be comforted; where the works of the veteran and delightful Robinson fail to turn up in the prize list, and men like Sutcliffe get in by side winds, they take a back seat in good company.

The College of Physical Science has become possessed, not before its time, of a splendid optical lantern (their old one was a perfect beast), and it has been used with much success and satisfaction during the past few weeks. It was made for them by Steward, of the Strand, the source of illumination being a Brockie Pell arc lamp of 2000

candle power, the requisite electricity being supplied by the College dynamo, a Parson's electric turbo-generator. The lantern is always ready for use, and the light is, vulgarly speaking, "immense."

D. D.

Foreign Notes and News.

Among the results communicated from the Vienna Photographic Research Laboratory are some researches by Dr. A. Lainer on hydroxylamine. For purposes of development, he says, it has one advantage over all other developers. It is perfectly permanent, namely, in ordinary aqueous solution, and does not, like eikonogen, hydroquinone, and pyrogallol, give brown decomposition products. The colour of the silver which it reduces, too, from silver bromide has a very agreeable greyish-black tint, without ever showing even traces of yellow; that which it reduces from silver chloride has brownish-black, blue-black, and reddish-brown tones. Hydroxylamine cannot, however, be as yet used as a developer for bromide dry plates, as the development causes an evolution of gas, which loosens the gelatine from the plate. But it is very suitable for chloride of silver gelatine, as it can then be used in very dilute solution. It is probable that it might be used with advantage for bromide collodion dry plates.

The death is announced of Herr Albert Greiner, one of the leading portrait photographers of Amsterdam.

In a short communication in his *Archiv*, Liesegang recommends a method of obtaining what would certainly be a godsend to all photographers, namely, a white, non-actinic light. To paint the windows with a fluorescent solution of sulphate of quinine, he says, is not sufficient to keep back all the actinic rays. A solution of three parts green nickel chloride, and one part red cobalt chloride, appears colourless by transmitted light, and when somewhat diluted is quite transparent, the two complementary colours completely neutralising each other. Passage through a solution of either of the salts renders light inactive on silver compounds, and it consequently will not act upon them after passing through a solution of both. Thus the transmitted light, though white, is not actinic. To prevent the passage of ultra-violet rays the walls of the vessel should be coated with a solution of sulphate of quinine in collodion. Liesegang says that he has exposed a sheet of sensitive paper for a week to the action of light behind such a screen, at the end of which time it was not altered in the slightest.

Liesegang admits that he has not experimented with gelatine plates, and until we hear definitely on that point we may perhaps be permitted to wonder how, say, a plate which is sensitive to *yellow* rays can fail to be acted on by yellow rays, whether they have passed through nickel and cobalt chlorides or not.

The following witty skit was intended for the April issue of the *Archiv*, but, unfortunately, arrived too late for that number. It is headed "Invisible Oil." "White light," writes Liesegang's contributor, "consists, as is well known, of rays of various degrees of refrangibility, and there exist also rays invisible to the eye—the so-called ultra-violet rays. The celebrated Professor Ingenious has for some years been attempting the liquefaction of these ultra-violet rays, and in this he has at length succeeded by employing a pressure of several hundred atmospheres, and a temperature of −120° C. To the resulting liquid he has given the name 'Invisible Oil.' This body possesses the remarkable property of rendering all objects invisible which have been coated with it. It is obvious that it will prove of great value in all occupations and pursuits in which invisibility is advantageous or indispensable. Thus, bank directors and cashiers 'on the run,' lovers desirous of escaping from the wrath of indignant parents or husbands, and knights of industry on the road, will doubtless regard it as an inestimable boon, and will be gladdened by the tidings that they will soon be able to procure it of all respectable chemists and druggists."

It is *not* a fact that Herr Verescz has attributed the fading of his photographs in natural colours to their having been coated surreptitiously with this substance by jealous rivals.

The *Wochenblatt* has been defending itself against the remarks made some time ago in the foreign column on the attribution of halation to total reflection. The *Wochenblatt* explains, as has since been stated, that it was the diffused rays which were totally reflected, and not the direct rays. This is, of course, correct, but as this subject was discussed many years ago in the columns of The British Journal of Photography, we may be, perhaps, excused for not imagining that the *Wochenblatt* referred to it. The year 1865 in this country suffered from an epidemic of halation controversies similar to that now convulsing Germany and if the *Wochenblatt* will consult the pages of The British Journal of Photography for that year it will find that much of the matter recently published in German periodicals on the subject of halation has been anticipated.

Signor Glissenti has made some interesting studies on sodium bisulphite. He has found that a plate immersed for two minutes in a five per cent. solution of the salt before development comes out much stronger and denser. This preliminary bath may be either acid or alkaline, so that in this respect sodium bisulphite acts differently from hyposulphite, which is, as is well known, without action in an alkaline developer.

Our Editorial Table.

Sun Artists. No. III.

(Kegan Paul, Trench, Trubner, & Co.)

That particular artist of the sun whose works are brought forward in this number is Mr. J. B. B. Wellington, and Mr. Graham Balfour has introduced him in a clever and discriminating essay on his life and works. The four pictures culled from Mr. Wellington's numerous works are:—*Eventide; A Tidal River, East Coast; The Broken Saucer;* and *A Study of Sheep.* In the first of these the materials are few and simple—merely a bit of marshy-looking river and a portion of a farmyard abutting on it—but the perfect drowsy quiescence of the evening scene is complete.

We are told by Mr. Balfour that Mr. Wellington makes all his own apparatus, emulsion, and plates. Pyro, bromide, and ammonia form his developer, although in instantaneous work he substitutes soda for ammonia.

The photogravures are by Swan & Annan, and are excellent. *Sun Artists* is certainly keeping up its reputation.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 5613.—"A Portable Photographic Dark-room Lamp." C. Guttmann.—*Dated April* 14, 1890.

No. 5742.—"Developing Photographic Plates or other Substances carrying a Sensitive Film." E. Fairweather.—*Dated April* 16, 1890.

No. 5860.—"Improvements in Photographic Cameras." H. Ransom.—*Dated April* 17, 1890.

No. 5863.—"Improvements in Photographic Shutters especially applicable to Hand Cameras." A. S. L. Abraham.—*Dated April* 17, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 8603.—"Phototypes." Fischer.—Price 4*d.*

No. 17,522.—"Photographic Apparatus." Damoizeau.—Price 8*d.*

No. 19,896.—"Photographic Films." Communicated by Eastman. Boult.—Price 8*d.*

1890.

No. 1098.—"Photographic Apparatus." Communicated by Kipper & Perry. Lake.—Price 11*d.*

No. 2776.—"Photographic Lens Shutters." Communicated by Voigtländer & Son. Bishop.—Price 8*d.*

PATENT COMPLETED.

Improvement in the Production of Phototypes.

No. 8603. Johannes Adalbert Fischer, Leipzig, Saxony.—*March* 29, 1889.

In the art of printing, the usual method of producing images in imitation of photographs has been, to print the images on specially prepared sheets (chalk or chromo-paper sheets), the said sheets being prepared with a suitable mass on their entire surface, which could only be done at considerable cost.

On the other hand, in attempting to transfer the images on ordinary printing paper, there arose the difficulty that owing to the absence of the so-called chalk base, the sheets could not be sufficiently polished or glossed to obtain the desired effect.

In order to simplify and cheapen the said printing process, I proceed as follows:—Any ordinary printing paper is coated with a suitable ground mass (or the latter is pressed on), but only within the outline of the images, after which the images are printed, and then the surface is polished or glossed.

The images or phototypes thus produced are similar to photographs or heliotypes, but can be produced more cheaply than those which were made by preparing the entire surface of the paper.

Having now particularly described and ascertained the nature of my invention and in what manner the same is to be performed, I declare that I claim:—An improvement in the production of phototypes, which consists in providing

the paper with a base of a suitably prepared mass within the outlines of the image only, then printing the image and subsequently polishing or glossing the surface by a polishing or glossing machine.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
April 28	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 29	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 30	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 30	Barnsley	Bank Chambers, Hargreaves-street.
May 1	Bolton Photographic Society	The Baths, Bridgman-street.
,, 1	Leeds	Leeds Mechanics' Institute.
,, 1	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 1	Glasgow Photo. Association	Royal Exchange Institute, 177, Buchanan-st.
,, 1	London and Provincial	Masonic Hall Tavern, Basinghall-st.
,, 2	Sheffield Camera Club	Whateley's Institute, Norfolk-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

April 17.—Mr. C. H. Cooke in the chair.

Mr. P. Everett inquired whether paper prepared with algeine for photographic purposes was now in the market.

The impression of the members was that the manufacture had been discontinued some time since.

The Chairman was of opinion that silver printing in any way ought to be abandoned.

Mr. W. E. Debenham, whilst admitting the superior permanence of other processes, considered that silver printing with a glazed surface was the method which most truly registered all the gradations of the negative and, therefore, gave the best results.

Mr. J. E. Teape showed a bag made of two thicknesses of a dense black material for changing plates in the field.

The Chairman thought it better to use a sufficient number of dark slides.

Mr. T. E. Freshwater showed prints from wood negatives taken on Easter Monday afternoon at about six o'clock. He also showed a photograph recently taken of Burnt House Farm, a place on the Essex coast, commanding a landslip at which sensational reports have recently appeared in the daily papers. He had a photograph of the same place taken about ten years since. A comparison of the two photographs showed that the present slip must have been but slight.

A discussion took place on the best way of packing plates. Mr. Freshwater advised their being placed face to face in contact, but Mr. Cowan considered that this plan involved too much risk of abrasion, especially if the plates happened to be at all moist.

Mr. Teape had noticed that when a plate took a long time in fixing, the process might be expedited by taking it out of the bath and putting it back again.

A member remarked that he had found the addition of sulphite of soda to the hypo bath materially accelerate the fixing action, but it was suggested that the addition of an equivalent amount of hyposulphite of soda would probably be equally effective, if not more so.

CAMERA CLUB.

April 17,—Mr. A. Stroh in the chair.

A paper communicated by Mr. W. Adcock on the subject of *Amateurs and Professionals* was read and discussed. Mr. Adcock took the view that there was some ground for complaint, in that injury was occasionally done to the professional by the action of the amateur. He urged all amateurs to avoid cause for any such complaint, pointing out the difficulties and expenses of a professional business. He thought that amateurs ought not to undertake work which might otherwise fall to a professional, and that they should make it a rule to give the printing of any complimentary photographs they might take to the local photographer. He recognised the difficulties in the bazaar system, and also in the case of the backyard semi-professional, who eked out a poor livelihood by taking portraits at odd available times. He described his own plan of conduct towards the professional, and invited all amateurs to place as much business as they could in the hands of their professional brethren.

In the discussion which followed, the question of the division of amateurs and professionals into separate sections in competitive exhibitions was brought up and freely argued, and a unanimous vote against any division being made was carried.

On Thursday, May 1, Captain Abney will read a paper.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

April 14.—Mr. Smith, of the Eastman Company, attended to show their Kodak cameras. He said that they now made them in eight different forms, so the No. 1 camera, with which most were acquainted, was objected to by many on account of its small size and its giving a circular picture. The size of picture with this camera was only two and a half inches in diameter. To meet the wishes of those whose only objection was its size, they had introduced one three and a half inches in diameter, also one giving the ordinary quarter-plate picture, another 5 × 4, and still another 7 × 5, each of these latter giving an oblong picture.

Upon Mr. Smith saying that they were intended for use with their new roll of celluloid film, Mr. H. Walker remarked that he thought the great objection to the use of the Kodak was the difficulty of obtaining this film, and just when one wished to obtain a supply to take with them when going in the country they might find it impossible to get any for several weeks.

Mr. Smith said that in future they hoped to be able to meet the demand, as they were entitled to one-third of all manufactured in America, and were completing the enlargement of their works.

In answer to a question, Mr. Smith said that the shutter worked at about one-fortieth of a second.

Mr. Walker: Is there any means of altering the speed of the shutter, as I consider this one of the most essential points in hand cameras?

Mr. Smith: The speed of working may be altered by releasing the spring, which the Eastman Company are always willing to do (if taken to them) free of charge.

Secretary: There have been complaints of several markings said to arise from electrical causes; is there any probability of its always being so?

Mr. Smith: There has only been one lot so marked, and it was from this, unfortunately, that Mr. Walker took those which he developed at the Camera Club, which gave rise to the idea that it might always be so, and these were taken accidentally from a stock which were known to be so damaged.

Secretary: What gave rise to the electricity which caused these markings, and are the same causes likely to operate again?

Mr. Smith: It was owing to working these films at the same tension in coating as paper; but since that time the machinery has been altered, so that there is little probability of any films being defective from that cause.

Secretary: Are not the old roll holders likely to cause injury in this way?

Mr. Smith: No; because the spring may be slackened by inserting a drop of oil.

On April 28 Mr. F. L. Pither will lecture on *Art in Photography*.

HOLBORN CAMERA CLUB.

April 18.—Mr. E. J. Wall in the chair.

Mr. H. Barns was elected a member of the Club.

The subject for the evening was *Hints to Beginners*, and Mr. F. Brocas kindly gave the necessary information, which, being of an elementary character, it will be unnecessary to repeat. After which Mr. Wall made a few remarks on lenses, and said that when he started photography he had to teach himself, but that now the best thing for the tyro to do was to join a Club like the Holborn, or any other good Camera Club, by which means the subscription would be saved over and over again by the information which would be gained. He also stated that after three and a half years' work, and some thousands of experiments, some friends and himself had successfully produced a printing-out paper which could be printed by gaslight with an exposure of about forty-five minutes, either matt or enamel surface, and any colour desired; or by simply fixing without toning a pleasing result would be obtained.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

April 15.—It was decided to hold a meeting of the Excursions Committee to arrange the dates and places of excursions for the summer months and to report to the next meeting.

The prints sent in for competition were then placed on view, and were considered the best the members have yet submitted.

A case of enlargements sent by the *Amateur Photographer* for exhibition was then exhibited.

A number of photo-lithographic prints sent by the Graphotone Company, Enfield, were placed at the disposal of the members.

BRADFORD PHOTOGRAPHIC SOCIETY.

April 15.—Mr. W. Leach read a paper on *Enlarging and Reducing*. Specimen enlargements to 24 × 20 were shown, and after the paper numerous lantern slides, reduced from whole plate negatives by Messrs. Leach and W. H. Scott, were shown on the screen by the Society's lantern.

A specially light 12 × 10 camera made for the President by Mr. C. Grayson was shown, the weight being under nine pounds.

Messrs. F. Pickles and W. Wood were elected members.

DERBY PHOTOGRAPHIC SOCIETY.

April 17,—Mr. Thomas Scotton presided.

Mr. R. Keene read a paper. He said that he had no new theories to propound, no new cranks in development, as we were so well provided with photographic literature that everything new was published as soon as it left the hands of the inventor; but he would give a short sketch of the trials and troubles of a photographer who practised the art some thirty or forty years ago. He dwelt upon the trouble of preparing plate glass, coating of same, and the silver bath, &c., as compared with the dry plate process of to-day. He exhibited a 15 × 15 camera of some twenty years or so back, and compared it to the beautifully made instrument now in use, stating that a kit of that period would weigh about three hundredweight, and now we can get the same result with only a weight of ten pounds or so. The paper was interspersed with many lively anecdotes, being altogether greatly interesting and instructive. He advocated system in the exposure of plates, and not to take everything indiscriminately, but to study the locality well before going out with the camera.

A discussion followed.

MANCHESTER PHOTOGRAPHIC SOCIETY.

April 10,—Mr. Abel Heywood, jun., in the chair.

The Chairman, on behalf of the Society, presented to Mr. W. G. Coote, the winner in the recent lantern slide competition, that portion of a large and beautiful album which had been subscribed for out of the funds of the Society, viz., 12s. 6d.; the balance in cost had been paid by Mr. Coote.

The CHAIRMAN called attention to a subject that had occupied the attention of the Council, and on which they desired to have the feeling of the members—that of continuing, or otherwise, the ordinary meetings throughout the summer months of June, July, and August.

The HON. SECRETARY (Mr. W. I. Chadwick) said three meetings were held last year as an experiment; they had been poorly attended and devoid of interest.

Mr. JOHN SCHOFIELD objected to their discontinuance.

Mr. ALAN GARNETT thought the reason for the poor attendance was owing to the fact that the back of the syllabus of last year's outdoor meetings had not been corrected. It stated there that the ordinary meetings of the Society were from September to May, inclusive.

The HON. SECRETARY was not aware that this was so, but admit ing the unpardonable omission on his part, he failed to see how it would apply, seeing that every member of the Society had had sent a circular for each of these three meetings, in the usual way.

Mr. GARNETT thought circulars had not *always* been sent.

Mr. CHADWICK said there had never been an ordinary meeting of the Society for the past fifteen years, during which he had been Hon. Secretary, that had not been called by special circular sent to each member.

It was ruled that the whole discussion was out of order, as the summer meetings had been added to the rules, and to make any alteration a special meeting would be necessary.

A committee to carry out the arrangements of the outdoor meetings was formed, consisting of Messrs. Benson, Bayley, Thompstone, Coote, and John Holding. The principal business of the evening was a competitive exhibition of members' own work, direct prints from negatives taken during 1889–90, and consisted of the work of about twelve or fourteen members. The pictures were divided by the Council into two series:—first, "Pictures above half-plate size;" second, "Pictures half-plate size and under." The judging was conducted by the members themselves, and voting by ballot, the result being that Mr. Tomlinson's picture, a Scotch view, won in the first series with a total of seven votes, and Mr. Whitefind was victorious in the second series, with a total of six votes. There were about forty members present who voted.

Mr. J. INGHAM inquired why his pictures had not been eligible for the competition.

It was announced that the Council had decided that at the next meeting, to be held May 8, there should be a competitive exhibition of enlargements by the members. The details of the competition to be arranged at a special Council meeting to be held April 10.

COLCHESTER CAMERA CLUB.

APRIL 14.—The members of the above Club, to the number of forty, met to witness a demonstration by the Britannia Company, Ilford, in their "alpha" paper and lantern slides. Both paper and slides were shown to give excellent warm tones, besides being easy to work.

The demonstrator was severely questioned, but was always ready with an answer.

Mr. Winch, a member, kindly lent about seven hundred photographs for the use of the members.

PHOTOGRAPHIC SOCIETY OF FRANCE.

APRIL 11,—M. Davanne (just returned from Cannes) took the chair. This gentleman received a hearty welcome from all. It was certainly pleasing to see the amount of sympathy his reappearance occasioned.

M. THOUROUDE laid before the Society the rules and regulations concerning the French Exhibition which is to be opened on the 1st of May at Earl's-court, London. Photography is to be represented in "Groupe VI." M. Thouroude counselled the trade to take part in that Exhibition, and in answer to a question from the President, he said that it was to be regretted that more time was not on hand. Messrs. Courtois, Suffit & Jambon, the celebrated architects and decorators, have given their word and honour to have everything ready on a given day, so it only remains for the exhibitors to send in their goods as quickly as possible.

The Society was informed by letter that the idea of international laboratories is making its way, in that two more dark rooms are at the service of members of photographic societies making a tour.

The question then arose about *cartes d'identité* (inscription cards)—how they should be made, &c.

The PRESIDENT requested the members to send in specimens of such cards, so that the Committee could choose and have some printed. Some railway season tickets were sent up.

Professor STEBBING exhibited his free entrance ticket into the last Paris Exhibition, on which was his portrait, saying that in his opinion that was all that could be required. Something of the sort must be done in order that the person presenting himself to obtain admittance into a photographic society's establishment can prove himself to be a member of a similar society, without which passport time would be lost. In England at the present moment it is necessary that the secretary of your society writes to the secretaries of the towns where you have the intention of calling to request hospitality. If international laboratories are to be made practically useful all difficulties must be set aside; at the the same time every society must defend itself against the risk of being plundered. The only way to do so is to have a card of membership of the society to which one belongs with the photographic resemblance of the petitioner upon it.

The Chairman then sent this to be investigated and reported on by the Committee.

The two dark rooms kindly placed at the disposal of the members of the Photographic Society of France when travelling are situated one at Brussels, the other at Antwerp.

M. Michelin presented to the Society a certain number of his new developing "capsules." They are composed of double or hollow wafers, one of which contains pyrogallic acid, the other the carbonate or sulphite of soda, these wafers being very much employed in France to contain pharmaceutic drugs.

The PRESIDENT remarked that a great risk of accidental poisoning was run.

A wish was expressed that the wafers should be tinted red, or their contents printed upon each of them.

Messrs. Vera & Martin presented their improved hot burnishing roller. The brilliancy on the proof is obtained by rolling and not by friction. The proof goes through two rollers; the under one is only useful to draw the proof through, the upper roller is hollow and highly polished. A series of gas jets burning through it get it up to the temperature required.

M. Martin, the manufacturer of photographic cameras, presented a very pretty instrument, which he calls the "photo-polygraphe." It consists of a quarter-plate hand camera, bearing a fender, a rapid lens, and an instantaneous shutter. A changing box, containing twelve plates or films, can be adjusted to the camera; when all are exposed another box containing twelve more can be put on. The changing boxes are very small and compact; the grooves are in metal, thus allowing the plates to be closely packed.

M. Mendoza presented a kind of easel which, being attached to any camera, can hold negatives to be enlarged or reduced. The upright bearing the cliché can be brought forward or removed backward from the lens at the will of the operator.

M. David presented a number of negatives on celluloid films made by him in 1883. Now that celluloid films are *à la mode*, it is well not to forget those who introduced them to the attention of the public.

M. VIDAL made a communication from M. Chicanard on the sulphite of soda employed in photography, how this salt is adulterated and contaminated by sulphates, carbonates, &c. He then drew the attention of the members to certain reagents which would detect such adulteration.

M. LE COMMANDANT MOËSSARD made a rather long communication on halation. He suggested many things to cure it, such as dyeing the emulsion, coating the plate previous to receiving the sensitive emulsion with a soluble coating containing a dye of some kind or the other.

After a long discussion M. DAVANNE said that the Society had some time ago devoted very much time to that subject, and the conclusions were adopted that the best means to prevent halation was to coat the back of the plate with some substance having the same index of refraction as the glass employed. At the same time a black or red dye should be mixed with it.

M. CORNU at a previous meeting exhibited a mixture of essence of cloves and cinnamon, so mixed that by putting a strip of glass in the liquid the glass would, as it were, become invisible. Some dye or colour is then added, and the back of the glass painted over, as, said the author, nothing but an optical contact with the glass can prevent halation.

M. MERCIER presented a new developer, which he calls "graphol," a modification of iconogene. This gentleman then exhibited a number of proofs toned with osmium, and spoke on the toning of photographic prints with the salts of other precious and rare metals in the platinum family.

M. BALAGNY gave a very interesting communication on the means at hand to obtain a perfect flatness of his films after development. "I discovered lately," said he, "that the curling was caused by employing alum. I now exhibit a bath composed of tannin (tannic acid) and a little glycerine in so much water. The films are left an hour, or even all night, in this solution. When taken out they are placed in blotting paper. When all the excess of liquid is absorbed, the film or films are laid flat in the open air to dry spontaneously." M. Balagny added that under any temperature whatever the films so treated will never curl.

Professor E. STEBBING then gave an account of his late visit to London, spoke on the number and organization of the different photographic societies of the metropolis; mentioned the Camera Club, its extraordinary and well-merited success, its hospitality to foreigners and other persons of note in photography; the energy displayed by the Committee and its indefatigable Secretary, Mr. G. Davison, in organizing conferences, concerts, outings, and social meetings, providing, as it were, food for the body as well as the mind, having the object in view the advancement of photographic knowledge and the elevation of photography as a branch of the art-science. The members of the Photographic Society of France expressed their sympathy with the Camera Club by loud applause.

The speaker then entered into the subject of international laboratories, the great advantage to be obtained for members of any photographic society to be welcomed as a friend by foreign societies, and his being allowed to change his plates, and even develop, if necessary, by simply showing his *carte d'identité*. The value of such a permission is only known to those who have travelled far from home. The speaker said that he was not aware before going to England that such an idea had been abroad, but he was happy to find that it was on the way to be realised. The Hon. Secretary of the Camera Club gave him a list of a great number of towns in which the local photographic societies had offered such hospitality. Another list was also joined to the first—that of many hotels in which the proprietors (intelligent enough to forsee the want) had a dark room made for the accommodation of their photographic guests. Professor Stebbing laid the lists on the table, expressing the wish that they might be reproduced in the *Bulletin* of the Society with those known to the Society, such as Paris, Lyons, Florence, Brussels, Antwerp, &c.; other adhesions will soon flock in.

M. LONDE then gave a communication on the best and most rapid means of obtaining lantern slides by the chloride of silver process.

A great number of lantern slides were exhibited by Messrs. Londe, Balagny, Martin, Busquet, and some brought from London by Professor Stebbing.

These, by the unanimous desire of the Society, were the first shown. They were presented by Mr. S. Webber, of the Camera Club, and Mr. Heratio King. These slides were greatly applauded.

The meeting closed at the unusually late hour of twelve o'clock.

The Administrators of the last International Exhibition of Paris have sent a notice to the journals that a number of agencies have appeared which send out false *diplômes* to exhibitors; the latter must be on their guard against such fradulent practices.

It is well known that the administration for the Exhibition of 1889 have not yet been able to get out the *diplômes*. A great prize was offered for the best model in a public *concours*; we shall have, therefore, by having a little patience,

an artistic *diploma*, and a commemorative medal as well. I hear that it is proposed to distribute these *diplômes* in a ceremonious manner, and it is supposed and designed that a great *fête* be organised for that occasion; perhaps it will coincide with the National *Fête* of the 14th of July.

Public museums are now the theatres of the exploits of unscrupulous knaves. Pickpockets did formerly a good trade in unburdening the visitors of a little of their valuables, but what is more serious is that they have set their covetous eyes on public property enclosed in the glass cases. A number of photographic lenses were stolen lately from a glass case. The Louvre was ransacked in the same way some time ago. Who cannot fear that some valuable objects may be purloined from the British Museum? On the 13th inst., in the museum of the Arsenal, at Vienna, some one stole the baton *de Maréchal de Radetzki* from the glass case where it was preserved. The baton was of gold, ornamented by precious stones, diamonds, and rubies.

Can nothing be done to prevent such "vandalism" in the century of electricity? I should propose that an electric communication be so arranged that as soon as a glass case in a museum be opened or tampered with an electric bell should be set ringing, to the astonishment of the visitors and the dismay of the thief. An entrance could, perhaps, be made in another way to pay expenses—such a staff of guardians would no longer be required.

E. STEINING.

THE BERLIN FRIENDS OF PHOTOGRAPHY.

MARCH 31.—Professor Dr. Vogel in the chair.

After the customary introduction and election of new members, the CHAIRMAN made the announcement to the meeting that Professor Dr. Tschirch—a member of the Committee of the Society—had been elected to the chair of Botany in the University of Bern, and at the same time expressed the sorrow that the Society experienced at the prospect of losing one of its most active members. Professor Vogel also announced that the Treasurer, Herr Goetmann, had reported that, notwithstanding the extreme expense of the Berlin exhibition, a sum of 425 marks 44 pfennigs remained to the credit of the Society.

Dr. JAFFÉ then gave an account, accompanied by experiments, of the employment of ozone water for the destruction of bacteria. The room was darkened for the demonstrations, which showed the curious fact that on adding the ozone water to the water containing the bacteria, a sudden incandescence was manifested.

In the afternoon sitting the competition photographs of Dr. Bowditch formed the subject of discussion. Mr. BOWDITCH himself was present, and exhibited a number of the results he had obtained. These photographs it will be remembered were obtained by superimposing the impressions of a number of individuals of the same class of man, so as to obtain in either case the class or race expression. From the results exhibited, an extraordinary degree of resemblance was found to prevail amongst student types even of different nationalities. This, however, will not be likely to surprise any one acquainted with the German "studiosus."

Herr GRÜNEWALD exhibited some photolithographs made by Zenker's method. They were on rough paper, and printed from unlicensed glass in sixty seconds. The red and yellow appeared, as in earlier experiments, satisfactory; the green came out clear green, and the blue was the same. Herr GRÜNEWALD expressed doubts whether Herr VOGEL's results were likely to be more permanent than earlier ones. According to the accounts this paper appeared very insensible, and the sight explains their apparently greater permanence.

After the answering of various questions, the sitting was brought to a conclusion.

PHOTOGRAPHIC SOCIETY OF STOCKHOLM.

FEBRUARY 12.—Professor H. GYLDÉN in the chair.

After the admission of new members, and the statement of accounts, Professor HAMBERG gave a lecture, *On some Experiments of the Elder Draper*. In the course of his remarks he pointed out that as early as the year 1840 Draper was in possession of facts relative to the formation of the photographic image which have generally been represented as first obtained by much later experimentalists. Thus, for example, the employment of optical sensitisers of the kind was anticipated by Draper, and described in his works.

Herr NILS PERSSON then exhibited a flash lamp in the form of a note-book, capable of giving twenty flashes within a minute, and also an instantaneous shutter by Secretan of Berlin.

After some discussion on the tendency observable in some dry plates to peel off during development—an evil which Herr FLEMMAN very naively proposed to obviate by changing the plate-maker—the proceedings terminated.

PHOTOGRAPHIC SOCIETY OF JAPAN.

MARCH 22.—Mr. J. Johnstone in the chair.

The following gentlemen were elected members:—Mr. H. E. Watanabe Hirosuke (President of the Imperial University), Professors R. Koto, J. Milne, and Aug. Rowland, Monetjoy Squire, Commander R.N., and Messrs. J. Fraser, G. Scott, A. Futami, T. Tanaka, T. Enami, S. Nihara, A. R. Lamb, and W. White.

A lantern exhibition was then given. Professor Milne opened the proceedings by a lecture on earthquakes, illustrated with maps showing the distribution of volcanoes and of districts subject to seismic phenomena throughout the world, and more particularly through Japan, and by a set of slides from photographs of the destructive effects of earthquakes in all parts of the world. Some of these showed the danger of arched structures where earthquakes prevail, others how fracture follows vertical lines of apertures in buildings, and one how the end bricks of a row may be, so to speak, heaved away by the momentum of the others, which themselves remain intact.

After this there was an exhibition of a popular nature. There was a large attendance of members and visitors, who seemed to thoroughly appreciate the pictures, but, unfortunately, the proceedings were considerably curtailed by a mistake of the exhibitor, who threw the words "Good Night" on the screen while there were still many slides to be shown. The audience rose, and were out of the hall before there was time to explain the matter.

Correspondence.

THE PROPOSED ILFORD SCHOLARSHIP.

To the EDITOR.

SIR,—I am sure you will join me in deploring the conclusion reached in this matter, as shown in subjoined letters, and will allow me to say, through your next issue, that I can only look forward to the good time to come when we shall have more cohesion between the various societies, more unanimity of purpose in the endeavour to add to the dignity of photography, and less airing of personal grievances and idiosyncrasies. Then the amateur and professional, as such, will exist no longer, but all will be photographers, without any invidious distinction other than merit; and all will form a race, by training and education, infinitely superior to their fellows of to-day. The Britannia Works Company hoped that their offer of a scholarship would have been the foundation-stone of such a Utopia, but it seems we are ahead of our times. No one seems equal to the task of laying this foundation-stone aright. When any society or committee of leading men see their way to fitly use the gift, it will be ready for them.—I am, yours, &c.,

JOHN HOWSON.

"*Photographic Society of Great Britain.*

"DEAR SIR,—With reference to your letter of the 20th ult. I am directed by the Council of the Society to send you a copy of the following resolution, which was passed yesterday evening:—'That the Council of the Photographic Society of Great Britain, while thanking The Britannia Works Company for their offer, regret that after due consideration they are unable to accept it.'—Yours faithfully,

"A. M. MANTELL, *Secretary.*

"To J. Howson, Esq., Ilford."

"*Britannia Works, Ilford.*

"DEAR SIR,—I thank you for your letter of yesterday, and share the regret of the Committee at the non-acceptance of the proposed scholarship. If I may be permitted to express an opinion on the matter, I feel that there is a great want of due regard to the interests of photography when a free and absolutely unfettered gift of 100*l.* per annum, to benefit the art-science, cannot find a recipient.

"JOHN HOWSON.

"To Captain A. M. Mantell, Secretary P. S. G. B."

GELATINE AND THE LATENT PHOTOGRAPHIC IMAGE.

To the EDITOR.

SIR,—In your issue of last week, pp. 243 and 244, you make some very reasonable criticisms on part of my recent paper at the Camera Club Conference, and I have no doubt you will allow me to reply.

It is asked whether it is by any means proved that when dry gelatino-bromide plates are exposed to light there is any combination between th bromine and the gelatine, and it is objected that it is "one thing to produce a precipitate by the direct addition of one of the halogens to gelatine in the liquid state, but quite another to secure combination between infinitesimal portions of bromine vapour and solid dry gelatine." It is certainly different. *All chemical analogy would lead us to expect that combination would take place more readily in the second case*, because the silver bromide is in intimate contact with the gelatine, and the bromine comes in contact with the gelatine at the moment of its liberation from its combination with the silver—in other words, *when it is in the nascent state*. In all probability the bromine is never in the free state, but its parting from the silver is simultaneous with and dependent on its interaction with the gelatine. This, however, is a rather abstruse point of chemical dynamics.

It is further stated that "combination should naturally ensue more readily in the presence of moisture." This is by no means generally true; in many cases when acting on organic compounds with halogens it is of great importance to ensure the complete *absence* of moisture.

Objection is also taken to my statement that we have direct evidence of combination in the fact that the gelatine becomes less soluble after exposure, and it is urged that Warnerke's observation was that the gelatine became insoluble after exposure and development. I was not referring specially to Warnerke's results. It is also urged that if this were true it should be possible to develop an image on a gelatino-bromide plate much in the same manner as in the carbon process.

The possibility of developing an image in this way depends of course on the *difference* of solubility of the exposed and unexposed portions. I said that the gelatine became *less soluble*, not *insoluble*. The difference, in fact, is not nearly so great as with bichromated gelatine. Then, too, when a plate is exposed for a length of time sufficient to produce an ordinary latent image, the amount of chemical change is infinitesimal, and we certainly should not expect to be able to recognise it by the somewhat lower solubility of the infinitesimal portion of gelatine which had been altered.

I quite agree, however, that the evidence was not conclusive, but the experiments which I will now describe seem to me to leave no doubt about the matter. I believe those relating to the solubility have not been made in such a definite manner before; at any rate, I can find no record.

There is no evidence that bromine is liberated in the free state when a gelatino-bromide plate is exposed to light, unless the exposure is made for a long time under a very bright light, and even then there is no conclusive proof. I have this afternoon exposed plates for a long time to bright direct sunlight without obtaining the slightest evidence of the liberation of free bromine.

Now, as to solubility. I took gelatino-bromide plates which had not been treated with alum at any stage in their preparation, cut them in two, and exposed one half of each to bright light for some time. Absence of alum is imperative, because the gelatine would have lost its solubility; a long exposure is necessary in order to obtain a sufficient amount of change to be recognisable. The exposed and unexposed halves were then placed together in a dish and treated with hot water, care being taken to ensure equal action. *In all cases the exposed films were less soluble than those which had not been exposed;* and after all the gelatine had been dissolved from the unexposed plates there was still a considerable quantity left on those which had been acted upon by light. The gelatine had not become insoluble, but distinctly less soluble; and taking all the facts together, I do not think there is any doubt that when a gelatino-bromide plate is exposed to light the bromine which the silver bromide loses interacts with the gelatine and forms a less soluble bromo-gelatine similar to, if not identical with, the compounds described by Knop.—I am, yours, &c., C. H. Bothamley.

The Yorkshire College, Leeds, April 22, 1890.

PETROLEUM ETHER *VERSUS* GASOLINE.

To the Editor.

Sir,—The relative advantages of these fluids have been compared by Mr. Ives in a recent letter to this Journal, and he has condemned gasoline as useless, while the ether is what he recommends. Petroleum ether is certainly the best liquid of the two for use in a limelight saturator; but gasoline has its good points, and may come largely into use when its peculiar qualities are understood.

The ether is sold retail by Messrs. Hopkin & Williams, and other London chemists, at 2*s.* a pound, which is rather more than a pint. It can be ordered in small quantities from country chemists at a somewhat higher price, though it is not usually kept in stock. It has little or no odour, is very volatile, burns with a smoky flame like benzoline, and is colourless. It can be used in a cold saturator, but the oxygen which has passed through the vessel leaves it in an explosive condition, and hence there is constant danger of a harmless but startling pop, or pistol report, due to a small explosion in the pipe leading from the saturator to the jet. This liability to have pops is very small with an experienced operator, who knows the conditions which produce them, but they are not infrequent with those who only occasionally use the lantern.

Petroleum ether in a warm-air saturator, which is gently heated by a nightlight, saturates the oxygen so completely that it is rendered *non-explosive*, and is consequently incapable of producing pops; hence the warm saturator is safer than a cold one. A cylinder of oxygen and a warm saturator charged with ether form the safest apparatus known to me for producing a limelight. So long as the nightlight is burning in its chamber, and there is fluid in the vessel, there is no more chance of explosion than in the use of a tallow candle. The cost of ether for a limelight exhibition varies from fourpence to eightpence per hour, and is much less than the cost of an equivalent supply of compressed coal gas.

Gasoline is a fluid very similar to petroleum ether with one important exception—the ether is odourless, but the smell of gasoline is like that of a gasworks. This is its greatest fault, the others are trifling in comparison. It is necessary to store the liquid in an outhouse, to fill vessels with it out of doors, and to cork them up carefully to prevent escape of vapour. The odour is destroyed by burning the fluid, and if leakage of vapour is arrested there is no smell during use. The vapour leaks slightly through rubber tubing, and there is always a slight scent when it is used with a saturator, and unless metal pipes are substituted for the rubber, it is difficult to avoid the aroma. Practically, gasoline answers very well out of doors, and in large halls where there is plenty of air; in small rooms it is undesirable.

Gasoline, as Mr. Ives says, deposits a gummy matter in the saturator, which would eventually interfere with its working if not removed. It is therefore desirable, after about one hundred exhibitions, to have the saturator restuffed at a cost of about half-a-crown, or to dissolve and wash out the gum by pouring gasoline into the upper tubes and letting it drain out of the filling tube at bottom.

Gasoline is not procurable in small quantities anywhere, except by dealers in the warm-air saturators. It is sold in eight-gallon cases by wholesale oil and colourmen; the price is from 1*s.* 9*d.* per gallon, and the expense of using it with a saturator is less than twopence per hour, if one buys it wholesale. Dissolving can be accomplished both with gasoline and with ether.

Benzoline is still cheaper than gasoline. It can be bought at 2*d.* a pint at most oilshops. It is practically odourless; gives the best light; deposits no perceptible gum; and for single lanterns, in experienced hands, it will be a favourite, as it costs only one halfpenny per hour with the limelight. It requires more heat than ether to enable it to be used in a saturator.

As Mr. Ives could not use a coil in the upper surface of his horizontal cotton roll, it is evidently quite different from his zig-zag airway, which I had not previously heard of.—I am, yours, &c., Albert W. Scott.

Ashcombe-road, Weston-super-Mare.

THE CRYSTAL PALACE CHALLENGE CUP COMPETITION.

To the Editor.

Sir,—We should think that your readers will be with us in feeling very much surprised at the trifling evasions of the Crystal Palace Executive. It is usually considered that in disputes "there are two sides to a question," but here we have, apparently, an exception to this rule. Spite of the amount of reputation which the management must know they have at stake in this matter, they have never from the beginning of the correspondence replied *with proof* to any one of our charges.

They say in their last communication that they "deny unequivocally the allegations," and "that the Company is in a position to prove that such allegations have absolutely no foundation in fact." Then their course is clear—*let them bring forward this proof*, and we shall feel satisfied. This is what we have all along fruitlessly asked for. At the same time, we are anxious to know what they will prove. Our last letter is *not* an allegation, but a string of plain facts, laid before your readers with no unnecessary comment.

Perhaps they will prove that we sent no pictures at all! Will they deny that we wrote asking them to lay aside the four pictures which they—but not their rules—objected to? Will they deny the letter from one of their own Judges, stating that only part of our pictures were judged? Will they deny their own letters accepting our pictures as in form? These are our "*allegations*," and unless Messrs. Wollaston and Peasgood are prepared to bring forward some of this *proof* which they profess to have, it is useless to reply further to their present valueless statements.—We are, yours, &c.,

Auty & Ruddock.	W. Parry.
T. Galloway.	J. Pike.
J. P. Gibson.	H. R. Procter.
J. E. Goold.	H. G. Ridgway.
Edgar G. Lee.	Lyd. Sawyer.

IMPROVED BURNISHING ROLLER.

To the Editor.

Sir,—In reply to Messrs. Moss & Mitton's letter in your issue of the 11th inst., in reference to our improved burnisher "Fernande," we admit the hollow roller may be similar to theirs and many others, but the several improvements in ours which render it so valuable are entirely dissimilar to any other: the springs, the chain, bearings, funnel to carry off moisture, &c., which keep the rollers dry, so that they do not require cleaning, are all new in principle. Its extensive use amongst our best firms is a proof of its novelty and value.—I am, yours, &c.,

3, *Guildhall Chambers, Basinghall-street,* C. A. Rudowsky.
London, E.C., April 22, 1890.

THE NEWCASTLE PHOTOGRAPHIC EXHIBITION.

To the Editor.

Sir,—I have been asked by several of the principal London exhibitors to express my views, and also to aid in forming a league having as its object the establishing of greater purity in the regulations of photographic exhibitions, and the greater certainty of obtaining fully capable Judges.

These invites come very opportunely with my experiences and observations at our own display being held at present at Newcastle. Although while these supply me with much data to write upon, they also make me feel heartily ashamed to see so many of the awards pitifully misplaced. I have some small personal consolation in the knowledge that I was only asked to rejoin the Newcastle Society after the award lists were printed and the Judges selected. I do not wish to greatly blame the Local Committee, who have only adopted the same old lines as have regulated many other exhibitions. I think also that in the matter of honesty the Judges stand unimpeachable; but this only makes it the more regrettable that their artistic judgment and care have been so inadequate to the task accepted by them. The pictures are hanging here with their awards attached, in many cases as monuments of satire to artist eyes that photographers, as represented by these Judges, cannot grasp and appreciate artistic points even when they have been by one means or other achieved.

I know the convenient odium which can be attached so easily to an exhibitor who complains about an exhibition at which he is showing, but in this case I have been myself honoured (?) with a silver medal award; so from this personal standpoint I could perhaps be content to remain silent. Besides, I should say not less than twelve of the pictures which I show have been previously awarded medals at the hands of much higher authorities than those deciding in the present show, so that it is a matter, viewed in this light, affecting me but little. But what does affect me very acutely is to go round the exhibition with various artists and critics, as it has been my duty to do, and note the excellent productions of H. P. Robinson, Crooke, Sutcliffe, Winter, Ralph Robinson, and many others confided to our care, hanging reproachfully unrecognised, whilst others with astounding inartistic shortcomings have received first honours.

It is a wretched blunder, and I am afraid will bring us into very bad repute; but "out of evil cometh good," and I feel inclined to prophecy that this will prove the last occasion of admitting these baneful rules and maxjudgments, attached more or less to many exhibitions, and which reaches a distinct climax in our own.

I have been under promise for some time to contribute a series of articles to THE BRITISH JOURNAL OF PHOTOGRAPHY. I hope shortly to get partially out of debt by therein expressing my views on the better arrangement of exhibitions, and especially on the advisability of some "court of appeal" being recognised to protect exhibitors, at least in extreme cases, from the incompetence or caprices of Judges.—I am, yours, &c.,

LYD. SAWYER.

WOOLWICH.

To the EDITOR.

SIR,—For some months past I have had a small class in photography in the above town. It is now thought possible to establish a photographic society for Woolwich and district. May I ask you, with your usual kindness, to insert this letter? that those willing to join may send their names and addresses to yours, &c.,

THE EDITOR OF "OUR SCHOOL MAGAZINE."

3, *Adelaide-place, London Bridge, London, E.C.*

Exchange Column.

Wanted, in exchange for gold watch, 12×10 camera with double slides.—Address, A. P. BAILEY, 22a, Hordern-street, Preston.

Wanted, a half-plate rapid rectilinear lens by good maker; exchange, a whole-plate portrait lens.—Address, Cox, 161, Union-street, Torquay.

I will exchange for a safety bicycle a Victoria camera with four lenses and a camera with nine lenses.—Address, M. POWELL, 72, Market-street, Manchester.

A 1/4 Dallmeyer C.-D.-V. lens, good as new, with stops complete, in exchange for half-plate Enlargers by good maker.—Address, T. J. L., 20, Earl-street, Coventry.

Will exchange, single dark slide for 17×15 plates and focussing slide, same size; wanted, half-plate camera with double slides.—Address, JAMES COLLINS, Turpington, Bayford.

Wanted, Facile or other good quarter-plate detective camera; will exchange whole-plate camera with landscape lens and three double slides.—Address, DAY, Photographer, Monmouth.

Will exchange wall and gate by Seavey for a shouldered background, or vignetting chair, or pedestal. Two lanterns by Middleton, four-inch double condensers, in exchange for studio accessories.—Address, WARREN GOTHARD, Wakefield.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

E. Eccles, Bury.—*Two photographs of the Bury Association Football Club.*

VICTIM OF DRY PLATE.—Send name and address.

E. J. R.—Short washing is the most efficient.

BEFORE HER.—Mr. Barrett's address is 50, Kellett-road, Brixton, S.W.

ROSE.—We have seen views of the highest class taken by the lens mentioned.

A. C. (Manchester).—By slightly increasing the distance between the lens and the stop, the flare spot will disappear.

H. BARRACLOUGH.—The prints are insufficiently fixed, otherwise they seem to be permanent. Do not print quite so deeply.

VANDELEUR.—1. If the bath still tones all right the discolouration is of no consequence.—2. The treatment would be of no advantage.

LITMUS.—If you state the nature of your complaint and send to us we will forward it to the gentleman named, who will doubtless send a prescription.

C. (Barnsley).—The substitution and the powder processes of ceramic photography are not protected by patent. You are at liberty to work either or both.

LONDON N.W. asks which we would recommend as being the best for cheap club enlargements, collodion transfers or bromide paper.—The latter, decidedly.

R. C. W.—The prints in question are not from copper plates (photogravure), but collotypes, and excellent they are. They are far cheaper to produce than photo-engraved plates.

NOVICE.—Glass, porcelain, and ebonite are the best and most durable dishes. The lens as recommended had a ratio of *f*-7. The stops are numbered according to the society's standard.

H. C.—The chromotype is an outcome of the carbon process. It was fully described by us in the JOURNAL for August 16 last year. The print enclosed is a fair example of that process.

WARNER.—Unless the engravings are yellow or stained there will be no advantage in using collodio-albumen plates. Obtain clear plates giving good density, such as those employed for negatives for photo-mechanical process.

G. W. A.—We cannot in this column give designs for studios. If you send us a rough sketch of what you propose to erect we shall be happy to give our opinion thereupon. Any design must be largely dependent upon the position and surroundings.

F. W.—The instantaneous stereoscopic pictures taken by Mr. England and by Mr. Blanchard many years ago were done with lenses of the Petzval form, which had an aperture between *f*-3 and *f*-4. The negatives were, of course, by the wet-collodion process.

AMATEUR.—Messrs. Mawson & Swan, we think, supply plates prepared so that the film can be stripped off. If they do not supply them we do not know who does. The film may be removed from any plate by Pleuer's method, namely, by immersing the plate in very dilute hydrofluoric acid.

LENS (Coventry).—The lens is one of Voigtländer's Orthoscopics. The maker placed the stops behind the back combination, but they may be placed either in contact with the front lens or immediately before the back. We have seen them in all these positions. It is not rectilinear, but will give pincushion distortion.

B. W. J.—As you purchased the plates for almost a nominal sum at an auction sale, and the date upon the boxes shows that they have been made many years, we do not see that you can expect the makers to entertain any complaint as to their quality. Moreover, the business has changed hands since the plates were issued.

HISTORICUS asks: "When did Mr. Henry Fox Talbot first try to fix the images seen in the camera obscura?"—It was on his return to England, in January, 1834, from a visit he made to the Lake of Como, in Italy, in the winter of 1833, where he had been amusing himself taking sketches with a camera lucida and a camera obscura.

A. ROGERS.—1. We have not yet heard from the writer alluded to.—2. Any non-actinic opaque pigment will answer for backing plates to prevent halation. We frequently mix Spanish brown with water, to which we add a little gum water to bind it, and enough glycerine to prevent it from becoming so hard as not to be easily removed by a wet sponge.

B. J. S. wishes to know how he can remove the lacquer from an old lens mount without injuring the polish of the brasswork. He has applied methylated spirits of wine to it without effect.—Let him make a strong solution of common washing soda in boiling water and immerse the brasswork in this, and the lacquer will be entirely removed in a very brief period.

S. WALTON.—Evidently you have sent two prints from the same negative in mistake. It is impossible to mount them so that they show stereoscopically. You are correct in your idea. The subject is an excellent one for a stereoscopic picture. We think, now that you understand the matter, you will do better to mount the pictures yourself than to send them to a professional mounter.

NO. 2 wants to know whether there is any medium or preparation to use for putting washes of black or opaque colours on silver prints to make them run smoothly.—A dilute solution of prepared oxgall, as sold by the artists' colourman, washed over the prints will cause the colour to "take" evenly. Simply licking the surface of the picture with the tongue is sometimes efficacious.

G. DREGE.—If the district surveyor will not pass the plans the best way will be to modify them according to the requirements of the local authorities. You may be correct in your idea as to the Building Act, but it will give you an immense amount of trouble and cause a delay in time to contest the matter. After all, the modification required is very slight and will not interfere with the light.

A. R. S.—1. This query is one that has puzzled photographers for years.—2. Simply by leaving the print long enough in the fixing bath to ensure that it is perfectly fixed.—3. Coat the paper with a solution of dextrine and allow it to dry.—4. Pyrogallic acid and sulphite of soda are used together.—5. At any upholsterer's or carpet warehouse.—6. Do not know the addresses.—7. Yes, if the japan be perfect.

G. B. BEAUFORT.—1. Certainly achromatic lenses can be made of two elements composed of one kind of glass, provided their dispersive ratios are different. Numerous lenses are now constructed of flint glass alone.—2. Cemented back lenses for the portrait combination were made by Voigtländer thirty years ago, and all his extra quick combinations of that period were thus constructed. Both backs and fronts of some of these were cemented triples.

W. HUGHES.—So far as we can see there is no help for it. Any one has the right to erect anything he likes on his own premises, even if it does stop the light from a neighbour's studio. If, however, the studio has enjoyed an uninterrupted light for not less than twenty years the case is different, as "ancient lights" can be claimed, and anything that interferes with them can be prevented. In this case the proceedings are by a suit in the Chancery Court.

EXPERIMENT writes: "I have some bromide of silver which I have thrown down from spoilt and foggy emulsions. Can you tell me of a simple method whereby I can recover the silver, so that I may make it into a slow emulsion suitable for landscapes. I have been aiming at great rapidity, which has ended in fog. What can I add to a foggy emulsion to remove the fog, and so cause the emulsion to work slow!"—The only reliable method for a novice is to recover the metal from the spoilt bromide and commence again with fresh nitrate of silver.

W. BONTMAN complains of the coarseness of the glass now used for focussing screens, and asks if it is not possible for one to make it finer by regrinding it.—Yes, it is easy enough to regrind the glass by using the finest washed emery and employing a small piece of thick plate glass as a muller. If the surface is very coarse it is often a saving of time to commence *de novo* with a piece of plain glass. It may take longer to make a coarse surface fine than to grind a fine surface from the beginning. In starting with fresh glass it will save time if patent plate be employed, as with that the surface is perfectly even and only requires "greying."

'NEW ZEALAND says: "I have been advised to go out to New Zealand, and it occurred to me that you would be able to give me some reliable information anent photographers in that country. Can you give me an idea how many there are in business altogether in both islands? Which town has most? Is there a fair demand for photographs, and are good prices obtained? Would it be difficult for an assistant to obtain a situation, and are they (assistants) well paid? Any information will be thankfully received."—Perhaps some reader who is familiar with the country will kindly give our correspondent the benefit of his experience.

E. P. says: "Can you favour me with any information as to the cause of the enclosed bromide enlargement (Eastman paper) being so flat and yellow? I use a short focus *carte-de-visite* lens by Dallmeyer, and after development by ferrous oxalate immerse in two baths of dilute sulphuric acid (two drachms to two ounces water), well wash and fix. I have made six enlargements from the same negative (a vigorous one), varying from two to ten seconds, and they all show the same fault—flatness and yellowness."—Diffused light seems to have had access to the paper while the enlargement was exposing; also the clearing solutions were not allowed to act long enough.

CANADIAN writes as follows: "Will you kindly let me know what you consider the best method of sensitising paper to give a blue tone. I sensitise about twelve sheets a day on a sixty-grain bath, into which I occasionally put a few drops of ammonia. I find this gives the desired tone, but it takes about an hour and a half to get it. I use the acetate bath and about five grains of chloride of gold to twelve sheets of paper. Should the precipitate from toning bath be brown? If you will kindly help me I shall feel greatly obliged."—The bath used answers well. The long time occupied in toning is caused by the dearth of gold. We are surprised that a "blue tone" can be obtained on twelve sheets of paper with five grains of the chloride. With more gold the end will be obtained more rapidly. Gold precipitated from old baths is of a brown colour.

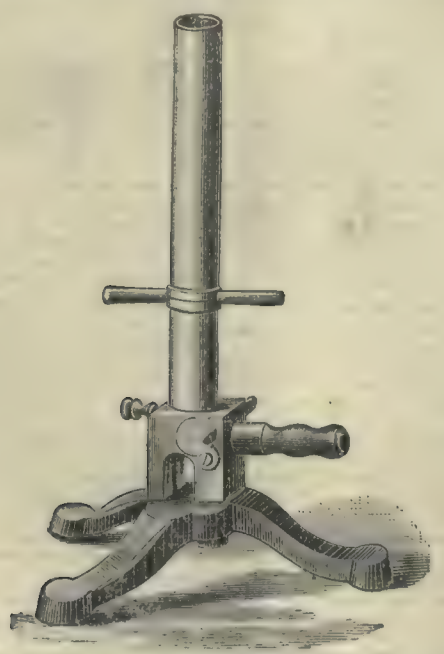
WE are exceedingly sorry to learn that, owing to the scarcity of platinum, the price of the salts used in platinum printing has been raised to a very serious extent.

A FOLDING card, containing the names of the officers, rules, and outings of the Oldham Photographic Society received by us is embellished by twelve portraits of the members of the Council for 1890, and forms one of the handsomest of the kind that we have seen.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, April 30, *The Development of Unknown Exposures;* May 7, *Lenses for Instantaneous Work.* Monthly Saturday Outing, April 26, Buckhurst Hill. Train from Liverpool at eight minutes past two.

WE learn that Mr. W. I. Chadwick, who for fifteen years has been Honorary Secretary of the Manchester Photographic Society, resigns that position. We hope that this step arises from such an increase of Mr. Chadwick's business as a manufacturer of stereoscopic appliances as to compel him to take it.

MESSRS. JOHN J. GRIFFIN & SONS (Limited), Garrick-street, have sent us a small and cheap, but very effective, atmospheric or Bunsen gas burner, which has quite a number of simple appliances for regulating the flame, allowing gas alone to any extent, or gas and air, to be consumed. It is shown in the cut.



The turning of the projecting pieces on the vertical tube forms one of the means by which the flame is regulated. We are much pleased to find that Mr. Robert Murray (formerly of Murray & Heath) is now connected with the above firm. It is a guarantee that photography will be ensured a good place among the output of the firm.

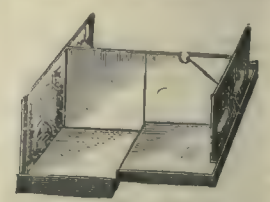
MR. T. R. DALLMEYER will lecture on *Photographic Lenses* in the theatre of the Society of Arts on Wednesday next, the 30th inst., at eight p.m.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical Meeting, April 29, at eight p.m., at 5A, Pall Mall East, when the subject of *Celluloid Films* will be brought forward.

PROPOSED EXHIBITION IN EDINBURGH.—It is proposed to hold an exhibition of photographic work and appliances in Edinburgh under the auspices of the Photographic Society there. The exhibition will be held in the Galleries of the Royal Academy, beginning about the middle of November of the present year and extending over a period of about two months. The arrangements for the exhibition have not yet been fully completed, but will be duly announced.

EXETER PHOTOGRAPHIC SOCIETY.—*President:* Dr. Cheese.—*Vice-President:* Major Dowdall.—*Treasurer;* Mr. Lake, High-street.—*Hon. Secretary:* Rev. John Sparshatt, Fairfield College, Alphington-road, Exeter. Headquarters, The College Hall, South-street. Meetings, first Tuesday in each month. Next excursion, to Silverton, May 10. Notices posted at Mr. Lake's. Visitors to Exeter requiring use of dark room are requested to apply to the Secretary or Treasurer.

THE INSTANTOLUX.—Under this name a shutter has been introduced by Messrs. E. & T. Underwood, of Birmingham. The specimen submitted to us is well devised for both "instantaneous" and time exposures, the former of these being regulated as to duration by an adjusting nut. The exposure is made by means of an opaque screen travelling over rollers actuated in the usual way by a tension spring. For time exposures, pressure on the pneumatic ball brings the aperture in the screen opposite to that of the lens, where it stands subject to a second pressure on the ball, by which the exposure terminates. It is claimed to be, and we believe it is, quite free from vibration.



MR. A. PUMPHREY, Birmingham, has brought out a portable stereoscope formed of cardboard. It folds up in small space, and is sold (with six pictures printed in collotype) for a shilling.

A NEW LIMITED COMPANY.—"Photophane," Limited, is incorporated under the Companies Acts, 1862-1886, with a capital of 20,000*l.* in 20,000 shares of 1*l.* each. From the prospectus we learn that there is to be an issue of 17,000 shares of 1*l.* each, of which 8500 are now offered for subscription, the remainder being taken by the vendors as part consideration for their business, payable 5*s.* per share on application, 10*s.* on allotment, and the balance if and when required at the option of the directors, with two months notice to the holders; or the whole may be paid up on allotment, entitling the holders to participate in dividends on the amount so paid up from the date of payment. (The shares taken by the vendors will carry a liability of 5*s.* per share.) "This Company is formed to take over, work, and further develop the business now carried on by Mr. Andrew D. Edward and others, under the style of the 'Photophane Printing and Publishing Company,' together with the photographic business and plant of Mr. F. W. Edwards, of Bellenden-road, Peckham-rye, one of the first art photographers of the day, whose enormous stock of copyright negatives—many being 23×18 inches, and larger—the collection of over twenty years, will become the property of the Company. Mr. F. W. Edwards will join the new Company as chief photographer and manager of the photographic department." Photophane is a process for mechanically printing photographic negatives. Photophane was awarded at the International Photographic Exhibition, 1889, against all comers the only medal offered for process work, while for art photography Mr. F. W. Edwards has taken eleven medals and several diplomas during the last two years. Over two acres of freehold land have been offered at Croydon, and plans prepared of the proposed new works, every possible contingency being provided for, allowing for the work of twelve machines, with room for extension. A powerful electric light (by which every part of the photophane process can be carried out) will render weeks in winter now quite wasted as profitable as the brightest summer weather. The present proprietors are the promoters, and will pay all expenses relative to the formation of the Company up to allotment, and take nearly all the purchase-price in shares; this has been fixed at 11,000*l.*, of which not more than 2500*l.* need be in cash. The Company will not take over the book debts, nor will it assume the liabilities of the vendors, but the book debts will be collected by the Company, and repaid to the vendors. The Company takes over the business as from the 1st April, 1890. The following contracts have been entered into:—One dated 18th day of April, 1890, and made between William Wainwright, William Holtum Hills and Andrew Duthrie Edward of the one part, and the Company of the other part; and one dated 18th day of April, 1890, and made between the Company of the one part, and the said Andrew Duthie Edward of the other part; and one dated 17th April, 1890, between Francis William Edwards of the one part, and Andrew Duthie Edward of the other part.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1565. Vol. XXXVII.—MAY 2, 1890.

ABSTRACTING WATER FROM ALCOHOL.

Mr. Cosmo I. Burton's article on *Desiccating Agents* will be found a useful and suggestive one by those of our readers who may be seeking any special means of drying in a chemical sense, especially alcohol. Yet even bearing in mind all that Mr. Burton says for and against the various agents mentioned, some of those who experiment for the first time will be liable to disappointment at the results obtained.

For instance, in dehydrating alcohol by means of potassium carbonate the operation as described is of the simplest. It consists in throwing into the alcohol, contained of course in a well-corked bottle, a quantity of recently dried carbonate of potash. If the latter be still hot from the drying, so much the better, for as it cools it absorbs moisture with great avidity, consequently when used hot it not only introduces less moisture into the alcohol, but has a more powerful attraction for that already there. The bottle is then corked, well shaken, and left to itself for a day or two, or longer—the longer the better—the contents being submitted to vigorous agitation at occasional intervals to bring the carbonate into contact with fresh portions of the spirit.

As time proceeds it will be noticed, if the bottle be gently rocked, that overlying the deposit of undissolved carbonate that settles at the bottom is a layer of oily looking liquid separated from the supernatant alcohol. This consists of aqueous solution of potassium carbonate formed by the water at first contained in the spirit; the dense saline solution, being naturally heavier than the alcohol, descends. If this be watched it will be found that the depth of this oily layer gradually increases up to a certain point, when it becomes stationery, and the full effect of the carbonate has been produced.

As Mr. Burton points out, it is impossible to obtain in this manner a higher grade of alcohol than about 95 per cent., that is, of about ·810 specific gravity. This is fully strong enough for all but the most particular of photographic purposes, and indeed so is the ordinary methylated spirit of commerce, which is frequently met with varying between ·820 and ·814 sp. gr.—we have found a sample, purchased in the ordinary way, to be as high as ·813. In treating such a comparatively high grade sample of spirit with carbonate of potash, as much time, or nearly so, would be required to produce the full effect as if the spirit were first largely diluted with water, though a larger quantity of the carbonate would be required. When a large proportion of water is present it attacks the carbonate greedily at first, but as the proportion decreases, its solvent action becomes less and slower, and we doubt whether, provided sufficient carbonate is used, any time would be lost by largely diluting the spirit before treatment.

It is well to remember this, since it recommends this method of strengthening in all cases where a very dilute spirit has to be treated, as for instance such as has been long employed for drying negatives, or has been used for precipitating gelatine emulsions, or similar purposes. But when the object is to still further "rectify" an already high grade of spirit, the game becomes scarcely worth the candle, as the time occupied is out of all proportion to the few degrees of gravity gained.

Besides this, there is another point that must be borne in mind, and one on which the casual reader of Mr. Burton's article may be misled. It may be assumed from that gentleman that after filtration the strengthened spirit is ready for use, consisting of pure alcohol—pure, that is, so far as freedom from alkali is concerned. Such, however, is far from being the case. It is quite true, as Mr. Burton states, that the carbonate of potash is quite insoluble in alcohol—or rather, to make the statement *quite* true, he should have said "*absolute* alcohol." As a matter of fact, if the carbonate does not dissolve in the dilute alcohol of sp. gr. ·810 the same result is arrived at by the *mixture* of a certain proportion of the aqueous solution of it with the alcohol; or, to put it another way, if the alcohol itself does not dissolve it, the water the alcohol still contains does, and the final result is that spirit so strengthened is decidedly if not strongly alkaline.

Of course, for all purposes of collodion making in the old wet plate days, such alcohol, unless subsequently further purified by distillation, was utterly useless. But even in the absence of any chance of contact with free silver, as in enamel collodion making, or for redissolving washed emulsion, the product so obtained is still useless, for the proportion of alkali retained is sufficient to completely decompose the pyroxyline in a very short time, and leave the liquid in a condition in which it is incapable of forming a film on glass. This is no theoretical fancy, but a hard fact, based upon actual practical experience, for the carbonate of potash method would have been of inestimable value in some of the old dry collodion processes *if it could have been used.*

Whether for such purposes as drying negatives alcohol so strengthened would be pure enough to be utilisable we cannot say from practical experience, but in this case, at any rate, it would be a comparatively easy matter to neutralise the alkali. The minute traces of crystalline matter likely to be left in a gelatine film desiccated by this means, whether consisting of the carbonate or of a neutral salt of potash, would scarcely produce any inconveniences in the film itself, and it is only therefore a question whether the alkali as such would operate injuriously; in one respect it is possible it might, for if the negatives to be dried had been finally washed in water con-

taining soluble lime, barium, or magnesium salts, it is tolerably certain that an opalescent veil would appear in drying.

In the case, too, of the application of this method to the recovery of the alcohol used in the precipitation of gelatine emulsion, it might or might not be needful to neutralise the alkali before reusing it. If, as is frequently the case, the emulsion itself contain free acid, the neutralisation would occur naturally; if, on the other hand, the "ammonia method" of preparation were used, it is scarcely possible that the slight addition of alkali from the alcohol could produce an appreciable effect, nor does it seem probable that so small a quantity of alkali acting for so short a time upon a perfectly neutral emulsion could do the faintest injury.

In this appplication it must be remembered that we have to deal with something more than the residual alkali, namely, the decomposition salts abstracted from the emulsion itself. Naturally it is to be expected that some portion of these remain in the "strengthened" spirit in the same manner as the carbonate, but, from experience extending back many years, we are enabled to say that there is not the slightest difficulty in re-utilising for its special purpose spirit that has been treated in this manner over and over again. It may at first sight appear that in course of time a considerable proportion of the salts would accumulate from repeated operations, but so far as practice goes we have never noticed any difference in the effect on the finished emulsion whether the alcohol was absolutely fresh or had been strengthened half a dozen times.

It appears likely, indeed, that after the first treatment the solid contents of the spirit become a fixed quantity, that the liquid has, in fact, a saturation point beyond which it cannot go; that when an emulsion is precipitated the whole of the soluble salts go into solution in the mixed alcohol and water, and that when the latter is treated with carbonate of potash it separates into two layers—the one wholly aqueous, the other mainly spirituous; and that the salts, from their vastly greater solubility in that menstruum, go chiefly to the aqueous portion, while a certain fixed small portion remains in the alcoholic portion. Be that as it may, we repeat we have so used alcohol time after time for precipitation purposes without ill effect.

It is right to point out that after precipitating an emulsion containing ammonia, the additional necessity arises for neutralising the alkali so newly introduced, otherwise, being practically as soluble in alcohol as in water, the ammonia would be equally diffused throughout the bulk. Clearly the neutralisation should take place before treatment with potassium carbonate.

Turning from potassium carbonate to calcium oxide, precisely the same objections can be raised without any additional recommendation. It might be supposed that there was less likelihood of traces of the alkali getting into and remaining in solution than in the case of the potash salt, but such is not the case. Treated with *pure* calcium oxide freshly prepared from white marble, after several weeks' contact the spirit was found to have reached a specific gravity of ·816 (from ·828), to be tinged slightly yellow, and to be even more strongly alkaline than would have been the case if carbonate of potash had been used. Add to this the fact that the lime became so finely diffused throughout the liquid that it was impossible to filter it out, and the only chance of clearing it was to let it settle during several weeks. This, of course, prevented free contact between the lime and the alcohol, and no doubt accounts for the high specific gravity of the product.

We have deemed it advisable to pen these remarks in order to prevent disappointment on the part of any of our readers who may expect, after a day or two's treatment with carbonate of potash, to obtain *pure* 95 per cent. alcohol.

SOME POINTS OF DARK-ROOM PRACTICE.

For the purpose of our observations it would be more correct to say "laboratory practice," but, as among the majority of the whole body photographic the dark room is the place where all chemical manipulations are carried on, we have thought the present title most suited to the circumstances, our purpose being to describe for those of our readers little versed in laboratory work the best method of carrying out such simple matters as the preparing of solutions and other similarly simple operations.

One of the commonest forms of expression in dark-room work has to do with the use of saturated solutions, than which nothing more troublesome to prepare or more uncertain in use occurs in the usual routine of photography. In the first place, a "saturated solution" is usually recommended to be made by placing an excess of crystals in a quantity of water, stirring the whole occasionally. Such a method will by no means prepare a saturated solution. A method by shaking, even at a given temperature, will produce a solution which may vary in strength from five to twenty per cent., according to the frequency of the stirring and the length of time elapsing between the shakings.

Granted a really saturated solution so made, it will vary according to the temperature, being weaker by precipitation or recrystallisation upon the undissolved crystals in the bottom of the vessel during colder weather, and very little stronger in the hot weather, for the spreading upwards of the stronger solution at the bottom of the vessel is at best an excessively slow operation, and, under some conditions, outside the bounds of practice, as will be seen later on in our remarks upon nitrate of silver. The presence of crystals at the bottom of a saturated solution usually results in these crystals growing larger at the expense of the dissolved portion, and so again irregularity is introduced.

If, however, a saturated solution for some purpose or other is looked upon as needful, and the exact proportion of solubility is unknown, a sufficient approximation may be obtained by the method of suspending the crystals on a tray, or in a bag of flannel, or other woven fabric of open texture, just at the surface of the water. Here quick circulation does take place by the action of gravity; no sooner is a little of the salt dissolved than it sinks by its superior gravity, making way by so doing for fresh liquid not so strongly saturated. When left undisturbed for a few days, a solution almost incapable of being strengthened is the result; where solutions are kept usually stocked this is the easiest method, whatever the required strength, as no attention is required. The crystals are put on the top of the liquid and left there. When the solution is required for use, all that is needed is to stir the whole well to mix the layers of liquid at the bottom with the supernatant fluid, for it must be remembered that as the solution forms it falls to the bottom, and does not, as we have said, diffuse itself upwards. This point in making solutions by the gravity method is often lost sight of, and many instances of irregular behaviour of chemicals may be traced to this cause. Many instances have occurred within our own knowledge.

But our readers will say such a method is only applicable

to stock solutions, or the most frequent occasions, for the dissolving of salts needs a quick and ready method, and this would be true. Here at once we may say the majority of photographers do not purchase their chemicals in the way best adopted for ready solubility. We think that in mentioning common alum, chrome alum, citric acid, bichromate of potash, bromide of potassium, acetate of soda, together with "hypo" and nitrate of silver and chloride of gold, we exhaust the list of the salts of common employment in photography. Let us divide them into classes. Nitrate of silver might be put apart because of its costliness, although it and bromide of potassium are very soluble, as likewise is acetate of soda from the smallness of the crystals. These may be classed together as substances which readily dissolve without undue loss of time. Then we have the alums, bichromate of potash, citric acid, and "hypo," usually purchased in crystals, which are large, solid, and require considerable time for their dissolution, even though they be shaken and stirred the whole of the time; there is, however, a readier mode of treating them, and in another article we will return to this subject and explain fully how a much quicker means may be adopted.

We must congratulate the Photographic Convention of the United Kingdom upon having as its Chairman of the Lens Standard Committee Mr. A. Haddon, a gentleman who is certainly adopting energetic means to have the long-vexed question of standard sizes adopted for len. fittings brought to a speedy termination. One meeting, at which almost every maker of eminence was present, has already been held; and another, which is to consist of manufacturing opticians, is called for the 9th inst. It will be a feather in the cap of the Convention if it effects a settlement of the terribly vexed question of diversities in the flanges and fittings of lens mounts. Once this is settled by the majority of manufacturers, it will not be long ere public demand will cause any who may remain outstanding to see it to be their duty and interest to quickly enter the fold of unanimity; and thus will be wiped away a long-standing reproach.

So great is the interest the Emperor and Empress of Germany take in practical photography, that on Thursday last week, besides Mr. O. Anschütz, the photographic chemist, Dr. Adolf Hesekiel was invited to show his platina paper and flash lamp, and explain to the assembled company how photographs can be taken without daylight. Dr. Hesekiel first exhibited several platina prints in different stages of printing, which were greatly admired for their softness, then, by invitation of the Emperor, Count Puckler was first photographed by the flash light, the flash startling the company. The Emperor then asked his consort to give a sitting, but as the Empress declined, the Emperor himself posed. Their Majesties were highly pleased with the results, and expressed to Dr. Hesekiel the pleasure the demonstration had given to them.

Every one will regret with us that the rapid spread of the beautiful process of platinum printing must be, even slightly, impeded owing to the enhanced and enhancing price of metallic platinum. However, for the better class of work this ought not to be the case. Where a good price is charged for the pictures, as is done by most artists who make a speciality of platinotypes, a considerable rise in the price of the material itself will not, after all, amount to much on the cost of each individual print. If, say, a guinea or more be charged for a dozen cabinet pictures, a few pence added to the cost of the paper can well be afforded.

The unfortunate part in the rise in the price of platinotype material is that there is no immediate prospect of its being again reduced. The supply of platinum is extremely limited, and owing to its inoxidisability it is now being applied to many new purposes, one of which, amongst others, is the coating of the insides of steam boilers; hence the existing supply of the metal is not proving equal to the demand. Added to this, the whole of the platinum business is in the hands of a few individuals: therefore, the trade may become, if it has not already done so, more or less a monopoly.

A short time back we alluded to the increased cost of material in the manufacture of dry plates, silver paper, &c. Since then there has been a still greater rise in the price of silver, and one which, with a corresponding increase in the price of the nitrate, will make an important difference in the profits of the consumer. During three days last week the price of standard silver rose within a fraction of threepence per ounce.

An important point in connexion with proof engravings was decided in a Court of Law last week. Briefly, the case is this: Messrs. Tooth, the plaintiffs, sued the defendant, who had, as a subscriber, ordered an artist's proof of the engraving of Sir John Millais's picture, *Bubbles*. The defendant refused the picture on the ground that it was not an "artist's proof," inasmuch as 500 of these impressions were taken, also that 500 more were printed to be issued as "lettered proofs." The contention was that the print had no right to the title of artist's proof when so many were made. One expert, from the print department of the British Museum, stated that after eight or nine artist's proofs had been taken an impression would hardly be called a very fine proof. Another expert said that after a plate had been steeled, no copy taken from it should be called a proof. In the end, the Court gave judgment for the defendant with costs.

There is no question that of late years there has been a continually increasing tendency on the part of print publishers to issue larger and larger numbers of so-called "proofs." This fact should be borne in mind by subscribers for proof impressions of engravings, photographic or otherwise. Some years ago the number of artist's proofs taken from a plate was limited to eight, or a dozen or so, and the number was stated. Then, of course, "proofs" were of value by reason of the few issued.

A copperplate quickly deteriorates by printing, and an expert in engravings would be able to detect a marked difference in quality between the first and, say, the twentieth impression. Since, however, steel facing—that is, coating the copper with a thin layer of iron by the electrotype process—has been introduced, there is little or no difference between the first and the hundredth impression, but then even the first one is not nearly so fine as it would have been if taken from the copper before it was steeled. By the steeling method a copperplate becomes almost everlasting, because when the iron facing begins to wear through, it is easily removed and a fresh layer deposited. But for the steeling process most photo-engraved plates would yield only a small number of passable impressions, very far less than would a hand-engraved plate.

Spring is with us now in all its beauty. It may be well to remind inexperienced amateurs that many subjects may be successfully photographed now which would be impossible later on when the trees are in full leaf. Also, that the light is almost in the zenith of its actinic quality; therefore, over-exposure should be guarded against. Not only is the light extremely active, even when it appears dull, but the young foliage is of a particularly favourable tint for photographing just now.

It has frequently been stated that photographic portraits are not received as evidence of identity in some of the Law Courts, the Divorce Court in particular. In this Court one day last week, according to a daily contemporary, an oil painting of the respondent was admitted as evidence, although the learned judge remarked that "he did not think much of the picture." It will no doubt be surprising to many that a painting should be looked upon as reliable while a

photograph is discredited. Most people, we imagine, would place more reliance upon the truthfulness of photography than painting, though both may "lie frightfully."

Since the question of fading has again been revived, our attention has several times been called to the fact that numbers of prints that are enamelled, or are cemented in optical contact with glass plates, notwithstanding the protection from atmospheric influences afforded, show signs of fading sooner than those mounted on cards or kept unmounted. The cause for this, in most instances, is not far to seek. It is very customary, in enamelling prints with gelatine, to use the most transparent and colourless samples procurable. These finer kinds are almost invariably strongly acid; this can be readily proved by litmus paper. Often when a packet of foreign white gelatine—particularly if it is new—is first opened, a distinct odour of burning sulphur is manifest, from the sulphurous acid used in the bleaching. If a gelatine of this character be employed for enamelling silver prints, or as a mountant for them in optical contact with glass, there need be little cause for surprise if they rapidly succumb, particularly in the presence of moisture.

Good bromide paper prints can scarcely be distinguished in appearance, even by experts, from platinotypes. Although they may be quite as good in every way, they should not be passed off on the public as platinum pictures. We are informed that some photographers with an elastic conscience are actually issuing the former for the latter. This is very reprehensible, if correct. If the practice prevails now, we may well expect an extension of it, seeing that the price of platinotype material is increasing. With regard to the morality of the proceeding nothing need be said. It is, however, certainly illegal to sell silver prints as platinum, even if they are equal to them, or cost as much to produce. Clearly, any one doing so would render himself liable to a prosecution, under the Merchandise Marks Act, for a false trade description.

SILVER PRINTING BY SUBSTITUTION.

II.

In resuming the subject covered by the above title I will first of all place an observation anent the form of nomenclature adopted.

The terms "development" and "substitution," as applied to printing methods, are sometimes taken as if they were interchangeable, but this, I beg to leave to hold, is a mistaken use of them. The definition of "development" as a chemical operation which brings an invisible change to sight is universally accepted, and it is rightly employed in connexion with printing processes which require the partly reduced surface to undergo similar treatment to gelatine plates that have been exposed in the camera. On the other hand, I should consider any printing method, in which a temporary visible impression is formed to be replaced by a substance that is to constitute the final image, as purely a "substitution" process. Passing over the chemical aspects of the various reactions that take place, the physical change produced is a simple displacement of one body for another; thus in the cold bath platinum process, for the blue-brown ferrous image first formed we substitute metallic platinum. Many persons call this a "development" of the picture, and although in a particular instance the term is convenient and even intelligible enough, yet, bearing in mind that the iron image is fully visible and by no means lacking in detail and vigour, I submit that the word is practically a misnomer, for, in point of strict accuracy, "development"—*i.e.*, the rendering of the invisible visible by chemical agency—does not take place. If the reduction of the ferric oxalate proceeded without exhibiting any physical indications of the change, and the invisible (latent) image formed retained the characteristic properties of the present visible image, we might have some reason for employing the term "development" in accordance with the definition above quoted, but even then I am afraid it would not be free of objection. I believe it has been habitual for many years to say that such and such a description of image may be "developed" with solutions of this, that, or the other salt; but if this is an abuse of terms, as I humbly argue that it is, it simply refers the responsibility for the error to other times and persons, and does not justify it. Photography, however, is fertile in loose terminology.

The phrase, silver printing by substitution, then, comprehends a process in which a sensitive, soluble compound spread upon paper suffers deoxidation or reduction wherever light acts upon it, and is so converted to a substance which deposits silver from its solution, while the unchanged body preserves a neutral behaviour, so far as the formation of the silver image is concerned, being, with the reducing substance, simply dissolved away from the support. This exposition will, I think, convey a clear idea of the subject under discussion, irrespective of certain minor considerations associated with it, which may for the present be reserved.

Entirely outside the direct theoretical and practical principles of the question are several heads of an economical description, in reference to which a few sentences may with advantage first be written. A perfected substitution process, having the qualities laid down in the previous article, would, I conjecture, offer many attractions to the professional photographer. As an example, the absence of the costly silver salt from the prepared surface would tend to allay a deal of alarm as to the probable deterioration of the paper. For identical reasons the extent of the "waste" of silver that usually occurs would very likely be narrowed down, while several difficulties that attend the transmission of sensitive paper to distant countries, its storage, its retention for comparatively protracted periods, would, if not wholly obviated, at least in all probability be largely diminished. Of course, the precise nature and properties of the image-forming salt employed would have to be taken into close account in estimating the keeping qualities of the paper. It is, as we know, the presence of the sensitive silver salt in albumenised paper which is responsible for the loss and trouble so often entailed with that process. I do not pretend to urge that in a substitution process the paper coated with one of the many salts that are primarily suitable to form the temporary image would not be liable to the drawbacks of premature decomposition, and so forth; on the contrary, I am fully sensible of the various risks to be run. The list of possible substances is large enough, however, to permit the inference that among them there are probably some bodies capable of being used which are not so readily liable to spontaneous reduction as others under normal or abnormal atmospheric or climatic influences. With one or two of these I trust to be able shortly to deal.

The practical working details of substitution printing can be imagined with facility. First, would come exposure in the frame; next, flotation of the picture upon a silver bath, in which, presumably, there would be another body influencing the quantitative or qualitative character of the image; finally, immersion of the finished picture in a clearing solution. Anybody can see that for simplicity and rapidity a substitution process would compare with any other process extant.

A commercial point invites momentary notice. There is surely no reason why photographers, in a new departure, should always wait for the manufacturers to show a lead. In several establishments it is still the custom to use home-sensitised paper, the floating and drying of which requires no extraordinary skill on the part of those used to the operations. An equal amount of time, labour, and ability would be about all that would be required for the photographer to prepare his substitution paper—using, of course, a suitable surface, in relation to which the only difficulty would be found. The preparation of the sensitising bath, the floating, the drying, would cover all that was new. After printing, the probable number of reagents required would be three—all doubtless to be found in every well-appointed photographic laboratory, or within reach of it. I suppose no professional photographer buys ready-made developing solutions for negative work, and would not purchase (say) ammoniacal silver nitrate, however miscalled, for substitution printing, and pay two or three intermediate profits upon it, when an assistant could far more cheaply make up a stock solution from materials (including hydric oxide) obtained at first cost.

Although I have dwelt upon these extraneous points at some length, I do not suppose the general considerations affecting substitution printing are by any means exhausted. I have all through assumed the ready feasibility of perfecting a process that would yield results not, on the face of them, inferior to platinum or developed bromide prints. It is to be surmised that the ordinary photographer, being

human, has the desire to rely upon the manufacturer as little as possible. A silver substitution printing process would, at less trouble than many existing methods entail, place him in a position of perfect independence. There was a time, now dim and historical, when the photographer depended more largely upon his own resources than to-day, and it is likely enough that a partial return to such healthy and stimulating conditions would not act to the prejudice of his professional well-being at the present time. THOMAS BEDDING.

THE ART OF RETOUCHING.

CHAPTER VI.—STUDY OF THE FACE (*continued*).

THERE are many who, although very fair artists, have never given this subject sufficient serious consideration. To those who intend making *portraiture* their especial *forte*, it is of absolute necessity that they should study the face exhaustively. I fear, however, they do not always do so. If you were to ask an ordinary student where the strongest likeness or individuality of any given subject is to be found, he will in all probability be rather puzzled, and unable to decide. This should not be so; he should be able to form a strong and well-founded opinion at once. Of course the locality of this leading expression or feature may vary considerably in many heads. In one it may be centred in the eyes, or nose, or the formation of the lower part of the face. In many cases, too, it may be in the forehead, although it is not usual to look in that locality for the seat of likeness. Now there is no sound reason against our looking for the leading characteristic of a face on the forehead. On the contrary, if we give this point our most serious attention, I feel sure we will be able to recognise that the forehead possesses in most cases a very strong and marked *likeness* or *individuality* stamped upon it. Another point which may never have struck the student is, that this individuality or leading characteristic, when situated upon the forehead, is not at the command of the possessor to alter or disguise.

It is strange how one may gain sound information on a subject, or have their attention forcibly drawn to it, as will be seen by the incident which first caused me to direct my attention to this oft-neglected portion of the face. Indeed, it was a strange accident which caused my attention to become firmly riveted upon this feature (the forehead), and showed me the advantages to be gained by giving it its proper amount of consideration.

One day, by the merest accident, I was introduced to a very prominent member of the Criminal Investigation Department of Scotland-yard, and after touching upon many subjects, and repeating many anecdotes, the conversation turned upon the power of recognising people under various conditions and disguises. This, in due course, led to the question as to where the principal seat of likeness was situated, and deciding upon this point we had to take into account the power of the possessor to alter or change it in such a way as might render it more or less unrecognisable. This, as any one may easily guess, led to a pretty long discussion, and during its continuance I was more than surprised at the extraordinary emphasis he laid upon the upper part of the face. The instant he advanced his argument I was bound to confess that he was perfectly right, and ever since have given more than ordinary attention to the retouching the forehead with a view to preserving all its minute details and characteristics.

"Give me a man's photograph," he said, "and let me see his *forehead*, and I will pick my man out of a thousand!" In this connexion he mentioned the name of that archfiend Peace, a man (if we may term such a monster a man) who had the most complete control over the lower half of his face. To such an extent indeed did he prove his power of altering it, that he did not hesitate to mix with the very men whose duty and business it was to arrest him. Now, had the officers in charge of his case been endowed with the same thoughtfulness as my friend suggested, there is but slight reason for doubting that he would have been captured the first time. As he said, "When I *want* a man, and have any doubts, *I try to see his forehead*: here I find the likeness over which he has no control. No man has the power to change this feature, while all others he can influence to a greater or less extent."

I saw the truth of all this in a moment, although I candidly confess I never before looked for much *likeness* in this locality. The forehead is a massive shape, and one, too, over which the muscles have no permanent power; it is solid, possessed of delicate formations, which carry with them no small amount of recognisable likeness. My attention once drawn to this point, I am bound to say I have since given this portion of the face more study and thought than I had ever done before. It is because I believe it (from experience) to be so essential that I now place this little experience before the beginner. When we thoroughly realise that every little *half tone* is a necessity, and must be preserved for the special purpose of securing likeness, we will not start recklessly and *smooth* the foreheads of our negatives in such a way as to ruthlessly destroy those slight markings, which, if preserved, would so largely tend to make a lifelike and striking likeness. No portrait can be regarded as successful if devoid of these most essential qualities.

For many, a "pleasant picture" is all that may be required; but this idea must not form the basis of our study. We must know the correct treatment first, we can then modify and pander to all the whims and desires of our misguided customers without having our own powers degraded, or at least corrupted. I am very glad to be able to say that the unbridled flattery which found such universal favour some few years ago is no longer in such demand. To the skilful retoucher much, however, is still allowable, and much is expected from him in the way of artistic effect; but all these he can accomplish without destroying the individuality of the portrait.

The forehead having been made a special study will, after a little practice, become an easy feature for the accomplished retoucher to exercise his skill upon. We can then proceed lower and treat the other features. Having completed the forehead down to the brows, we come to the eyes. In all portraits the eye should be a dominant feature, full of expression and life. No portrait can be lifelike or resemblant with imperfect eyes, and too much trouble cannot be taken to render them effective and full of expression. This organ, if not altogether overlooked, is too often regarded as a secondary consideration, both by retouchers and photographers; yet it is one, the proper treatment of which demands the greatest care and skill. As our object is to thoroughly master all the various details of the face, so as to arrive at the greatest degree of excellence, special attention must be directed to this organ and its treatment. The eye is a feature greatly effected by time and other natural influences, and it is as well to know where to look for these changes, and how we should treat them when found. This is a knowledge which *must* be acquired, for it is better far to leave the eye altogether untouched than attempt to treat it without sufficient knowledge as to how we should proceed.

The progress from *childhood* to *youth* is indicated in the *inner* angle of the eye, while as years roll on and manhood advances, on the *outer* angle will be found the indelible records of advancing time. These we must modify, but in so doing must take great care not to lose any of their character. The difference of expression and character between the eye of a man and that of a woman should not be passed over without sufficient consideration. The eye of the former is benefited by the possession of a look at once epic and philosophical, while that of the latter must be depicted in all softness and brilliancy expressive of tenderness and sentiment.

The eye of a lady should be, as a rule, treated as in full light, so as to demonstrate and clearly bring out all the characteristic delicacy of construction possessed by it. When photographed in such a light as may show every detail of structure, the desire to intensify or accentuate all the visible niceties of form may often lead the student to error, if not to utter discomfiture. In small portraits, even if we succeeded in detailing all the little feathery forms noticeable, it would be absolutely impossible to handle the eyes with such accuracy of relative density as would preserve the lifelike expression so necessary, and would consequently be a useless expenditure of time and trouble. Where the rendition of very minute details is not necessary to resemblance they should be merely indicated; this is mostly observable in large light and shade portraits, and they require the most scrupulous truth and judgment in their treatment. In all negatives where every minute portion of the structure of the eye is thoroughly depicted, every line must be rendered, but with great care, as should certain portions be touched in such a manner as would result in spottiness or severity, utter ruin would be the inevitable result. When successful,

however, such treatment results in imparting a considerable amount of breadth and natural effect to the picture—qualities well worth securing.

A light sufficiently strong to throw the eye into deep shadow is one that should not be used for photographing persons advanced in years, as it is most unfavourable to the truthful production of likeness. It will not only signalise much too forcibly the indications of age as regards the eye itself, but also the surrounding traces and indications of age will be accentuated to a most unnatural as well as most unpleasant extent. When, however, such a light happens to be used, it will be the retoucher's task to preserve breadth by preventing dark spots appearing upon broad lights and subduing any bright spots of light which may be showing in the dark tints and half tones, or, in other words, producing general softness of gradation between the lights and shades. There are cases where success in this direction will be found almost impossible, if not absolutely so, but it should always be conscientiously struggled after.

To convey the impression of vitality and intelligence to the eye, every part of it must be accurately adjusted and cared for. The light reflected in the eye must be many degrees brighter than that of any other portion of the face, having strict regard to the ever necessary preservation of general harmony with the surrounding portions.

The eyebrows in dark-complexioned people should not be treated in such a manner as would make them appear a hard or solid mass; retouching the flesh in a sharp line up to the brow will produce this very undesirable defect.

The cautionary remarks against *severity* or *hardness* of lines apply equally to all parts of the face, such effects being altogether false to nature as well as contrary to all feelings that are artistic. The exceptions to this rule are very few indeed, such as in the cases of men with very *bushy* brows, or here and there *tufted*, or perhaps a break in the hair; these points must be represented by very spirited and decided touches with a soft and blunt pencil, but no attempt must be made to individualise the hairs, as such would be sure to result in failure both as regards effect and fact.

A striking feature, and one upon which much of the character of the eye depends, is the upper lash; the lower contributes but little to the marking of the eye. The proper definition of the eyelids and eyelashes has considerable influence on the beauty of a portrait. If the former should have moved slightly in exposure we should do our utmost to *sharpen* them, and so give force to the drawing of the eye and its surrounding. Of course the fault of this lies with the operator, but he is many times unable to avoid it, owing to the restlessness or nervousness of his sitter. If the lower lash be without sufficient force to throw up the eye, we should help it a little by accentuating some of the surrounding lights that might create a contrast, and if that does not prove sufficient, a few touches on the print will accomplish our object.

The treatment of the eye may honestly be considered complete when we have thoroughly mastered the working of its surroundings, as in most cases the eye itself is best left alone. Extreme care, however, must be given to retouching that portion of the face under the eye, and situated between the lower eyelash and the cheekbone, because if it be retouched sharp up to the eye, it will produce a harsh, dark line, which is most objectionable. Too much care cannot be bestowed upon this feature when at all touched upon, so better by far leave it alone than, retouching it, fail to do it justice. Having succeeded in treating this feature satisfactorily, we must turn our attention to the rest of the face. REDMOND BARRETT.

SILVER PRINTING.

A FEW EXPERIMENTS AND DEDUCTIONS THEREFROM.

ONCE more the question of permanency of silver prints has cropped up, and, so long as the process remains popular, may be expected to be of periodical recurrence. Much has been already said, and so much is known of the attributed vagaries of the process, that there is very little new to learn or suggest respecting it. Recruits to the army of photographers are continually being added, so that the repetition of an oft-told tale has at least the advantage of newness to some one or other. It strikes one forcibly that if only a tithe of all that has been known and written was remembered, it would leave little or nothing more to say. Permanency, to begin with, as connected with photographs, is a debateable term, and I do not think that any one giving thought to the matter will deny that the metals employed vary considerably in their powers of resisting atmospheric influence, and prints made by their aid seem to have a proportional resistance. We know that silver prints, made when albumen was first introduced for the purpose, are now in existence and good condition, and also that very many have become faded and obliterated; in fact, there is no disputing that the greater proportion of them have become faded and yellow—two distinct faults, by-the-by, which might have been confidently predicted of a process worked as largely and in the incomplete and unintelligent manner that silver printing on the whole has been. If we know why faults exist, we ought to be able to apply a remedy, and this by carefully examining the methods used in their preparation; but then, influenced by the general consensus of opinion almost entirely based on seeing so many defective prints, faults—owing to all manner of slovenly and makeshift plans, as certain in themselves to lead to disaster as if the prints were deliberately put in the fire and burned—have been without further thought ascribed to the instability of the process.

Many years ago a number of skilled chemists took the matter in hand, and the result of their investigations was certainly adverse to the permanency of silver printing; the conclusions arrived at were not encouraging with respect to the permanency of the process. No satisfactory explanation has been given why some silver prints remain perfectly good for an indefinite time, and others, prepared apparently in a precisely identical manner, fade rapidly away. The unknown quantities to be dealt with are seemingly fatal to any definite conclusions being drawn. The paper itself may be good, bad, or indifferent, and may be responsible for the eccentricities of prints made on it, but over which we have no control; in itself sufficient to upset any theory or to vitiate any experiment. Albumen also, or whatever does duty for it, varies considerably in quality. At certain periods of the year much of the egg albumen is obtained from preserved eggs, and behaves differently than from fresh eggs, and is less suitable for albumenising. Albumen is also obtained from other sources—another matter rather beyond the control of ordinary photographers who do not, as formerly, prepare their own paper.

Then, again, the different methods of preparation in order to gain a glossy surface and make the paper keep well after sensitising add to the difficulties of the case and prevent any definite and reliable conclusions being drawn from the experiments photographers are enabled to make, for it is not very probable they will revert to the old plan of albumenising their own paper.

Independently of all this, there is no reasonable doubt but that a strong negative printed on heavily salted paper, sensitised on a strong silver bath, will give a more permanent result than the system adopted nowadays, when most other qualities have to give place to modelling and delicacy. The results are undoubtedly more beautiful, but less permanent. Without retouching (and the complaint of fading prints is almost entirely from portraitists), the majority of modern portrait negatives are thin images made up to printing strength by retouching, and it is to the lead pencil rather than to the real negative the photographer looks for effect, such negatives printed in the sun or very strong light giving but poor prints; the whole process is as much as possible contrived to give the best results from such negatives. Many photographers make a practice of reducing their over-printed proofs after they have been finished, so far as their final washing is concerned, by re-immersion in strong hyposulphite solution or weak cyanide of potassium until the image is sufficiently dissolved out. Prints reduced by either plan are probably less permanent than others not so treated; at any rate, the colour is somewhat impaired. Possibly the reducing action on the albumenate of silver, of which the modern prints are so largely composed, starts a decomposition that gradually continues till the proofs are worthless. Of course, this applies to the first fixing, but is more pronounced with a second treatment, for it must be borne in mind that silver prints of the present day contain much less reduced silver and more organic matter than formerly, and are, as a matter of course, more easily affected by the hyposulphite and other reducing solutions.

The whole system of silver printing, as applied to portraiture in the present day, seems calculated to produce nothing but fugitive prints; they are certainly things of beauty, but not joys for ever. The origin of the want of permanency is primarily in the thin negative; then follows printing on weakly salted papers, with a thick layer of albumen, and toning with a small quantity of gold. The fixing I believe to be frequently inperfect, and the washing afterwards very much too long. It is an undisputed fact that if prints are *properly* fixed, and the hyposulphite *rapidly* extracted afterwards, with a short washing to complete, prints will be *very much* brighter and better in colour and gloss than if the hypo is slowly eliminated and the washing continued for many hours. This reduction of gloss by long washing seems to indicate that the albumen surface is partially dissolved by the long continued action of water, and at the same time incipient decomposition presumably sets in, the very means intended to enhance the permanency having precisely an opposite effect. If the negative is strong and good, the printing conducted in strong diffused light, a reasonable quantity of gold used in toning, the hyposulphite bath good and sufficiently strong, the fixing thorough, and the washing effectual but brief, all precautions will have been taken that are required in the ordinary course of silver printing, and the results should be satisfactory in the matters of permanency and brilliancy.

The hyposulphite solution, which is a very important factor in the matter of permanency, may be inadvertently used too weak. The hypo may be bad in quality, so that when the proper quantity is weighed out the solvent powers will be much below the standard, or a large number of prints having to be fixed, the strength of the solution being sufficient for the first lots is not so for the last, the consequence is, a proportion of the prints partially fixed yellow and fade after a comparatively short time, the first remaining good.

The next cause why silver prints fade is owing to the mountants or the mounts. The mountants in general use are starch, glue, flour-paste, and gum arabic; of these starch is the most popular, and when pure, perhaps as good as any. Starch and glue may, and frequently do, contain impurities that will destroy the silver print; the pure articles themselves, when made up for mounting, may become deleterious by keeping, which indicates they should always be freshly made. The white powder starch used for medical purposes is the best kind for photographers. Good flour-paste is not to be despised; it adheres well, is unobtrusive, and cleanly.

The mounts themselves are frequently complained of. I am very doubtful if much harm accrues from this source. Some few years ago I mounted prints with starch and with gum on some of the common yellow-brown straw-packing boards and put them aside. Up to the present time there is not the slightest trace of injury apparent. This sort of board has the credit of being particularly impure. I have sometimes noticed that when impure mountants are used with a brush, the brush marks are distinctly shown by faded or yellow *lines* on the face of the print, presumably where a rather thicker layer of the mountant remained. If fading was inherent in the print it would show itself in *patches*, or it might do so if the mountant was spread evenly by a roller or other means. Providing the mount itself was in fault, *patchy* discolouration and fading would also take place. *Spreading* spots with nuclei indicate foreign matter not necessarily connected with the preparation of the print, in all probability particles of a sulphur character. Metallic spots on the paper are visible and at *their worst* as soon as the print is finished; they never spread afterwards. Mounted prints usually begin to fade and go yellow at the edges, the fault gradually spreading inwards. This is generally attributed to the action of the atmosphere on the less protected parts—the edges. If this theory is right, unmounted prints, to which the air has free access all over, should be the first to fade; but, as we know, the contrary is the case. The conclusion one naturally comes to is that the cause of fading is either in the mount or mountant, and not in the print itself. Why modern prints more rapidly deteriorate than those prepared years ago seems to be because they have not the stamina in them to resist pernicious influences, even if carefully prepared in all stages; and as many are not so prepared from a chemical point of view, thousands come to grief, and poor silver printing gets more and more the character of an unreliable process without deserving it. EDWARD DUNMORE.

NOTES ON YELLOW SCREENS.

THAT photographers, both amateur and professional, are waking up to the advantages of using colour sensitive plates is clearly shown by the numerous inquiries that are made about yellow screens and how they should be employed. I propose, therefore, to give a few hints which may prove useful to those who have not had much experience with colour sensitive plates and screens.

Some writers have insisted that no advantage is gained by using colour sensitive plates unless a yellow screen is used with them, and no doubt this is perfectly true of some of the so-called "*orthochromatic*" plates in the market; and, curiously enough, the idea has gained a strong hold on the minds of many photographers that a colour sensitive plate will not work unless a yellow screen is used in conjunction with it, just as a steam engine will not work unless heat is employed to generate the steam. If a colour sensitive plate is worth its name as a photographic dry plate, it will (without a yellow screen) give results equally as good as the best ordinary dry plate on any kind of subject, even though it be the reproduction of an object without colour of any kind, such as an engraving for instance; but immediately colours have to be photographed, then a gain in favour of the colour sensitive plate is immediately apparent, more or less strongly pronounced according to the character and colours of which the subject is composed. Thus take the engraving again. Let us suppose the paper on which it had been printed had become yellow with age; then, as the ordinary plate is almost as insensitive to yellow as to black, the resulting negative would be flat and wanting in contrast, but the plate truly sensitive to yellow (without a yellow screen) would give a bright, crisp negative, which would throw a print correctly representing the difference in the values between the black and yellow.

I have carried out a series of experiments with isochromatic plates, and have arrived at the conclusion that the indiscriminate use of the yellow screen will, in many cases, lead to exaggerations almost as fatal to pictorial effect and truth as the well-known incorrect rendering of certain colours by the ordinary processes.

Before treating of the practical use of the yellow screen, a short description of the construction of some of the screens with which I have experimented may be of service as enabling those who are unacquainted with the subject the better to follow me.

The most useful form of screen is undoubtedly one made of optically worked glass, placed either in front of the lens fitted into the hood or at the back of the lens inside the camera, made either to fit on lens mount, if the lens projects sufficiently through the rising front, or it may be attached to the inside of the rising front. The advantages in favour of the glass screen are that any size of stop may be used, and if fixed inside the camera may be used with any lens, provided that it is large enough to allow all the rays of light reaching the sensitive plate to pass unobstructed through it.

It must, however, be borne in mind that ordinary yellow glass is utterly unsuited to the purpose, as unless the two surfaces of the glass are perfect planes, and absolutely parallel to each other, the rays of light would be bent in passing through it, thus making it impossible to obtain a correct focus. This defect would not be overcome by focussing with the screen in its place, as some parts of the image might be quite sharp, whilst others would be distorted. A simple test as to the suitability of a screen of this description is to look through it, held at arm's length, at the sash bars of a window when the light is fairly good outside. If the shape of the sash bar, as seen through the screen, is distorted in the slightest degree, or appears thicker or thinner than the adjoining part not seen through the screen, then the screen should be condemned as unfit for the purpose. If perfectly made the screen would not make any difference in the *size* or *shape* of an object viewed through it.

Another useful screen is that made in the form of a diaphragm fitting in the diaphragm slot, the aperture in this case being covered by a thin transparent yellow film. The only drawback to this arrangement is, that as the screen forms a stop in itself a separate screen is required for each aperture, unless the screen is made for full aperture and stops made sufficiently thin to fit in the slot with the screen. This form of screen cannot be used with the revolving or Iris diaphragm.

A well-known writer in the photographic journals recommended coating one of the surfaces of the lens with a coloured collodion; this is, perhaps, the least convenient method that could be adopted, as it would necessitate removing the film every time that the lens had to be used without a screen, and in the case of landscape work would mean carrying a bottle of coloured collodion into the field. Apart, however, from its inconvenience, applied in the manner recommended, collodion is not a suitable medium for the purpose, as the most transparent and structureless collodion that can be made has an opalescent

appearance when a dead black is viewed through it. This characteristic of collodion has the effect of causing a slight diffusion of the rays of light passing through it, and should be of use to the "naturalistics," as by its aid a moderate diffusion of focus could be obtained, the amount of diffusion depending on the quality and thickness of the collodion.

For most general purposes a screen of a very pale tint—one that would increase the exposure about three times—will generally be found most serviceable.

In order to discover if any isochromatic effect—or better rendering of colours—could be obtained by using a yellow screen with ordinary plates, I have made numerous experiments, but have not found any advantage; in fact, in many cases better negatives could be obtained with ordinary plates without the yellow screen than with it. The yellow screen increases the exposure with ordinary plates to a much greater extent than with isochromatic plates, thus a yellow screen that would only increase the exposure about three times with the latter plates would require about ten times the exposure when used with ordinary plates. In order to secure cloud effects on ordinary plates, Captain Abney suggested using a yellow screen that would increase the exposure about thirty times, this would make it extremely difficult to secure good results, as the prettiest cloud effects are generally to be obtained in windy weather, when the clouds travel rapidly. With a colour-correct plate, clouds are much better rendered than with ordinary plates, but in some cases, in order to secure a good cloud effect, a pale yellow screen may be used.

When hazy distances have to be photographed, a yellow screen can be employed with advantage; but if the screen is too deep in tint, the atmospheric effect would be destroyed and the distances made to appear too near. I have two photographs in my possession—one on an ordinary, the other on an isochromatic plate—of a view looking up the Lleder Valley, North Wales. The light was about the worst I have ever exposed a plate in; an indescribable muddy mist hung over mountain and valley. With the ordinary plate the foliage, only about sixty or seventy yards away, is practically lost in mist, but with the isochromatic plate every detail is visible, and the different shades of green, &c., are correctly rendered. In this case I used a rather dense screen, but a paler screen would have given a better effect, as the distant foliage is made to appear rather too near to be truthful; but the result is infinitely better than the best that could have been obtained under the circumstances with ordinary plates. In a future article I propose giving the result of experiments with screens in portraiture and photographing oil paintings, flowers, &c.

BIRT ACRES.

SPEED.

THE present time is remarkable for the advance which has been made in every branch of science. The last few years have been more particularly distinguished by the practical application to every-day use of the knowledge of the scientific discoveries of previous periods. The demand for increased speed, inseparable from commercial life of the present day, has pressed into its service the agency of things which at first were looked upon almost as luxuries; they are now regarded as *essential* to business. Great progress has been made in photography during the last fifty years, but the next fifty years will see a greater advance. It will probably see the general adoption of daily illustrated papers by *photography;* and though many may say it is impossible to send a photograph through a wire, I am under the impression that it will be done before five years have passed away, for with the effects I have produced in my latest experiments I have come to the conclusion that it is *not* impossible to reproduce a photograph transmitted by electricity through a wire. Don't forget that more than thirty years ago Professor Caselli transmitted drawings through a wire. Each invention acts as a lever by which we invent or improve on others, for no man is a real inventor; all inventions are an improvement or advance on what others have found out before us. We only want to look at what others have done in a sober light, and with coolness and patience try to improve, and then it is not long before we shall see the benefit of our efforts. Try to grasp things through the eye first before you grasp them in the mind, for we must remember that the difficulty of unlearning is greater than the difficulty of learning. Let things be impressed as you see them, not as you know (*or at least fancy*) them to be, for knowledge can only be obtained by observation, and observation will lead to improvement; and experience will show that an improvement upon anything, no matter how remote from every-day life it may first appear, ultimately confers unforeseen benefits on commercial life.

By the aid of these bands which I show you to-night it is possible to reproduce 1000 years hence the ceaseless stream of life as it is to-day—with the varying dress, gait, &c.—also the changing elements of the scene, not merely a cycle of motion, but a continuous representation of street life from a given point. These bands are taken with a camera I have in my possession. It will take ten pictures a second by merely turning a handle, and there is no difficulty in doubling that number, doubtless most important for investigating nature's secrets, of which photography is the pioneer; but there is no need for my purpose to take them at shorter intervals than one-fifth of a second, which corresponds the nearest to our persistence of vision. It would take too long to go into this now, and if any one is interested in it they can see page 150 of this year's *Year-book of Photography*, where I have gone more into detail.

FRIESE GREENE.

MEANS OF PREVENTING LIGHT GETTING TO THE SENSITIVE PLATE IN THE COURSE OF DEVELOPMENT, AND CAUSE OF FOG ON LANTERN SLIDE COVERING GLASSES.

[A Communication to the Liverpool Amatuer Photographic Association.]

THERE can be no doubt that millions of good negatives are lost to photographers every season from carelessness or ignorance as to the protective power necessary whilst the sensitive plate is in process of development, or if they escape utter destruction, a weak, flat negative is the result, wanting in contrast, pluck, and sparkle. Too frequently failure is put down to bad plates or bad chemicals, or some may be satisfied with a modicum of success, and lazy or indifferent as to future excellence. To arouse people of this sort, place a first-class negative before them, and they will immediately inquire who the maker of the plate is, and what developer was used.

A man is sure to get into trouble that attempts to build a house with a rickety foundation. I don't mean to say this is the only difficulty the aspiring amateur photographer will meet with, for every one will find their name is legion. Let us begin at the beginning; so much for the preamble. The instrument I use to arrive at a definite value of the glass in the dark-room window is a pocket spectroscope as made by Browning, of London. Suppose it to be ruby glass, I apply it to the glass, and when I see a total absence of the green and blue I come to the conclusion it is safe to proceed developing; but I am not satisfied with a local examination, but run over the entire surface of the glass. This caution is required, for rarely do you find the ruby colour equal all over the sheet. This arises from the difficulty the glass blower has in spreading it equally, for the colour is the merest veneer on the surface of the glass. I illustrate this by two pieces cut from the same sheet; *one* is *perfect*, and the other worthless, or, rather, fraught with danger to the operator's negative. The density of ruby in a molten state requires this mode of treatment, and hence the main body of it is white transparent glass. This gives it the name of "flashed glass," and is done with other colours beside ruby. I think I hear some say, "ruby hurts the eyesight." That is so, and that difficulty vanishes by sliding a piece of finely ground white glass over it. This softens it to the eye, and spreads the light equally over the room.

This arrangement has the advantage that no change by light or damp or other deleterious influences can take place. Now we come to subordinate colours, viz., red *stained glass*. (It was from this glass I invented glass vignettes.) This colour is got by mixing the chloride of silver with Venetian red as a vehicle to spread it over its surface, and may be done on both sides. It is placed in a furnace until it gets into a semi-molten state, and on its being allowed to cool very gradually, say for six hours, may be taken out and cleansed. I show you specimens so treated. If you apply the spectroscope you will find the green and blue reappearing in a small degree, and hence the necessity of using paper and ruby calico to assist its weakness to prevent the prism of the actinic power. All these additions gradually change colour by prolonged light and damp. The last specimen I present you with is *pot* metal, yellow-coloured throughout its body, in glass pots, and hence its name, but it is weakest of all, and is only used with orange paper. Old septuagenarians may say, "we only used yellow glass, and got good pictures." All this has departed, for our sensitive plates are fifty times more sensitive. There were no isochromatic plates in those days. I may mention that an ordinary prism will answer the purpose of a spectroscope, and I bring you one of home make to show you.

CAUSE OF FOG ON LANTERN SLIDE COVERING GLASSES.

Prior to 1840 all window glass in this country was made by seaweed being used as the fluxing power, and went under the name of

"kelp;" it yielded six per cent. of alkali: and it was not until 1845 that Mr. Jas. Muspratt, of Liverpool, invented and manufactured soda ash which yielded forty per cent. of fluxing power, and the demand for glass making became a monopoly in his hands, and he reaped a handsome fortune. The impulse that this discovery gave to glass making in this country was immense, and it was not long before we discovered that the sand in this country was largely impregnated with iron, hence our glass was a dark colour compared with the French sand that was entirely free from iron. In consequence of this discovery we tried how best we could overcome this disability by counteracting the effect of the iron by introducing a flux calculated to alter the colour to white, as made in France. Chemists recommended manganese. This was adopted, and at first appeared to succeed, but on exposure to a summer's sun it became a pink colour, and the consequence was studios just established found their exposures were doubled. This was abandoned in favour of arsenic, and a year's experience proved that it turned yellow, and that it was no improvement on the manganese plan. Another step was taken by increasing the amount of soda in the mixture, but this proved a failure also. It was left to the introduction of Siemens' gas furnace to minimise it to so small an extent that it was not worth while to follow it further. Hitherto America has been a great market for the export of glass from England, but enterprising Americans are gradually shutting their doors against us, for they have yielded to the temptation of a large import duty in their favour, and the old mother country is being gradually extinguished.

In THE BRITISH JOURNAL OF PHOTOGRAPHY of the 18th inst. there is an account of the proceedings of the London and Provincial Photographic Association, with my old friend Mr. A. L. Henderson in the chair, stating that whilst in America lately "he read an article on the *green-glass effect* sometimes found on the cover glasses of lantern slides." I now place before you one handed to me by a member of this Society, and pronounce the effect as silicate of soda, and that English glass is now perfectly free from this defect.

JAS. ALEX. FORREST.

MOUNTING PHOTOGRAPHS.

THIS, in one sense, although almost the final stage a picture reaches, is by no means the least important, for no matter how much care may have been bestowed in bringing a print through the numerous operations ere it reaches the final stage, it is unquestionably a fact that much may be done in the way of spoiling what otherwise would have been a perfect result by carelessness in the mounting.

In considering such an important subject as this, undoubtedly the question of primary import is, What is the best mountant to employ?

In the case of ordinary prints on albumenised paper, where the final support is cardboard in some form or other, it will be at once obvious that the operation of mounting such will differ considerably from what would be necessary in the case of, say, an enamelled print, where the picture is much thicker, through having received in the operation of enamelling a backing of thin cardboard to enable its removal from the enamelling glasses. I propose to deal with the former class of work first—viz., what I may term every-day ordinary work.

From time to time the question of unequal expansion of prints crops up also, and this leads to a consideration of the question whether or not a print ought to be mounted in a dry or moist state. Before, however, going into this part of the subject, it may be advisable to give some little consideration to the class of mountants most generally in use. Outside of professional mounting, I take it that by far the most common substance in use by nearly all amateurs, or those who only now and again have a batch of prints to mount, is common starch. Doubtless its presence in nearly every household, and the ease with which a quantity of mounting medium may be produced with its aid, accounts for its wide-spread popularity. Starch, however, should never be used hot; and when such is to form the mountant it should be freshly prepared, and allowed to turn cold before being used. Starch, however, will not keep in good condition for any length of time, and this had led to many other substances being employed in lieu of it as a mounting medium, among which, notably, may be mentioned gelatine, or a mixture of arrowroot and gelatine. Among the latter class of mountants, perhaps the best form of making such is the following:—

Take a tablespoonful of arrowroot, and with a little water stir same until a nice cream is formed. Soak about sixty grains of gelatine in water till same is soft, then add both the gelatine and arrowroot to as much water as will, when boiled, form a nice thin paste. Allow this to partially cool down, and then stir in five ounces of alcohol and a few drops of carbolic acid. When cold, this forms a nice paste, and when going to use, take out with a clean spoon as much as will be required, and place same in a clean vessel, such as a saucer; beat same up with a hog-hair brush, and use. If the paste should turn out too thick when using, add to the portion taken out from stock-pot a little cold water and beat up with brush.

I have used this mountant for many years with much acceptance, and have only recently discarded it for another form, which I shall describe later on. When, however, it is desired to make a supply of mountant that will keep for a reasonable length of time, the arrowroot and gelatine form will be found as good as any.

Among the forms of gelatine mountant a very good one may be prepared by dissolving four ounces of gelatine in about fifteen ounces of water, then add one ounce of glycerine and five ounces of alcohol.

Personally I do not like a gelatine mountant, but when it is required to mount prints in a dry state, such as in an album or other book, where cockling must be avoided, then this form of mountant should be used, and the prints rolled through a hot press previous to having the mountant applied. Of this I may have more to say later on.

With respect to the use of glue as a mounting medium, with professionals it undoubtedly is most popular, and, as before stated, when pictures of more than ordinary thickness have to be mounted, a hot solution of glue carefully applied just slightly inside the edges of the print with a suitable brush will permit of the enamelled prints being placed in a pack with intervening sheets of suitable paper to protect their surfaces, and when so packed one on top of another they are placed under pressure till quite firmly adhering to their mounts. In the absence of a special mounting press, an ordinary letter-book copying press may be brought into requisition, and as each fresh print is attached to its mount, the press is screwed up to admit of the last picture being put on top of pack, then screwed down again, and so on, until all are mounted.

With most amateurs, however, who have no hot rolling press, or who merely mount a few prints now and again, doubtless the most convenient way is to mount their prints damp—by damp I don't mean what some call wet, there is a wide difference between the two.

I have seen a batch of good prints spoiled by the careless use of blotting paper in the mounting of them. All told, perhaps there is no better way of going about this work than by using a supply of good clean towels as drying agents.

Just let me describe how I go about the operation when I have, say, five or six dozen to mount on cards. From the washing water I carefully take out the prints one by one and place them in rows on a clean linen sheet. Over the top of these I throw another linen sheet, and when all superfluous moisture is sucked up I allow the prints to lie quite still till they begin to show signs of curling. They are then nice and limp, and just ready to be gathered in a pack one on top of the other. I then place the pack of prints face down on a slab of clean glass, and having ready the cards and a basin of clean water and a linen handkerchief, I am ready to go ahead. Where batches of different-sized prints have to be mounted, the packs only contain those of the same size, and as every print is cut with the aid of cutting glasses that just register properly to the cards, the placing of them on the cards in the proper position is a matter of much ease and certainty. In this, however, there is a knack; provided the prints are just dropped on in what I may term by the middle, there will be much less difficulty experienced in rolling or squeegeeing the prints into contact. In my practice I use a squeegee, and never have any bother with scratches, as I have heard others complain about. When the prints are firmly placed in contact on the cards, they are rubbed lightly over the face with a clean, damp, linen handkerchief and set away to dry.

I have stated that until somewhat recently I employed as a mounting medium a mixture of arrowroot and gelatine prepared as described. Lately I have hit upon a most excellent mountant in the shape of a paste which I prepare from a species of rice. Since using this I have succeeded in reducing the curling of the prints to a minimum, and such a thing as a print leaving its mount never happens.

In my next I shall give the readers of the JOURNAL the benefit of my experience, and describe how to make this excellent mountant.

T. N. ARMSTRONG.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

SEVENTH ANNUAL EXHIBITION.

(*From our own Reporter.*)

On the invitation of the President and members of the Council of the Association, representatives of the press were invited to a private view of the works by the members of this Association on Friday, April 25.

Previous to the inspection by members of the press, all arrangements had been made and carefully carried out by the Council. The various exhibits had been well hung, and the gentlemen appointed as Judges had made their awards, the prize notices appearing on the various frames. A neat catalogue, embracing the various exhibits and awards, was ready for distribution to the press reporters on their entering the rooms; and Messrs. Watson and Morrison, who were appointed by the Council to attend to and wait upon the various representatives, were most courteous and willing to give whatever information was desired.

As in previous years, the Council decided to utilise their own spacious rooms for the Exhibition, and we were pleased to see such a good collection of photographs gracing the walls of the Association at 180, West Regent-street. Although on looking over the catalogue the names of many old members are conspicuous by their absence, still we have a goodly array of new aspirants for honours taking their place, the result being that the walls of the Association are filled with a very fine collection of pictures.

It must be very gratifying to the gentlemen who acted in the capacity of Judges in previous years to find themselves again called upon by the Council of the Association to undertake the task of awarding the various prizes. In this the Council have paid a graceful tribute to Messrs. Paton, Allan, and Young, thereby acknowledging the soundness of their decisions, and which have given the utmost satisfaction. It would, perhaps, be too much to expect such an Exhibition to pass without some criticism as to the various awards made, but Messrs. Paton, Allan, and Young must be congratulated on the soundness of their judgments.

As in previous years, the Exhibition comprises exhibits both competitive and non-competitive. Of the former class, Section A comprises the Large Landscape Class, and the first prize has gone this year to David R. Clark, M.A. This gentleman is strongly represented throughout the whole Exhibition, and also carries off the medal presented by the *Amateur Photographer* for the most artistic picture in the room. We should imagine the Judges had but little trouble in coming to this decision in the case of Mr. Clark's charming picture of *The Trysting Tree*. This picture bears upon the face of it a keen artistic conception, and is a striking example of what may be done by photography in the way of grouping together light and shade. Mr. Clark must be congratulated on his success.

The various classes are well filled, especially the Small Landscape Class, which we were pleased to learn was the strongest exhibit ever put together since the Association was formed some eight years ago. In this class Mr. Watson shows a series of nice studies, and Mr. Ralph Elder has a strong exhibit, his frame containing a series of views in Brittany, these being selected by the Judges for the first prize in this class.

In the Instantaneous Class the place of honour goes to Mr. George Sheriff, who has printed his pictures by Blanchard's platinum process. If any exception could possibly be taken to the finding of the Judges, it is here that it lies. True, Mr. Sheriff's centre picture, *Before the Find*, is a charming little bit, but his two others, in our opinion, detract considerably from his exhibit as a whole. In this class we have a particularly fine set of instantaneous views taken by Mr. John Morrison, jun., with a hand camera. We have never seen better, if, indeed, anything to equal these little pictures, and should have liked to have seen some recognition of at least the photographic skill displayed in getting them on the part of the Judges. They have, however, ignored them. Are they too small?

In the Transparency Class Mr. Watson takes first prize, and this gentleman also carries off a similar honour in the Enlargement Class. His picture of *Falcide, Norway*, is a splendid bit of work, and it is quite refreshing to look upon it after such an exhibit as Mr. Mackenzie sends to this class. We have seldom seen such a ludicrous example as Mr. Mackenzie exhibits.

In the Portrait Class Mr. Taylor takes first prize. He shows three good portraits, and excepting that they are somewhat faulty in the choice of background and style of vignetting, they are otherwise very commendable, especially in the way of lighting.

We append the prize list:—

Class 1. "Landscapes." (Section A, Large Size.)—First prize, *Summer Morning, S. Monance, The Trysting Tree, Pittenweem*, David R. Clark, M.A. Second prize, *Cottages in Lamlash, Near Rothesay, Old Pier, Lamlash*, Charles J. Shaw. Third prize, *Fisherfolk, Pittenweem, Fishing Boats, Willows on the Carron*, George Sheriff. (Section B, Small Size.)—First prize, *Views in Brittany*, Ralph H. Elder. Second prize, *Lake of Monteith, Ploughing, Kelvingrove*, John Morrison, jun. Third prize, *Views in Brittany*, Ralph H. Elder.

Class 2. "Figure Studies." First prize, David R. Clark, M.A.

Class 3. "Instantaneous." First prize, George Sheriff; second prize, T. Steven, jun.

Class 4. "Portraits." First prize, Thomas Taylor.

Class 5. "Groups." First prize, Victor L. Alexander.

Class 6. "Animals." First prize, James Fleming.

Class 7. "Still Life and Interior." First prize, David R. Clark, M.A.; second prize, T. Steven, jun.

Class 8. "Enlargements." First prize, Arch. Watson.

Class 9. "Transparencies." First prize, Arch. Watson.

Class 10. "Developed Prints." First prize, John M. Primrose; second prize, John M. Primrose.

"Amateur medal for most Artistic picture." *The Trysting Tree*, David R. Clark, M.A.

Our Editorial Table.

The A B C of Photography.

(The London Stereoscopic and Photographic Company, Limited.)

A sub-heading to this work gives an improved reading of the title by the qualification that it is the A B C of modern dry plate photography; but anyhow, it is the twenty-third edition of the work, and it is quite revised and considerably enlarged. It is divided into two general parts, the first being intended for the photographer who as yet is in an inchoate condition, and requires to be informed as to the nature of the apparatus he needs, and, of course, as to how to select them. It also includes simple and plain directions concerning the development of the negatives, with printing from and mounting the same. This is all made as plain as "A B C." Part II. is intended for more advanced students, and in it we find hints on the use of diaphragms, portraiture, and groups, together with chapters devoted to retouching, lantern slides, enlarging, detective cameras, film photographs, orthochromatic photography, instantaneous photography, and much besides. There are numerous cuts, and three mechanical prints from photographs.

We can cordially recommend the book to those who desire to have a full knowledge of the practical taking of photographs, without caring, or having time, to make themselves acquainted with the more purely scientific aspect of the art. Price 1*s.* in paper covers; 1*s.* 6*d.* bound in cloth.

Concentrated Toning Solution.

Mr. J. R. Gotz, Buckingham-street, Strand, has brought out a toning solution in a concentrated form which must prove exceedingly convenient, especially to those who use the Obernetter gelatino-chloride paper, for which it is mainly intended. The sample bottle we have received contains fifty c.c. (nearly two ounces), and it embraces in its liquid contents fifteen grains of chloride of gold in addition to other modifying agents. This quantity is sufficient for making a toning bath of one litre (thirty-six ounces), to which it is added to water in this proportion. The prints when placed in this bath acquire an engraving black tone. However, if purple or blue tones be preferred, it is only necessary in the former case to remove the prints between the brown and black stages of progression; or, in the case of the latter, to allow them to remain till after the black tones have been reached. Some specimens on matt paper which we have received are most brilliant, the toning having been stopped just as it entered upon the black stage, that is to say, it is a purple-black.

A Yellow Screen.

From Mr. Gotz we have also received a yellow screen for orthochromatic work. It is made of optically worked glass of a pale yellow colour, and so thin as to easily fit in the lens in the place for Waterhouse diaphragms. The screen is just twice the length or height of the diameter of the lens tube, and it is covered with thin opaque paper (pasted on one surface), in which are cut circular apertures of different sizes, and so located that whichever end of the glass slip is inserted *in situ* the stop will be central, or in the axis of the lens. By this simple means it forms both a diaphragm and a coloured screen. The idea is ingenious, and it costs nothing to be carried into practical effect beyond the cutting of the glass and the pasting on of the black paper perforated to suit each individual requirement. Used in this way, the screen does not seem to disturb the focussing or fine definition of the lens.

Platinotype Pictures.

(By F. W. Edwards.)

In the production of platinotype pictures of large dimensions, Mr. F. W. Edwards, of Peckham, has acquired a deservedly high reputation. But his skill in taking irreproachable negatives quite equals his

platinum printing abilities, and we have now before us selections from some of those of his works which have procured for him several medals at exhibitions both in London and the provinces.

First we would notice the view of the grounds *Wood Pits, Eschurst*. Here we have everything that can conduce to the making of a pretty picture. A small river at the left foreground, a boat with occupants, a rustic bridge, a lake, charming grounds, a fine house, and richly wooded surroundings. What more could a photographer desire? Mr. Edwards has made the best of it. The print is 22×16; the tone is superb. It is just the kind of picture that one can see a medal awarded to without feeling inclined to impugn the good taste of the Judges.

Of equally large dimensions are *Lambeth Palace* and the *Tower of London*. Although from the sharpness that characterises the people who are on the pier waiting for the boat in the former picture, the exposure must have been exceedingly rapid, yet is it well lighted and sharp throughout.

We have also some of those reproductions familiar to visitors to exhibitions, such as *Waiting for the Head of John the Baptist*, *The Release of Barrabas*, and *Hector rebuking Paris*.

With the exception of two, which are toned to, or printed in, a warm brown, these prints are in the engraving black tones so long associated with platinotypes.

Foreign Notes and News.

The new Photographic Society of the south west of France, whose headquarters are at Lyons, has recently been inaugurated at a public *reunion*, under the presidency of Professor Donnadieu, the gentleman who recently obtained considerable celebrity by his excellent micro-photographic reproductions of phylloxera. The proceedings were commenced by a lecture from the President, illustrated by lantern projections, after which a collection was made for the purpose of supplying the new Society with funds.

It is interesting to find that the *Moniteur* thoroughly agrees with our estimate of the value and importance of Herr Vereseze's "discoveries" in photography in natural colours. "There is nothing," says our contemporary, "hitherto disclosed which can be regarded as new."

Herr H. W. Vogel, of Berlin, has since been testing the permanence of Herr Vereseze's results. He exposed the glass photographs to the action of the sun for twenty minutes, and of the electric light for seven minutes. In the former case the colours were but little altered, but the brown colour of the uncoloured portion was considerably darkened. In the latter case the colours were a good deal altered. It would thus appear that Herr Vereseze's results can by no means be regarded as perfectly permanent.

For over-exposed prints on bromide paper the *Archiv* recommends the employment of a solution of cyanide of potassium to which a very little iodine has been added. The effect is said to be magical. Green fog is removed at once, and even yellow spots round the edges disappear. The solution must, of course, be subsequently washed out.

THE PHOTOGRAPHIC CONVENTION ON THE QUESTION OF THE "STANDARDS."

A meeting convened by the Committee appointed by the Photographic Convention of Great Britain to consider and report upon Photographic Standards was held at the Mona Hotel, Henrietta street, Covent Garden, on Friday evening last, the 25th ult., Mr. A. Haddon in the chair.

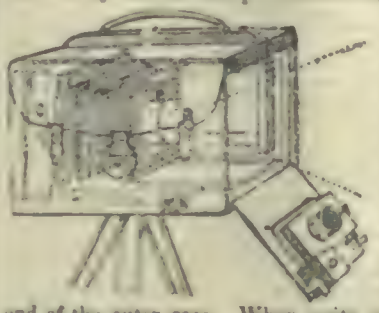
On the question of the standard for apertures of lenses and diaphragms, the standard of the Photographic Society of Great Britain, *f*-4, was supported by Mr. W. Taylor (of Leicester), Mr. Conrad Beck, Mr. W. Bedford, and others, whilst Mr. T. R. Dallmeyer spoke in favour of his own standard. On the sense of the meeting being taken as to the three proposed standards—that of the Photographic Society of Great Britain, that adopted last year by the Congress in Paris, or that of Mr. Dallmeyer—the standard of the Photographic Society of Great Britain was adopted with but a single dissentient.

The question of standards for lens flanges was also considered; and in the course of the discussion Mr. Taylor showed a standard flange kept at the Leicester establishment. There was a mark on it indicating that the lens when screwed home would have the centre of the diaphragm slit opposite to it. As all the flanges sent out from that establishment were similarly marked, and the lens tubes were all cut to screw home with the top to the same mark, it followed that any lens might be put into any flange with the certainty that when one lens was in the right position all would be.

As to the adoption of standards for flanges, the following resolution was passed:—"This meeting recommends that a meeting be called of as influential a body as possible of manufacturing opticians to decide upon the most convenient series of sizes for standard flanges and camera screws, that shall be more suited to meet existing conditions of their manufacture. When decided, it is also suggested that the question of means for their adoption shall be decided upon. That this meeting be called for the 9th of May, at this hotel, at seven o'clock, to report to the Committee of the Photographic Convention of the United Kingdom."

"THE APTUS."

Among the hand cameras at the recent Crystal Palace Exhibition was one by Messrs. Sharp & Hitchmough, Liverpool. It claims to be "universal" in the sense of adapting itself to lenses of either long or short focus, including wide or narrow angles of subject. The cut shows the camera when bearing a short-focus lens. When one of greater length is used, the bellows-body racks out until the camera front projects beyond the square aperture (here thrown open) in the end of the outer case. When quite closed up it may be used as a detective.



RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6228.—"An Improvement in Photographic Objectives." Complete specification. P. Rudolph.—*Dated April* 21, 1890.

No. 6229.—"Improvements in Photographic Objectives." Complete specification. E. Abbe and P. Rudolph.—*Dated April* 21, 1890.

No. 6256.—"Improvements in or relating to Developers for Use in Photography." B. Jurgeaux.—*Dated April* 22, 1890.

No. 6261.—"Improvements in and relating to Photographic Cameras." Complete specification. J. Merritt and W. E. Spencer.—*Dated April* 22, 1890.

No. 6299.—"A New or Improved Apparatus for Ascertaining the Distance of any Object for Photographic Purposes." H. M. Hastings.—*Dated April* 24, 1890.

No. 6247.—"Improved Apparatus to be Used in the Development of Photographic Negatives." Communicated by E. Casal. C. R. Bonnl.—*Dated April* 24, 1890.

No. 6294.—"Improvements in Dark Slides for Photographic Cameras." W. H. Stacey.—*Dated April* 25, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 6	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 6	North London	Myddelton Hall, Islington, N.
,, 6	Holmfirth	
,, 6	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 6	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 6	Paisley	Paisley Museum.
,, 6	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 7	Coventry and Midland	The Dispensary, Coventry.
,, 7	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 7	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 8	Birkenhead	Hamilton Rooms, Birkenhead.
,, 8	Cheltenham	
,, 8	Manchester Photo. Society	36, George-street.
,, 8	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 9	Ireland	Royal College of Science, Dublin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

April 29.—Technical meeting.—Mr. T. Sebastian Davis in the chair.

Mr. Jackson showed a Kodak of larger size, as now furnished by the Eastman Company. It was furnished with a roll holder for forty-eight exposures of 7×5, and, when full, weighed five and a quarter pounds. The stops were arranged on the margin of a metallic quadrant.

The Chairman inquired what development had been used.

Mr. Jackson preferred pyro with soda and potash, but some had been developed with ammonia. Quinol was too slow in its action, although any amount of density can be got with it. It was necessary to develop until the image was almost gone, as it went back so much in fixing.

Mr. ARNOLD SPILLER inquired whether there was any satisfactory method of varnishing celluloid films.

Mr. JACKSON had not met with any successful method. In drying, he first immersed the films in a bath of methylated spirit, glycerine, and water, and then pinned them up by one corner. They where, when dry, wound round a roller with the film side out for a couple of hours.

Mr. SPILLER inquired whether by using glycerine there was not a danger of the film absorbing silver from the sensitive paper.

Mr. JACKSON replied that the small amount of glycerine left could be wiped off with a piece of cotton wool. The films were about twice as rapid as the stripping films.

Mr. FRIESE GREENE had developed long strips of these flexible films, and for the purpose used long dishes made of Willesden paper. He also showed a wooden dish with glass rods crossing it; the film was wound in and out round these rods and the dish kept in gentle movement during development.

Mr. SPILLER would like flexible films of less sensitiveness. He found that with these highly sensitive films there was not a power of restraining in cases of over-exposure.

Mr. JACKSON said that they were made of several degrees of sensitiveness.

Mr. SPILLER had been able to get great density by using eikonogen and caustic alkali. The films were very hard and would stand strong alkali.

Mr. W. England showed three negatives developed on celluloid films; these were on much thicker support than those previously shown.

Mr. T. SAMUELS thought that it was a great advantage to have such thick supports. It was very difficult to handle thin celluloid in developing.

Mr. JACKSON said there was no difficulty in development. He was in the habit of placing about twelve films in the dish at one time. It was best to keep them face downwards and to lift the bottom one on to the top, and so keep them moving as in toning.

Mr. England showed several contrivances for holding celluloid films in ordinary dark slides. One of these contrivances consisted of a piece of thick cardboard on which were glued strips of thin card to surround three sides of the film, and other strips over these so as to form grooves. This was for use when a film was to be used of smaller size than the slide was made for. Another contrivance consisted of a sheath made of card, with edges made of ferrotype plate along two or three of the sides.

Mr. A. COWAN showed the results of a few experiments made in orthochromatising ordinary plates. In one case he showed two plates which had been exposed under a negative close to a dark-room window covered with four thicknesses of golden fabric. On the ordinary plate there was scarcely any image, whilst on the orthochromatised one there was a fully printed transparency. This showed the great increase of sensitiveness for yellow which had been conferred. The general sensitiveness of the plate, however, was diminished to the extent of about one-half, as shown by camera exposure and by experiment with the sensitometer. The effect of different kinds of daylight in showing greater or less advantage for the orthochromatised film he had not been able to discover. Plates, ordinary and orthochromatised, exposed at noon and at seven in the evening, had not shown any difference in their relative speeds under these circumstances.

Mr. W. E. DEBENHAM said that the experiments were conclusive as to the efficacy of the orthochromatising solution employed by Mr. Cowan. The strong pink colour still left on the plates indicated a larger amount of dye than was used in commercial plates; he had only seen such a strong colour in plates that he had experimentally prepared.

It was announced that at the next technical meeting, to be held on May 27, the subject of *Stereoscopic Photographs and Apparatus* would be discussed.

CAMERA CLUB.

APRIL 24,—Captain W. de W. Abney in the chair.

The subject was *Treatment of Subject by Focus*, which Mr. T. R. DALLMEYER reopened by recapitulating the points made in his paper at the Conference. Mr. Dallmeyer in his lecture replied to criticisms passed in the discussion at the Conference, emphasising his contention that to portray a subject as the eye sees it, the chief plane of interest should be better defined than the others, for the eye has to alter its focus for different planes up to a certain and considerable distance. From the experience of the artist, Mr. Davis Cooper, who for many years has lost the use of one eye, it would seem that there is an alteration of focus for planes within a distance of about sixty yards. Uniformity of definition robbed the lens (which was single-eyed) of conveying solidity, an effect only to be fully gained on a plane surface by contrast in definition.

Mr. CLARK opened the discussion with a short paper, and an animated controversy was kept up for some time.

On Thursday, May 8, there will be an exhibition of lantern slides from negatives recently taken by Mr. D. R. Rogers and Major Nott in Egypt, and Mr. H. M. Elder in Madeira.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

APRIL 24,—Mr. W. H. Prestwich in the chair.

Mr. T. E. FRESHWATER, observing that many of the members might be going to Chester in the ensuing season to attend the Photographic Conference, brought for inspection an album containing views of that city by Wilson, of Aberdeen.

Mr. F. A. BRIDGE showed a print from a negative of Burnt House Farm, at Walton-on-the-Naze, taken last September; negatives taken twenty years earlier showed two fields in front of the house, where now successive landslips had left the house, as shown in the recent photographs, standing at the edge of the broken ground. Mr. Bridge then showed a collection of early enamel photographs, some of them the production of Lafon de Camarseu, and others of F. Joubert. It was understood that in both cases the powder process had been used. Mr. Bridge also showed two photographs of a water-colour drawing—one on an ordinary, and one on an isochromatic plate. The effect was very different, but the person for whom they had been made had selected the one from the ordinary plate. He remarked what was, he thought, contrary to the claim generally made for orthochromatic work, that the grain of the paper showed more strongly in the photograph taken in that way than on the ordinary plate. In copies of an oil painting the use of the isochromatic plate and yellow screen had proved very advantageous.

Mr. A. COWAN inquired whether any member could speak of the effect of an isochromatic plate without yellow screen.

Mr. COOKE could not find any advantage in that case.

An inquiry was made as to the use of the yellow screen with an ordinary plate, and Mr. BRIDGE said that with some plates there was a marked advantage and not with others. Wratten's plates used with yellow screen gave the greatest similarity to an orthochromatic plate of any that he had met with.

A discussion then took place on the best way of dealing with the crowds of curious onlookers, mostly boys, who are apt to baulk the photographer in his efforts at obtaining views in cities; and amongst the plans mentioned as being the most successful was that of working in couples, and whilst one photographer was working his camera rather demonstratively, but exposing no plates, his companion at a little distance was able to succeed in getting what he wanted.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

APRIL 15,—The President (Mr. J. Traill Taylor) in the chair.

After the preliminary business, Mr. TAYLOR, having vacated the chair (which was taken by Mr. William Bishop), gave a lecture on *The Stereoscope*. He referred briefly to the principles of binocular vision and to the early history of the instrument, explaining the parts severally taken by Wheatstone and Brewster in the invention of the stereoscope. The causes of its decadence were then traced; these were, in a limited respect, the construction of the stereoscope itself, and more especially the flooding of the market with slides which were bad both in conception and execution. In regard to the instrument, he said that, where at all possible, the eyepieces should be achromatic and of from five to six inches focus, it being desirable that expedients for effecting the separation of the eyepieces be adopted. If the component parts of the slide were properly mounted, so as not greatly to exceed two and three-quarter inches from centre to centre, coalescence of the pictures would take place when the axes of the eyes and of the eyepieces corresponded, or nearly so; but some slides were so badly trimmed and mounted as to have that distance from three and a half to four inches apart, and such could only be made to combine when the eyepieces were separated from each other to their utmost extent. The carelessness that prevailed in this respect in the works of some makers was most reprehensible, for with most stereoscopes coalescence of the pictures could not take place, and the public became disgusted. He exhibited a home-made stereoscope he had constructed for his own use, in which he could see every class of slide. It had large achromatic eyepieces of six inches focus, and the light was admitted to the slide on every side. It had no central division, and the lenses were capable of being separated so as to suit all eyes and every class of picture, whether properly or improperly mounted. He described some of the stereoscopes specially adapted for viewing pictures of large dimensions, instancing the Wheatstone reflecting one and the prismatic stereoscope of Grubb as the best. Some years ago Harding Warner, with Murray and Heath, introduced a stereoscope for pictures of much taller dimensions than usual. This increase of vertical angle was often useful for certain subjects of the ravine class. The stereoscopic base, or paralactic angle, by which he meant the distance between the lenses in the camera, ought not to be of a definite measurement, but should be variable, so as to suit the subject; a very near object, such as a vase of flowers standing within four or five feet of the camera, would not require such a wide base as a scene in which the nearest foreground object was situated at a considerable distance. An example of the necessity for increasing the stereoscopic base was to be found in obtaining a binocular view of the moon, in which advantage had to be taken of her librations, thus, in effect, separating the lenses of the camera to thousands of miles apart. He then treated of methods of viewing large pictures when placed side by side in contradistinction to the viewing such pictures when separated, as in the Wheatstone stereoscope, and showed the application of prisms for this purpose. Numerous pictures showing false effects were exhibited. He hoped for a rapid resuscitation of the stereoscope, and spoke of the efforts of Chadwick to do so, he making a speciality of this department of photography. A camera and stereoscope by this maker were also exhibited.

At the close, remarks were made by Messrs. James Martin (who exhibited a stereoscopic camera of the earliest make), D. H. Hill, F. W. Hart, W. Bishop, and others.

WEST LONDON PHOTOGRAPHIC SOCIETY.

APRIL 25,—Mr. Charles Bilton (President) in the chair.

Mr. JOHN A. HODGES, the Hon. Secretary, read a paper entitled, *Some Practical Hints on the Choice of a Lens*. After briefly referring to the history of photographic optics, and describing the particular properties of different kinds of lenses, the lecturer proceeded to give some hints on the choice of a lens. He advised the use of a long-focus lens whenever it could be employed, and exhibited upon the screen a number of photographs taken with both long and short focus objectives, demonstrating the falsity of drawing * produced by the latter. He also thought every one should possess lenses of different focal lengths, in order that various angles of view might be obtained. A photographer hampered by such considerations as the focal length of his lens could never do himself full justice. If economy were an object, it might be effected to some extent by a judicious selection; in such a case two lenses, by using the back combinations, might be made to do the work of four. After speaking of different lenses, the lecturer referred in eulogistic terms to the "triplet," which for flatness of field, he said, surpassed the rapid rectilinear. He did not believe it was necessary to give a very high price in order to procure a reliable lens. English-made lenses of high quality were now obtainable at moderate cost. Foreign instruments, sold either without a name, or with that of the British purveyor engraved upon

* Nay, the drawing is not "false," although the perspective may be violent by the point of sight not being sufficiently far removed from the nearest part of the subject. —ED.

them, required more careful selection, and should be tested; some were admirable, others comparatively worthless. Excellence in a lens was a matter of individual merit; because a particular lens happened to be a good one, it was no reason that another of the same make should be equally good. The lecture was illustrated by a number of diagrams projected on the screen by the lantern, and also by the exhibition of a variety of lenses, both finished and in different stages of construction, the tools used being also exhibited. A number of negatives of the same subject taken with various lenses of well-known makers were also shown.

Mr. E. W. FOXLEE, who spoke at considerable length, said although few people would care to work now with a lens uncorrected for the coincidence of the chemical and visual rays, yet such lenses, if the necessary adjustment after focussing were made, gave results fully equal to instruments in which the correction had been performed by the optician, nor did he think the correction had improved the quality of the lens, although it was a great convenience. Stops were a very serious defect in any lens. When people spoke of particular lenses possessing unusual depth of focus, it would often be found that, owing to the amount of spherical aberration present, the lens had no real focus at all, and as no point was absolutely sharp, no other point appeared much out of focus by contrast. Some of the French lenses which had been spoken of as possessing great depth of focus were badly constructed in this way. He was glad to hear the importance of the use of a long focus lens emphasised by Mr. Hodges, and he thought opticians might give a little more information in their catalogues upon the matter. If a lens of eight inches focus was necessary to take a *carte* picture in true perspective, how small a picture of 15 × 20 have justice done by it, in regard to perspective, if taken by a lens of twenty-five inches focus, which was the ordinary length catalogued to cover that size?

Mr. G. F. BLACKMORE said it so happened that the two lenses with which he generally worked were approximately of the focal length advocated by Mr. Hodges, *i.e.*, five and a half and eight and a half inches for the half-plate. These two focal lengths he had found sufficient to enable him to deal with all kinds of half-plate work. The short focus lens, however, was not a wide-angle one, but of the rapid type, a Wray 5 × 4, which at *f* 16 covered the half-plate well, and with full opening was very useful for quarter plate work.

Mr. C. WARNER was of opinion that if only one lens could be afforded, preference should be given to a wide-angle one, and if a longer focus was required the back combination could be used. He thought a short focus lens indispensable, the usual difficulty in taking views being the inability to get sufficiently far away. It did not always do to focus first and then stop down, as that procedure sometimes threw the point focussed for out of focus—this was more often the case with long-focus lenses. The tripod was one of the best lenses made; at one time it was considered slow, but with the rapid plates of the present day that objection did not obtain. He would like to know in using the single combinations of a doublet whether it affected the result the stop being before or behind the lens? He had not noticed any difference with a portable symmetrical.

Mr. FOXLEE said if only the central portion of the field was required when using the single combination, the stop might be behind, as the central definition would be better; but if a larger angle were required, then the stop should be placed in front.

Mr. BLACKMORE thought members would find the iris diaphragm a great convenience; the image could be focussed and the effect of stopping down observed without removing the head from the cloth. He judged the exposure by the appearance of the image on the screen, but the gain of light on stopping the lens from under the cloth enough in order to insert a stop materially affected his judgment; this was obviated by employing the iris.

It was then announced that summer excursions would take place on **Saturdays, May 3, 17, and 31; and also on Saturday, June 28; the next indoor meeting being fixed for July 26.**

The annual smoking concert will be held at the Richmond Hotel, Shepherd's Bush-road, on Friday, May 9, at eight p.m. Members are entitled to bring one friend.

THE LANTERN SOCIETY.

THE inaugural meeting of the new Society having this title, and having for its chief objects the development and popularisation of the optical lantern, took place at the theatre of the Society of Arts on Friday last, when some two hundred ladies and gentlemen attended.

The CHAIRMAN of the Council, the Hon. Sidney Bethell, prefaced the demonstration by an apology for the fragmentary nature of the programme, which, he said, was due less to a lack of numerous lives to an earnest desire to rushing an entry forthwith, with the view to placing the affairs of the new body well in the foreground. Having explained that two sessions proper would commence on October 1, and that all applications for membership received in the interval would be treated as belonging to the year then to be entered upon, he appealed to all present, who were interested in the optical lantern, to bring the claims of the Society before their friends at the first fitting opportunity; and, continuing, said it had been urged that the programme of the society might best be carried out—1. By the engaging of premises in some central position in London, at which the meetings of the Council and of the Society might be held. 2. By acquiring suitable apparatus for the purpose of giving exhibitions of general and scientific interest to both members and their friends. 3. By increasing the services of specialists in every branch of art and science suited to optical demonstration. 4. By offering—as far as the funds of the Society will permit—remuneration or awards for the development of the optical lantern, and of all apparatus pertaining thereto. 5. By inspecting intending to those who are desirous of learning how to effectively manipulate the optical lantern, to produce slides and apparatus, and to efficiently employ the same both in private and in public. 6. By securing for the members of the Society special and advantageous terms from manufacturers and others for the purchase or loan of apparatus and slides. 7. By forming a large and comprehensive loan collection of lantern transparencies pertaining to art, science, and kindred subjects, such loan collection to be placed at the disposal of every member, upon conditions to be laid down by the Council. 8. By providing a means of inter-communication between the members of the Society, whereby each member may be made acquainted with the private collections of his fellow-members, and may be able to negotiate a mutual loan, if so desired. 9. By arranging an interchange of demonstration between photographic, microscopical, and other societies interested in optical lantern work.

The CHAIRMAN further remarked the marvellous powers of photography to illustrate and bring home to the mind in the most striking and faithful manner (especially by means of the optical lantern) the glories and beauties of nature, the treasures of art, and the wonders of science, induced us to hope that by drawing together persons thus interested a powerful society might be formed on an intellectual, educational, and scientific basis, with a recreative and social side, and of which our present meeting is but a crude and incomplete example. Although not a "Club" in the usual sense of the word, still we hope soon to have a suitable habitation, where meetings of members will be held, papers read, discussions encouraged, and some photographic work carried on. Composed, as I believe we shall be, of scientific and practical men, of professional as well as of amateur photographers, of those learned in chemical, microscopical, and optical science generally, constructors and designers of every description of apparatus, we shall endeavour (at least) to benefit and instruct each other (if not those unconnected with us), and bring to greater perfection in all its phases and aspects (technical as well as artistic) this particular branch of the art and science which we have adopted for study. Another aim that the Society has in view is the formation of a large loan collection of lantern slides, complete in its classification, arrangement, and method of illustration. As we advance, scientific and photographic societies, educational bodies, schools, institutes, &c., will have facilities of affiliating themselves to us, and thus obtaining much assistance from our extensive photographic library, so to speak. Members will of course receive this privilege and many more to a larger extent, for eventually we hope to offer them additional advantages, viz., the use of dark rooms and laboratories for all photographic operations, the production of lantern slides in particular. America has already made great strides with the optical lantern, so we shall endeavour to put ourselves *en rapport* with our cousins across the Atlantic, and to interchange with them for photographic illustrations of their grandest wonders of nature, representations of some of *our* homely but lovely scenery. Welcoming as members of the Lantern Society all thus interested, we shall develop, I trust, into a large and influential body, competent and willing to place any fresh knowledge and experience that we may acquire within the reach of others of like tastes. Finally growing in strength, we may number amongst our body members practically and scientifically more learned in particular branches of science, who will come forward and initiate us into the meaning, mysteries, and beauties of many of our unappreciated photographic illustrations.

Further on the address of the Chairman, which was cordially received, there were projected upon the screen about one hundred and thirty very fine slides, [illegible] different lots, and comprising—Views, by Ferrier and Soutter, of Italian and Swiss scenery; ice scenes in Swiss mountains and at Vienna; astronomical photographs of the moon and of the eclipse of the sun, taken with the Lick telescope; views of the Forth Bridge and of the engine rooms of the City of Paris after the accident to her machinery; representations of old lace from the South Kensington Museum; a large collection of Woodbury slides of Indian and Syrian temples; types of heads; views of English cathedrals, both interior and exterior; insects mounted direct on glass; views of the Paris Exhibition, and a large collection of landscapes from all parts.

The proceedings were much enjoyed, and applications for membership were made in the room.

In the interval that elapses before the programme of the Society is entered upon in earnest, the Council will be busily engaged in drafting by-laws, collating suitable accommodation for the future home of the Society; and the Hon. Secretary (Lieutenant C. E. Gladstone, R.N.) will be pleased to forward full particulars and applications for membership upon receipt of a postcard at 6, Bolton-street, Piccadilly, W.

HOLBORN CAMERA CLUB.

APRIL 25.—About two hundred and fifty lantern slides made by members of the Club were shown to an appreciative audience.

This was another very fine [illegible].

On Friday, May 2, Mr. E. H. Bayston will read an article from one of the photographic papers. Friday, May 9, The President (Mr. T. C. Hepworth) will give a lecture illustrated by the optical lantern. Saturday, May 10, Field day to Carshalton; meet at station at three p.m., and at the Greyhound at half-past five. Friday, May 16, Mr. F. J. Cobb, on *Silver Printing and Mounting*. Friday, May 23, Lantern night. Friday, May 30, *Chats on Photography*.

HACKNEY PHOTOGRAPHIC SOCIETY.

THE above Society held their annual *soirée* on Thursday, April 24, at their rooms at Morley Hall. The room was tastefully laid out as a drawing room, and about four hundred ladies and gentlemen attended, who fully appreciated the excellent programme provided. Songs, glees, recitations, and instrumental solos were given by the members and their friends. Rather a novelty was the Society's orchestra, comprised of members who are musical as well as photographic enthusiasts. Mr. H. J. Beasley gave an amusing conjuring entertainment, the evening concluding with an exhibition of members' lantern slides through the lantern, shown by the President. Those of Messrs. Fred Evans and Carpenter, prize winners at the recent Crystal Palace Exhibition, being among the number.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 24.—Mr. Paul Lange in the chair. The chair was taken at half-past six precisely.

Messrs. William B. Roberts and Thomas Mansell were elected members.

Mr. J. A. FORREST read a short paper on *The most Effective Means of Preventing Light getting to the Sensitive Plate whilst it is in Course of Development in the Dark Room* [see page 280]. Mr. Forrest also explained "the cause

of a peculiar fog that comes over lantern-slide covering glass," which lately created inquiry and discussion in the photographic journals.

Mr. F. Vaughan read a paper with demonstrations on *Photography as applied to Letterpress Printing.*

LEEDS PHOTOGRAPHIC SOCIETY.

April 10,—The President in the chair.

Mr. Godfrey Bingley read a paper on *Lantern-slide Work.* He said: What I have to say this evening will, in a great measure, be based on my own short experience, and though what I may bring forward may be "stale, flat, and unprofitable" to many of the older members of this Society, I trust that it may be of some little assistance to any who have not yet attempted to make lantern slides. For some reason or other, only a very small proportion of the members of this Society send in lantern slides to our annual Lantern Exhibition. Certainly there is no better or more pleasing way of showing photographs than by exhibiting them on a screen by the aid of the optical lantern; the fact that so many people go to our lantern exhibitions is in itself a proof that this branch of photographic work is appreciated, and to the photographer the artistic qualities and *failings* of his work become more manifest when seen enlarged on the screen than when viewed on a small print. Before proceeding further it may be well to allude to the best size of camera to work with, as some amateurs do not care to make anything but lantern slides. Small cameras are made to take a plate three and a quarter inches square, and although this small-sized camera may do for ordinary landscape work, it is practically useless for instantaneous photography, such as marine and seaside studies, cattle-pieces, and other moving objects. Many of you, no doubt, who work quarter-plate cameras have found them too small for this class of work, and have been considerably disappointed when the plate has been developed to find nothing but a barren waste of water, or a field with the surrounding fence as the only subject on the plate. I would, therefore, advise nothing less than quarter-plate, or 5×4. Lantern slides are made either by "direct contact," or by "reduction" from the negative by rephotographing from the negative by means of the camera and a reducing frame. Slide-making by "direct contact" is the plan most generally adopted by amateurs, because of the ease with which it can be done by artificial light; but I very much prefer, however, making slides by "reduction," especially if working from a half-plate or larger negative. No doubt very good slides are made from quarter-plate negatives by "contact," but how few pleasing ones are made from the larger-sized negatives in this way; for when taking a view with the camera you study the proportions and composition of the picture in relation to the size of the plate you are working, and not simply with the idea of printing out a picture three and a quarter inches square; it is only by "reduction" you can get the full value of your negative on the lantern plate. Another advantage obtained by "reducing" is that a soft slide may be made from a hard negative, and also good slides from poor and faulty negatives—negatives from which it would be impossible to make a slide by "contact," or even to get a passable silver print from. In "contact" printing the length of exposure required of course varies according to the make of plate used, and the density of the negative. I think it is best to have one fixed distance from the light for exposing the slide, and to vary the *time* of exposure according to the density of the negative, rather than vary the distance. If the *distance* the frame is held from the light be varied, always remember that the length of exposure will increase as the squares of the distances the frame is held from the illuminant, and not in a numerical ratio; for example, if an exposure of ten seconds at the foot distance is sufficient, and the distance is increased to three feet, an exposure of ninety seconds will be needful. For making slides by "reduction" some sort of reducing frame is required to hold the camera and negative; the apparatus is, however, very simple. It consists of a baseboard, on which there is a sliding block to carry the camera at one end, and at the opposite end a deep box about ten or twelve inches square, open at the end next the camera, the other end holding a sliding carrier in which to place the negative. "Reductions" are best made by daylight. The plan I adopt is as follows:—Having placed my reducing frame on which I have fixed a quarter-plate camera in front of an upper window (in the lower square of which I have inserted a sheet of ground glass for the purpose of diffusing the light), I place the negative in the sliding carrier and carefully focus it, then stop down the lenses to U.S. sixteen, and expose the plate in the usual way. The exposure of course varies according to the light and density of the negative as in contact printing; at this time of the year the exposure will vary from thirty seconds to a minute with a fair average negative. A long exposure and retarded development will give warm tones; a short exposure and active development will give black tones, and I find the tones are always warmer if the exposures are made on a bright sunny day, than even with a long exposure on a dull day. I advise, however, that workers should adhere to one *standard strength* of developer; and for "contact" printing one *fixed distance* from the light for exposure, and produce the tone desired solely by the time of exposure. If this plan is adopted I am sure much more satisfactory results will be obtained than by continually altering the strength of the developer, and varying the distance the plate is held from the light. Most of the slides prepared by professionals are made by the collodion or wet-plate process; very fine slides are also made by collodio-albumen. It is generally considered that there are no lantern slides at all equal to those made by or other of the collodion processes. No doubt for brightness and "sparkle" collodion slides are difficult to surpass, but there is often a want of half tone about them, consequently little gradation between the high lights and shadows. The gelatine plate is running the collodion process a very hard race; and I venture to think (though it may be considered somewhat heterodox to even throw out the mere suggestion) that for softness and half tone the gelatine plate holds the field. I do not propose to enter into any details of the working of the collodion processes, neither do I intend to say anything about preparing gelatine plates, as I have had no experience in any of these branches of photographic work. I know there are several of our members present who prepare their own plates, and who have in the past given us the results of their experience. There are many good makes of plates on the market, and for those who do not care to make their own, I would say try several makes, and then stick to those you find give you the best results. I may say in passing that gelatino-chloride plates are of no use for reducing, as they are far too slow. Lantern plates are usually developed either by ferrous oxalate, pyro and ammonia, pyro and washing soda, or hydroquinone. Formerly ferrous oxalate was the favourite developer for lantern-plate work, but is not so much used now; the tones produced by it are always of a cold grey, and considerable care is required when working with it, for the slightest contact of hypo will cause a fog to spread over the plate. Pyro and ammonia is a favourite developer with many workers; some add a little carbonate of ammonia to obtain red tones. A very good developer, and one easy to work with, is washing soda and pyro. It gives pleasing tones, but it has, however, the disadvantage of often leaving a yellow fog on the plate, which must be removed by a clearing solution, and unless considerable care is used in clearing, many of the finer details may be entirely removed, and if allowed to remain in the solution too long, the plate loses its sharpness, and looks very flat when shown on the screen. Hydroquinone has now come into great favour as a developer for lantern-plate work, and is the one I prefer to all others. It gives absolutely clear glass, and the slides require no clearing after development, unless they have been taken from thin or faulty negatives, when a little local clearing, by means of a camel-hair brush, may be required. The formula that I like the best is one given by Thomas & Co. with their plates, viz:—

No. 1.—Hydroquinone	160	grains.
Sulphite of soda	2	ounces.
Bromide of ammonia	20	grains.
Citric acid	60	,,
Water, to	20	ounces.
No. 2.—Carbonate of potash	2	ounces.
Carbonate of soda, crystallised	2	,,
Water, to	20	,,

Use equal quantity of each.

I generally develop four plates with two and a quarter ounces of solution. I have developed as many as ten, but four are quite sufficient, for after that number the developer becomes very slow, and has a tendency to "block" the shadows. Eikonogen is said to produce very similar results to hydroquinone, but I have never tried it. It is better to develop slides by artificial light rather than by daylight passing through some non-actinic medium; for daylight is so variable in its intensity that it renders it very difficult to judge the proper density of the slide in consequence, whereas by artificial light you can have one fixed standard, and develop the slides to pretty nearly an equal density. It is desirable to develop a little denser than required, as the slide loses a little of its density in the fixing bath. Immediately after placing the plate in the developing solution, pass a camel-hair brush (kept in a cup of water near the developing dish) rapidly over the plate, to remove any small air bubbles which may be on the surface of the film. After development the plate requires a good wash under the tap, and should then be placed in the fixing bath (hypo, four ounces; water, twenty ounces), and allowed to remain there for a few minutes after all whiteness has disappeared, so as to ensure thorough fixation. Wash again after removal from the fixing solution, and place it for a short time in a saturated solution of alum to harden the film. If working with hydroquinone, on no account place the plate in the alum solution *before* fixing, or you may obtain a result not to be desired. If from any error in exposure, or the slide is taken from a thin negative, causing it to be opaque when there ought to be clear glass, this opacity may be removed with a little care and patience by the aid of the following clearing solution:—

Sulphate iron	3	ounces.
Alum	1	ounce.
Sulphuric acid	1	,,
Water	20	ounces.

Pour a little of this solution into a small dish, and place a basin containing clean water near, then holding the plate in the left hand, with the sky or fogged part slanting downwards, so as to prevent the clearing solution running into the details of the picture, paint with a small brush the clearing solution over the fogged part of the plate until it becomes quite clear, frequently dipping the plate into the water during the process to prevent the clearing solution spreading over the plate. Any over-dense shadow may also be reduced in this way. Before doing this, take care the slide has been in the alum bath. Lantern slides must be quite free from fog or veil, and the above method will quite remove this defect, and if care is used the details of the picture will not be injured. After fixing and clearing as above mentioned, the slide should be washed for a few hours in the same way as an ordinary negative. On taking the plates out of the washing trough, it is advisable to give each a good rinse under the tap, so as to remove any particles of grit that may have been deposited on the film from the washing water, and then place them on edge to dry, not in a rack, where they will be kept quite free from dust. There are several me hods of toning slides, but I have not tried any of them, for I much prefer the rich brown, or even the black tone of the ordinary photograph, to the red or other tints that may be obtained by toning, and I believe there is considerable risk of a toned slide fading away. When the film is thoroughly dry it is ready for mounting for the lantern. I am sorry to say there is often very little care exercised with this part of the work, and many an otherwise good slide is completely spoiled by the careless and slovenly way in which it is mounted. The photograph and cover glasses should be absolutely clean, and free from all dust and finger-marks, and here I would say a word as to the thickness of the cover glasses. Very thick glass adds much to the weight of the slide, as you will find to your cost if you have them to carry far. The extra thin covers are the nicest, but, unfortunately, they soon break when using the slides, even the pressure of the fingers will do this; therefore I would say use a medium thickness of glass, and take care to have it free from scratches and air bubbles. The paper mask to be placed between the photograph and the cover glass should be of suitable shape and carefully adjusted to the size of the photograph; on no account use the circular masks, as this shape is most inartistic, and frequently quite spoils the picture. The masks having one white side and the other coloured are the best, as the white side is an indication to the lantern operator as to the side of the photograph to be placed next the

light, and it also enables the name of the slide to be written upon it. The binding strips should be neatly put round the edges of the slide, and two white or coloured dots placed on the two top corners of the front of the slide to show at a glance which is the top of the view, then carefully remove all finger and gum marks, and the slide is complete.

The lecture was illustrated by a large number of slides, which Mr. Bingley passed through the lantern in order to show the various tones, &c., to be obtained by the different processes.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

April 1.—Special meeting.—Mr. John G. Bullock in the chair.

The Chairman announced to the Society the sudden death of their President, Mr. Frederick Graff, which occurred on Sunday morning, March 30.

After the reading of the formal call for the meeting by the Secretary, remarks were made by a number of members expressive of their strong affection and high admiration for their late presiding officer, and deepest grief at his loss. His kindly spirit towards all with whom he came in contact, his painstaking care and energy in all work falling to his share, his great interest in photography, and particularly in this Society, whose growth he had watched and fostered from its infancy, were dwelt upon.

A Committee was appointed to draft a suitable minute in regard to the death of Mr. Graff for publication in the daily papers, to report at the stated meeting on the 2nd inst., and also to prepare a more formal memorial to be published by the Society at a later date.

The meeting then adjourned.

April 2.—The following minute, prepared in accordance with the action at the special meeting, was adopted and ordered to be published, after which, out of respect to the memory of their honoured President, the Society adjourned:—

"The members of the Photographic Society of Philadelphia desire to testify to their sense of the great loss they have sustained in the death of their President, Frederick Graff. They feel that by his death not only have they lost a most efficient presiding officer, but that each one has been bereft of a dear friend, a wise counsellor, and one who gave of his very best to promote the interests and well-being of the association. For nearly thirty years his official connexion with the Society has been continuous—as Chairman of the meeting called to organize the same, then as Vice-President, and serving two terms as President. He may indeed be called its father. To his untiring zeal for its welfare the Society is in a great measure indebted for the present high position it holds in the photographic world.

(Signed) "John G. Bullock, *Vice-President.*
"Robert S. Redfield, *Secretary.*"

PACIFIC COAST AMATEUR PHOTOGRAPHIC ASSOCIATION.

The most interesting events presented to the members for the meeting of March 27 brought out a large attendance.

Professor Bolton, of the New York Society, addressed the Association and exhibited his photographic outfit. By an ingenious use of the bayonet catch these lenses are made to fit into one flange, to change from a long to a short focus lens is but the work of a moment, and to use this compound arrangement, a Newton clutches it in such a way that it adapts itself to any of the several lenses. Answering the statement of the President that he was an old and enthusiastic photographer, Professor Bolton replied that while he claimed to be enthusiastic he could not claim to be a veteran, having only within a short time taken up the study for the purpose of recording certain phenomena in the deserts of Arabia. Professor Bolton is now on his way to the Sandwich Islands; upon his return the Association hopes to have the pleasure of again listening to him.

An interesting and instructive paper was read by Dr. A. P. Whitsell, in which he recommended the use of saturated solutions in place of the system of weights and measures in use at present. To support his suggestions he instanced the method now in vogue throughout the medical world for measuring solutions of cocaine, by drops of mercury, &c. The Doctor also exhibited a very compact camera of his own design. To economize space, the lens, when not in use, is made to fold inward. The holder, which is only a couple of inches in width, holds twelve glass plates or one hundred films by the use of springs similar to those used in a faro box. [The Doctor dryly remarked, "Of course none of you know the details of a faro box!"] It is an easy matter to put a fresh plate in the front. A small changing bag is necessary to do this, but the ingenious construction of the holder makes the operation an easy and safe one.

A friendly letter was read from the President of the Calaveras Camera Club, an organization differing from the Pacific Coast Amateur Photographic Association in that there is no restriction upon the members as to the disposition of their work. The Secretary was instructed to respond in the same spirit of goodwill and to offer the rooms of the Association for the next meeting of the Camera Club, or until they secured permanent quarters.

Resulting from the resolution adopted at the previous meeting providing for the admittance of ladies to active membership, twelve names were balloted upon. It is pleasing to note that the vote cast was the largest ever polled in the history of the Association, and it is unnecessary to state that their admittance was unanimously favoured. This change will put new life into the Association, as the work of many of the lady amateurs equals the best of the more skilful of the sterner sex.

At the conclusion of the evening's entertainment, which included a large collection of lantern slides, some of them by Mr. Regas, who has just returned from a trip through Europe and Asia, and part of Africa, the members sampled a large bowl containing a huge lump of ice and some slices of lemon. The solution looked like a pyro developer, but it was not. There could not have been a better medium for drinking the health of the newly elected President (Mr. E. L. Wendel and the Vice-President (Major W. H. Heuer).

When these lines are read the exhibition of the Association will probably be a thing of the past, but a description of the work presented will be given in these pages in a later number.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

FADING OF SILVER PRINTS.

To the Editor.

Sir,—Referring to the interesting and practical discussion which you have opened in your columns upon the fading of silver prints, I feel emboldened to contribute my quota of experience, with the view of shedding some light upon a subject of such paramount importance to the photographer.

At the outset I will call attention to the fact that twenty-five years ago prints were toned with gold and hypo made in one bath. To this the system of acetate toning has given place, and as anent this I may say that I have now in my possession two plates which were prepared fully a quarter of a century since by this process. These are to all intents and purposes intact, and they fail to display the merest *soupçon* of fading or down-gradiness. One of the prints is an admirable plate of a pretty village scene taken in East Farleigh, Kent, and the other is a portrait of myself, produced some twenty-seven years ago. Beyond the mere mellowing afforded by their age, nothing approaching deterioration in full and clear distinctiveness can be observed.

I may add that three years ago I took a 12 × 10 photograph of a snow scene. The print was made in a hurried manner with egg albumen, and was not washed for more than half an hour. It was mounted on chocolate and exhibited the same morning in a stationer's shop in Maidstone. The same print was exhibited in the ensuing winter for some weeks, and it now exhibits not the slightest trace of fading.

It is noticeable from the facts I have cited that albumen formed of blood is now used instead of that produced from eggs, and, further, that sensitised paper prepared from an acid with a weak solution of silver has superseded the old sixty-grain bath with its strong solution. I would therefore suggest, as a remedy for the calamity of fading, that we should hark back to the use of egg albumen, short washings, and home-prepared paper. Perhaps my brethren in the profession will compare their experiences with my own and communicate them to your valuable Journal.—I am, yours, &c.,

Clement Vernon.

Tonbridge-road, Maidstone.

THE RIGHT OF TAKING PHOTOGRAPHS IN EPPING FOREST.

To the Editor.

Sir,—Is it possible that the keepers of Epping Forest have the power of preventing any one from photographing in the forest? I have just been told that a party was stopped the other day by one of the keepers, and told that no one could photograph there without a license. I intend to take a camera there some day soon, but have no intention of asking anybody's permission to use it, and feel, that as a *part proprietor* of the forest, I am at liberty to do anything I please there, short of actual mischief. What do you think?—I am, yours, &c., G. H. S.

London, April 28, 1890.

[This is the first time we have heard of any restriction being placed on photographing in Epping Forest. We occasionally photograph there, and shall do it again without asking permission of any one.—Ed.]

THE CRYSTAL PALACE EXHIBITION.

To the Editor.

Sir,—The Newcastle exhibitors complained that some of their pictures were excluded from the Challenge Cup Competition, and I thereupon immediately checked off, by their list and the catalogue, every picture as hung in the three alcoves set apart for them. *Not one was missing*, but, in addition, two of those which had been previously shown at the Crystal Palace were included. As, however, no mention of the disqualification of those two, or of any others, was made to a single Judge, it is not easy to see how the presence of two additional pictures was prejudicial to the interests of the Newcastle Society. The entire number of the Newcastle pictures (Mr. Sawyer having substituted two new for two old ones) was submitted to the Judges for their consideration, and the responsibility of the Executive was then and there brought to a close.—I am, yours, &c., J. F. Prescood.

Crystal Palace Company, Crystal Palace, S.E., April, 26, 1890.

A CORRECTION.

To the Editor.

Sir,—I find on reading over my "Notes" that I have made an error. The lantern presented to the College of Physical Science was made by Messrs. Newton & Co., Fleet-street, and my apology is due to these gentlemen for the mistake. I don't know how I could have made the error, as my information was correct.—I am, yours, &c., D. D.

Newcastle-on-Tyne, April 29, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Suter's 4B aplanat lens, 10×8; wanted, Laverne's 9×7 wide-angle doublet.—Address, E. R. PRINGLE, 83, Berners-street, Ipswich.

Cyclostyle copying apparatus, foolscap size, in exchange for half-plate wide-angle lens or folding tripod.—Address, BERNARD, 101, Goldhawk-road, W.

Exchange tricycle (Beeston Humber) for 12×10 outfit for outdoor work.—Address, R. H. BLYTH, Grove Studio, Ilfracombe.

Will exchange two fine plaster casts (three-feet statuettes) for half-plate portrait combination by good maker.—Address, H. H. NEWMAN, 15, Green-lane, Kettering.

I will exchange whole-plate camera, bellows body, four double and two single backs, with portrait and view lenses by Dallmeyer, for a good tricycle.—Address, T. WRIGHT, Margery Hall, Forest-gate, E.

Will exchange "Optimus Euryscope" (7×5), Fallowfield's "Special" camera (8×5), one double back, and Marshall's patent pneumatic shutter, for good cabinet portrait lens of six or seven inches focus and cash to adjust.—Address, W. HARE, Lind-road, Sutton, Surrey.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:

F. Harrington, Pimlico, S.W.—*Photograph of four girls dancing.*

LUX.—We do not know of such a camera as you specify, but will make inquiry, and, if successful, communicate with you.

W. M.—Fresh acetate of soda is not necessary every time the bath is strengthened. A little added now and again will suffice.

HARD UP.—You may possibly get a second-hand detective camera at the sum mentioned by means of a shilling advertisement.

LINED.—1. We believe the paper is not made now, as the manufacture was not altogether satisfactory.—2. The carbon process.

H. H. NEWMAN.—Eight feet would be very narrow for a studio. However, single figures could be taken in such a building, but groups could not.

G. H. A.—1. A five-inch condenser will barely suffice for a quarter-plate, therefore will be too small for a five by four plate. 2. Good paraffin oil.

GENERAL UTILITY.—We have no practical acquaintance with the Van Neck camera, but from what Van Neck told us at a recent interview we think it will fulfil your requirements.

JUMBO.—You can register any name as a trade mark, provided it be not a descriptive one. Apply to any patent agent. You can use a crown or coronet, but not the Royal Arms.

J. B. W.—The cause of the fog is that the plates are what the Americans term "light-struck;" that is they have been fogged by the action of light. See that your source of illumination is safe.

A. BYRNE.—The spots on the negative sent are caused by dust on the film. They can only be avoided by care in dusting the plates before putting them into the slides, and seeing that the slides themselves are free from dust.

C. J. W.—The collodio-albumen is not an emulsion, but a bath process. The collodio-bromide is an emulsion process. Either you or your informant is a little "mixed" on the subject, but the above reply will set matters right.

BEN. ROYAL.—If the negatives are coated with plain collodion before they are varnished it is an additional protection of the film from staining by contact with the paper in printing. Of course the varnish should not be applied until the collodion is dry.

C. GRAVES.—1. The No. 1B *carte* lens will make a better lantern objective than the rectilinear.—2. At that distance the former lens would about fill an eight-feet screen.—Begin with a blow-through jet, it will give quite light enough for your present requirements.

PRICE, O'MALLEY, & Co.—It is a very common practice to give a matt surface to prints which would otherwise have a glazed one, such as carbon or bromide paper, by squeegeeing them on to ground glass, zinc, &c. Silver prints can be treated in the same way.

G. W. S. asks if any of the following processes are free from patents and can be worked commercially without restriction:—Collotype; Photo-zincography; by Transfer; Photo-etching on zinc, steel, or copper; Bitumen method.—All these processes are unfettered by patents.

READER W.—1. Sufficient heat to drive off the water of crystallisation.—2. Recrystallised.—3. No. You had better purchase the salt than attempt to prepare it yourself, unless you have suitable appliances and know something of the subject—that is, if you really desire the *pure* article.

W. C. B. (Leeds.)—There is no copyright in Hogarth's original engravings, so that you can make lantern slides from them. From the tone of your letter we conclude that you are labouring under a misapprehansion. If a picture is copyright it is equally as illegal to copy it for lantern slides as for paper prints or other purposes.

ENLARGEMENTS.—1. It is not usual to tone bromide prints, as no good would result therefrom. The prints are already as black as they could be made by gold toning.—2. Make the enlargements on rough paper and work them up with ordinary black crayons, to be obtained of all artists' colourmen.—3. No.

S. DORE.—The best plates for lantern slides are those specially sold for the purpose. Rapid or extra rapid plates, whatever developer may be used, are not well suited for transparency making. The negatives from which most of the early transparencies of Ferrier were made were by the albumen and by the Taupenot processes. Some of these transparencies were by contact and others by camera printing.

J. A. MANTON.—(*a*) It is not liable to crack back, unless the nozzle contains an abnormal amount of gas. (*b*) The condensers may be so close together as to touch, provided it does not interfere with other mechanical arrangements. (*c*) The longer the focus of the objective the nearer must the radient be to the condenser. It is simply a case of conjugate foci. (*d*) Not having tried the warm-bath saturator we cannot say.

ENLARGING.—1. The exposure will depend upon the quality of the light at the time and the density of the negative. "Ordinary density and daylight" mean anything or nothing.—2. Judge by the brightness of the image.—3. This can only be ascertained by experiment, and this we have not made. Why not make a few experiments with the paper and plates in question, you would then be able to judge what exposure would be necessary under the conditions mentioned. There is no other way of arriving at it.

DELTA asks if three sheets of thick yellow glass will be sufficient for a dark-room window that faces the north, or how he can make sure the light is safe, as he has not a spectroscope to test it by.—All will depend on the colour of the glass. The following experiment will prove whether the window is safe or not. Place a plate, of the kind generally used, in a dark slide; then withdraw the shutter, say half-way, and expose for a minute or two twelve or eighteen inches from the window; afterwards develop the plate and note the result.

W. F. writes: "Would you oblige me by answering the following questions?—1. I have a copy of a photograph of a clergyman of this town done by Messrs. ———; it is a *carte-de-visite*, half-length. If it is copyrighted would I be breaking the law by copying that photograph, altering the size of the head and vignetting off by the shoulders; there would be little or no resemblance to the original picture, the only thing would be in the likeness, of course. I think myself I could do it with impunity.—2. I have a whole-plate camera, the bellows of which are leaky, especially about the corners of the folds; would you name some composition, varnish, or other substance with which I could coat it to make it right?—3. Could you name some cement which would fix cloth to tin or zinc?"—In reply: 1. Certainly you would be breaking the law. The mere fact that the size of the portrait is altered, and it is vignetted, makes no difference, the piracy is still the same. By copying the portrait in any form you will be liable to prosecution.—2. Patch the bellows with macintosh cloth cemented on with indiarubber solution.—3. Try a solution of shellac or marine glue.

WEST LONDON PHOTOGRAPHIC SOCIETY.—May 3, Excursion to Hampstead Heath. Members to meet at Jack Straw's Castle at three o'clock.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 7, *Lenses for Instantaneous Work;* May 14, *Photographic Definition.*

WE notice that Photophane, Limited, are keeping their lists open for a few days longer, and offering to all connected with the trade the first opportunity of securing shares in their business.

MR. DALLMEYER'S lecture at the Society of Arts on Wednesday evening on *The Construction of Photographic Lenses* was well attended by the *cognoscenti* and the manufacturing brotherhood. We shall give a full report of it next week.

Illustrations, No. 8 (Simpkin, Marshall, & Co.), this month bears out its title in a pronounced degree, as it contains an unusually great number of photographs engraved by the Meisenbach process, including views in Italy and the Lake district. There is also a good portrait of Stanley (Elliott & Fry), with a sketch of his life.

APROPOS of a remark we appended to the patent specification of the camera of Messrs. Skinner & Co., East Dereham, relative to the distinction between a wheel and a pinion for actuating a focussing rack (see page 253 *ante*), Mr. Skinner has called and shown us the special adaptation in question. It consists of a strong steel spindle extending from side to side of the camera, having a wheel tightly fixed on at each end, quite differing in this respect from the usual pinion.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1566. Vol. XXXVII.—MAY 9, 1890.

THE PERMANENCY OF BROMIDE PAPER PICTURES.

For enlargements the bromide paper has practically superseded most other methods, and for direct prints it has made, and is still making, rapid strides. Now that the metal platinum has risen so in price, this process will, for many purposes, be made to take the place of the platinum processes. For this reason we shall direct attention to the question of the probable stability of the pictures as they are now very frequently produced. It is not the first time we have treated upon this subject, and the reason for again recurring to it is, first, its extreme importance; second, that recently we happened to be in a portrait establishment where the process was being worked, both for enlargements and for direct prints, and, from the way the prints were produced, we have no hesitation whatever in saying that within a very brief period they may well be expected to undergo a material change. If they do, it can in no way be attributed to the process itself, as it will be entirely due to the carelessness—or, perhaps, to speak more correctly, to the want of knowledge on the part of those who were doing the work. It will be remembered that in an article in the Almanac for 1887, Mr. E. W. Foxlee called particular attention to the fact that many workers did not really understand the conditions necessary to secure permanence in bromide pictures, and pointed them out, yet they are too frequently disregarded in every-day practice.

We said just now that we imagine the pictures we saw made would eventually show an altered appearance, but we do not go so far as to say that they would fade in the sense that the image itself would lose in vigour; but what we should expect is, that within a few years the lights and half tints would acquire an objectionable yellow tint. The oldest bromide prints are but young. As yet, however, we have not seen an instance of genuine fading—that is, a disappearance of the image or a reduction of its vigour. We have, we regret to say, seen many instances of yellowing of the lights and delicate tones which might easily have been avoided with more care, or a better understanding, in the manipulations.

It is an unfortunate circumstance that a large proportion of those who work the different methods of photographic printing know little, or nothing, of the chemical part of the subject. So long as they produce pictures which are satisfactory in appearance—and this they do by rule of thumb—they consider themselves proficient, and so, also, do those who enlist their services.

Here is the way we saw the bromide pictures produced the other day, and we know that the system followed is by no means exceptionable. After the pictures—in this instance direct prints—had been developed they were "cleared" as usual with dilute acid. They were then rinsed with water from a rose attached to the tap, and afterwards transferred to a tray of water in which were a number of others that had been previously made. When probably a score or so had accumulated, an assistant placed the pictures in the fixing bath for eight or ten minutes. They were then removed to the washing trays, which were plentifully supplied with running water.

Who, with any knowledge of the chemistry of the subject, would for a moment be astonished at pictures made under these conditions becoming yellow in the course of time? The greatest wonder would be if they did not, and that speedily too. At the time the pictures were placed in the fixing bath they, from the perfunctory washing they had received, must have contained a considerable amount of free acid from the clearing solution. The action of the acid would be to at once decompose some of the hyposulphite of soda, setting free sulphur, sulphurous acid, as well as pernicious silver compounds in the paper, which in the end would have a marked effect upon the pictures.

As regards the fixing, the time allowed in the bath—as the paper was very thick—was far too short. It was certainly long enough, no doubt, to dissolve the unaltered bromide of silver, or rather to convert it into the hyposulphite of silver, but not long enough for the hyposulphite of soda to dissolve out the double salt which is insoluble in water, particularly considering that only a small quantity of solution was employed, and even this had been used to fix previous batches of prints earlier in the day.

If bromide prints are to be rendered permanent—and in the general acceptation of the term we believe they may be—the necessary conditions to make them so must be fulfilled. When they are not, as in the instance just cited, it is generally from no desire to shirk them, but simply through a want of knowledge of what is really essential. We are led to this conclusion, because on the washing of the pictures after fixing we noticed that the greatest possible care was bestowed. Unfortunately, however, this would be of little avail, as it would not remedy the evil originated at the earlier stages of the work. The presence of hyposulphite of soda, pure and simple, is far less hurtful to a print than is that of the sulphur compounds of silver.

In a word, if bromide prints are to be made lasting, all acid must be removed from the paper before they are immersed in the fixing bath, and this can only be effected by a far more copious washing than is usually given. The action of the bath also must be continued for a much longer period than is very frequently the case. The best plan is, after the prints are con-

sidered perfectly fixed, to place them in a fresh bath of hypo-sulphite of soda for five or ten minutes before commencing to wash them.

COLLODION FILMS FOR COLOUR SCREENS.

Most old photographers with a collodion experience extending over, perhaps between, thirty and forty years, will be inclined to join issue with Mr. Birt Acres on the statement contained in his article on *Yellow Screens* that "the most transparent and structureless collodion that can be made has an opalescent appearance when a dead black is viewed through it." There are, of course, many degrees of opalescence, and it might be possible with some samples to prove the existence of a barely appreciable departure from absolute clearness in order to support his argument, though the diffusion of light caused thereby might be *nil*. We do not, however, intend to "split straws," but to make the counter statement that it is easy for an adept at collodion making to prepare films that shall be, so far as the human eye with every artificial assistance can detect, perfectly free from opalescence of any kind; far more so, indeed, than the best glass that can be made. Under the microscope it may, of course, be possible to discover "structure," but in the sense meant by the author of the paper, we repeat collodion films can be made that are above suspicion.

Purchasing at the present day such samples of pyroxyline or collodion as may be obtainable, especially if from a photographic source, it is not improbable that some at least, if not all, may exhibit the defect alluded to, because the conditions essential to the production of the best photographic collodions are such as to favour, if not actually to cause, the formation of opaline films. Pyroxyline made for other than photographic purposes is generally remarkable for the beautiful transparency of its film, though taking as an example ordinary "surgical" collodion, its solution may be so thick as to produce "structure." Even in such cases judicious "thinning" gets rid of that evil, and it must be borne in mind that the collodion used for screen purposes is always recommended to be very thin—a one or two per cent. solution at most, with a preponderance of alcohol, in the solvents; but if a specially transparent and clear preparation be required, let a thin collodion be made from papyroxyline dissolved in the most highly rectified alcohol and ether obtainable, in the proportion of 2 : 1, and we think Mr. Birt Acres will have a difficulty in discovering any opalescence.

In speaking of this defect, perhaps he has overlooked a rather important element in its possible production, namely, the colouring matter used. Aurine and tumeric are especially liable to cause a clouded film, some samples of the former seeming to possess a direct action upon the pyroxyline. Turmeric, even when employed in the form of clear tincture, almost invariably produces a slight cloudiness when added to the collodion, owing, no doubt, to the presence of some substance insoluble in and precipitated by ether. This may disappear if the collodion is allowed time to settle.

THE SPECTROSCOPE AND COLOURED GLASS.

Mr. J. A. Forrest has had a long and intimate acquaintance with ruby and other coloured glass, and was one of the first to utilise the spectroscope for testing it photographically; but is he correct in relying so implicitly, as he apparently does, on that test? He speaks of regarding a sample of glass as "safe" when he finds a "total absence of the green and blue," but in our own experience we have never met with a sample of ruby, or, indeed, any other kind of glass that would answer those conditions without being at the same time so nearly opaque as to be useless. It is true that by screwing down the slit of the spectroscope until it admits scarcely any light the proportion of blue and green rays is so reduced as to be invisible, but the fair test is to work with the slit fully open, so that as much light of every colour reaches the eye as falls on the plate. Under these conditions it must be a very dense kind of glass or a particulary good colour that will not show both blue and green.

The stained red glass mentioned by Mr. Forrest appeared to us at one time to be particularly suitable for photographic purposes from its colour, which, in proportion to its density, stops more green and blue than any ruby glass we ever came across. But we had to give it up on account of its irregularity, the silver staining preparation apparently "soaking" in so unevenly, that while portions of a sheet might be tolerably safe others were hopelessly useless.

The method of combining ground glass or a fabric with the transparent coloured medium as mentioned in the same article is an excellent one, as in addition to softening the light it apparently greatly increases its illuminating value, especially in the case of very deep ruby. The fact was first published in our columns some twelve or fifteen years ago by a fellow townsman of Mr. Forrest, Mr. H. A. Wharmby.

Photographic lanternists are familiar enough with compressed oxygen, though not all are acquainted with the method of preparing the gas by Brin's Company. The process, which is a patent one, consists of exposing barium oxide under certain conditions to purified air, and so causing it to absorb oxygen, which was afterwards driven off from it, and the original oxide left in a condition to reabsorb and again give off oxygen. Under a modification of the conditions referred to recently introduced, a much larger supply of oxygen is obtained from the same materials, and so we may hope the price will be reduced.

In the old system the oxide was first heated to dull redness, and the air passed over it at a pressure of about ten pounds; absorption of oxygen took place, and the oxide was changed into dioxide. Next, the heat was increased to bright redness, and the vessels containing the dioxide connected with an air pump, with the result of the conversion of the dioxide to its original form, and the consequent evolution of oxygen. The main principle herein involved was change of temperature, and the process involved much loss of time and great wear and tear of the retorts.

In the new method the temperature is kept at about 700° C. all through, and the pressure greatly varied. Air is pumped in at about fourteen pounds pressure; the current is then stopped, and the pressure reduced to about thirteen or fourteen pounds below that of the atmosphere, at which point the absorbed oxygen is again given off. Far less of the gas is obtained at each operation, but as the whole process of absorption and revolatilisation occupies but a quarter of an hour, while four hours was required by the old way, the aggregate for the day is greatly increased.

At the International Medical Congress of Vienna recently held, a new form of lantern, with electrical illumination, was exhibited, and gave great promise of usefulness. According to the Vienna correspondent of the *Times*, Professor Stricker, its inventor, by an ingenious combination of lenses, contrives to project the magnified images of opaque objects on to a white screen in their natural colours, with such perfect success that, for example, a small pimple on the skin of a patient can be shown just as it really appears to an audience of many

hundred students. That lanterns for the exhibition of opaque objects are no novelty we need scarcely say, but one powerful enough to exhibit on a large screen such a small object as described clearly points to some novelty in lantern construction.

Some considerable unjustification seems to have been felt as to the explanation of the mode of construction of the apochromatic objectives recently described at a meeting of the Royal Microscopical Society. Some published matter bearing on the subject suggests the existence of some soreness among English opticians, and one writer went so far as to insinuate that the fluorite, in the use of which the secret was said to lie, was simply a pigment. There, however, can be little doubt that by the term fluorite, the mineral generally called in this country "fluor-spar" is to be understood. A writer in the *English Mechanic* points out that it is stated that Tulley was of opinion that a glass of the same power as rock crystal and a green crown glass would correct the secondary spectrum in an objective. The use of "fluorite" is thus anticipated, seeing that it in all probability differs little from rock crystal in its refractive and dispersive powers.

One of the difficulties of the fluor-spar has been supposed to be its colour, which is usually a pale green; but when slices of the thickness required for a microscopic objective are used, the residuum of visible colour must be almost *nil*. It may be pointed out that long ago Faraday produced new glasses for the microscope, and Ross tried them by utilising them in the manufacture of objectives, but their use, despite the great advantages gained, was given up on account of the atmosphere acting upon them. Every photographer conversant with the subject knows that the same experience has been passed through in regard to photographic objectives, and proof of the unalterability of the apochromatics should be sought for before their purchase is indulged in too freely.

LONDON CHAMBER OF COMMERCE PHOTOGRAPHIC EXHIBITION.

The Photographic Exhibition shortly to be held at Drapers' Hall in the centre of the City under the auspices of the London Chamber of Commerce must be interesting to all the leading members of the trade in London. Looked at only as a matter of business interest, it offers an unique opportunity of hanging their best work under favourable conditions to the notice of a wealthy and influential circle. This concerns most directly the metropolis, but also it affects all the principal holiday resorts of its wealthier inhabitants, Brighton, Hastings, Eastbourne, Folkestone, the Isle of Wight, all the south coast towns to Bournemouth and Plymouth are interested, and the same may be said for Ilfracombe, the favoured spot in Wales for the lake district, and for the enchanting pleasure resorts that Scotland offers to tired Londoners. Certainly the studios of Ayr, Greenock, Largs, Ramsay, of Edinburgh, Dundee, and Aberdeen, should display their conspicuous merits at Drapers' Hall, and add their quota of value and interest to the first photographic exhibition held by invitation of a great City Company in its magnificent hall.

A photographic section added to the list of trades associated with the Chamber of Commerce is the first practical step towards creating a bond of interest among photographers that has long been wanted, and it will prove a centre for combined actions for trade interests wherever it may be required. We understand that already nearly all the large amount of space at command for the show of apparatus is engaged, but there is still plenty of room for the worthy display of photographs. Intending exhibitors will do wisely not to delay their applications for space. The last day for receiving exhibits is the 27th of the present month.

ON THINGS IN GENERAL.

In reading the concluding sentence of the *critique* on the Newcastle Exhibition, the impression is irresistibly produced that the reviewer would have liked to sum up his judgment somewhat as follows:—"Exhibition, very good; Judges, very bad." And there can be no doubt that a large number of critics—responsible and irresponsible—frequently hold such views when brought face to face with pictures and medals. The brave effort of the Parent Society the year before last got over all such difficulties; but photographers would have medals, and the old story had to be repeated. Whatever hints the Liverpool Society are to glean, there is to be said that theirs was the best photographic show ever got together, and the best shown. There was one point in connexion with their exhibition which deserves praise and should be imitated at all others—the giving awards to "sets of pictures." There are few photographers who do not manage at some stage of their career to make one good picture; but when it comes to getting together a frame of half a dozen, or a dozen, the best man has every chance of scoring. I commend this plan most heartily to the Photographic Society of Great Britain. They have nothing like the space or opportunity of exhibiting a number of sets that Liverpool had, but they might, however, and with advantage to the exhibition, exercise their power of rejection, and so obtain the necessary space. But the worst of exhibitions with such a multiplicity of classes is the temptation, when there is no vast amount of difference in excellence between the two best pictures, to say, "Oh, Brown has one or two medals already, let this go to Jones," and so on. This is human nature. Is not the time come to put a stop to giving medals at a public exhibition for the glorification of dealers and manufacturers? Let the plate and the paper makers give as many premiums as they like, but Committees of public exhibitions should not lend their authority to the system: if the appointed Judges would decline to adjudicate on classes where the medal was supplied by a manufacturer and the class defined by his name, the system would soon be ended. It is degrading as now carried on.

There is no fear of a repetition of such a droll affair as is reported in connexion with the Manchester Photographic Society, at a meeting of which, last month, we read that the Chairman, on behalf of the Society, presented to the winner in a recent lantern-slide competition "that portion of a large and beautiful album which had been subscribed for out of the funds of the Society, viz., 12*s.* 6*d.*," the balance in cost having been paid by the winner. If a large and beautiful album had been subscribed for, why did he not get it? But then 12*s.* 6*d.* would scarcely pay for a large and beautiful album, so it must be the "portion" of the large and beautiful album that the Society paid for; but then the difficulty arises, what did they do with the portion the winner paid for? was it in his pocket when the Chairman presented the Society's portion? There is a pleasing variety about the various ways in which the problem may be treated; a fairly approximate result might be obtained by the use of logarithms perhaps.

The *exposé* by Mr. Freshwater at the London and Provincial Photographic Association (April 7) of the sensationalism of the accounts of the landslip at Burnt-house Farm lets in much light upon the ways that are dark of newspaper men; but their ways are not dissimilar when the tales are in pencil rather than pen. I had the following true story direct from the lips of the daughter of a bishop some time since:—A friend had sent to one of the illustrated papers a sketch of some spot in India which was then attracting public attention, and was much horrified to find some palm trees ornamenting the reproduction of his sketch. On his return to England he called to remonstrate at the liberty taken with his sketch, which by implication accused him of ignorance. "There is not a palm tree within thousands of miles," said he. "Oh, it does not matter," he was told; "the British public looks for palm trees in tropical pictures, and it must have them."

I observe that Mr. C. I. Burton, in a note upon desiccating agents, recommends the use of carbonate of potash well shaken up with alcohol for abstracting the water from it, stating that the supernatant spirit may be poured off the salt, and the layer of solution formed by it, from the water previously in the spirit, and the alcohol so strengthened used for drying plates or making most kinds of varnish. It would be very unfortunate to put it to any such use, for it would most assuredly contain an appreciable amount of the alkali, and no one could look with equanimity upon placing a negative in a bath of weak carbonate of potash and allowing it to dry into or upon the film.

Photographers who look closely into their bills will find their expenditure on precious metals increasing of late to a very disquieting extent. Silver, which in the metallic form was down as low as three shillings and sixpence per ounce a few months ago, has been up to four shillings and over lately, while platinum, whose motto has been

excelsior for some time, is now just about twice as dear as it was twelve months ago. Platinotype paper in consequence is "up." A little incident occurred at a well-known country studio a short time since that is worth mentioning, for the sake of example. A tin of platinum paper had arrived so damaged, that the proprietor said to his clerk, "Send this up to the post office, and tell them I should like them to see it before it is opened, that any damage there might be could be proved to have occurred in the post office." The clerk wrote and said "the post master was to examine it before opening it," that he might see the damage! A slight change, but an important one; for at the close of the day the packet was sent back with the post master's compliments: "He had thoroughly examined it in a good light, and there was no harm done." The feelings of the photographer, when he realized that each sheet had been taken to the window and overhauled in a good light, and then placed in the tin without any precaution against absorption of moisture, may be more easily imagined than described. Moral: the Platinotype Company should have a printed label securing the lid, and bearing the usual legend, "Not to be exposed to light or air." FREE LANCE.

PHOTOGRAPHIC LENSES.

[A Communication to the Society of Arts.]

PHOTOGRAPHIC lenses in general are optical systems for the formation of real images. The perfection of the image, its exact resemblance to the object, and its distinctness, will depend on the exact conveyance of all the rays of pencils emanating from every point in the object into strict mathematical points in the image, or the nearest approximation to such points as may be. If aberration is present due to improperly chosen curvatures or improperly combined materials, the resulting image will lose in its distinctness, and may become useless. The object, then, in constructing lens systems is the best possible destruction of aberrations, both chromatic and spherical. With this in view we have to consider, first, the proper selection and perfect homogeneity of the materials employed; secondly, the best selection of curves ascribed to the material; and thirdly, mechanically, a strict maintenance of the "figure" (as it is technically termed) of the curves when the material is properly polished. As it will not be possible in the time allotted to this paper to touch on the mechanical processes employed, I will mention here that this, of course, is a very important consideration.

Glass is a very perfectly elastic substance, and if in the processes of sticking the glass on to polishers the material becomes "biassed," however perfectly the curve may then be polished, the glass on being released from the polisher will spring back, and the true curve will no longer be maintained, and will give rise to an unexpected appearance in the image technically termed "unnatural" aberration. Similar effects occur from bad workmanship in polishing, the polish not being distributed equally. Such defects are quite inadmissible, for though not visible by ordinary reflection, the polish appearing very good, a critical examination of the image will show the deleterious effect.

In the application of photographic lenses for ordinary purposes, we ask the instrument to do practically what is theoretically an impossibility. An imaginary perfect lens can only truthfully depict one plane at a time, every other plane being out of focus; when, however, the lens is used under conditions that all rays coming from points in the object are so situated that they are practically parallel, or the circles of confusion in the plane of the image, when removed from the plane for parallel rays, are so small that they are undistinguishable from points visually, the general appearance is one of uniform sharpness. In ordinary lens construction the rays are usually considered as parallel, but in large portrait lenses the means should be given, if sharp images are the theoretical desideratum, of correcting the spherical aberration introduced for nearer planes.

There are great advantages, you will be aware, from rapid lenses or brilliant images. Herschel points out that the brightness of an image is proportional to the quantity of light which is concentrated in each point of it; and, therefore, supposing no aberration, as the apparent magnitude of the lens which forms it, seen from the object $\times \frac{\text{area of object}}{\text{area of image}}$. Or since the area of the object: that of the image :: (distance)^2 of object from lens: (distance)^2 of image; and since the apparent magnitude of the lens seen from the object is as its $\left(\frac{\text{diameter}}{\text{distance of object}}\right)^2$, the brightness or degree of illumination of the image is as the magnitude of the lens seen om the image alone, whatever be the distance of he object. Now the apparent magnitude of the lens seen from the image is always much less than a hemisphere. Therefore (leaving out the loss of light by reflection and refraction), the brightness of the image is always much less than that of the object.

I mention these facts at the outset for the reason that you may clearly understand that it is quite impossible for the lens, with a large ratio of aperture to focus, or one that aims at attaining a maximum brightness of image (such as are used in portraiture), also to maintain, at the same time, the uniform qualities above referred to in a lens, the ultimate employment of which is to depict, with sufficient exactitude or definite-

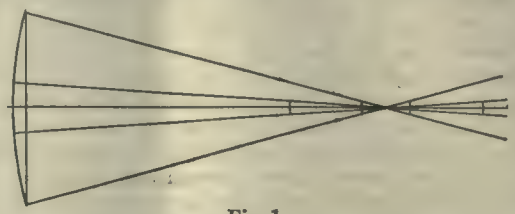


Fig. 1.

ness, objects in different planes. With the decrease of brightness or aperture comes a reduction of the angle at which the extreme rays cross, increasing thereby the limits through which the plane of the plate may be moved for similar diameters of out-of-focus circles; but, as the depth increases by the proportion the diameter of the lens is diminished or stopped down, the brightness decreases as the square of the intensity of ratio, or the ratio or aperture to focus.

As the ultimate applications of various optical systems are at the outset understood, a knowledge of geometry and analysis will enable the optician to construct different forms that shall be particularly suited to the end to be attained.

I take it for granted that you are all acquainted with first principles and first approximations in the refraction of light at plane and spherical surfaces, and are familiar with the fact that the different coloured rays of which white light is composed are unequally refracted in their passage through a refracting medium, giving rise to chromatic aberration.

As stated before, our effort is, as far as possible, to destroy in the final image of every system the aberrations arising from the spherical forms of the lenses and from chromatic aberration. The process necessary to destroy the latter being the easier defined, we will approach it first and return to the headings.

I.—THE PROPER SELECTION OF MATERIALS.

It is well known and easily demonstrated that a single lens cannot be made free from either spherical or chromatic aberration for parallel rays. A study of the different forms of single lenses and their adaptability to different photographic purposes is very interesting and instructive, and we will run through them briefly when on the subject of spherical aberration. If, however, we combine two or more lenses of different media, we have the means of annihilating both aberrations simultaneously. The elimination of chromatic aberration is rendered possible by the property of refracting substances of dispersing colours in a very unequal degree, though the difference in the refractive power is comparatively slight.

Taking the D line of the spectrum as brightest visually, and the G or H line as that of the most chemically active rays, in order that a lens may be of value in photography (or be actinic) it is most essential that these lines be combined, whatever may become of the rest. Thus two lines can be combined with two different kinds of glass, and n lines may be of course combined by employing n different kinds of glass.

For example, take Chance's ordinary hard crown glass, the refractive index for line D = 1·517,116, and for the line G, 1·528,348; for dense flint, for line D, 1·622,411, and for line G, 1·646,071. The difference, then, between these lines is, for the crown glass, ·011,232, and for the flint, ·023,660. The dispersive power of the flint between these particular lines is more than twice as great as that of the crown.

Now, you know that if a number of lenses are placed in contact (supposed infinitely thin), the focus or convergence of the system is equivalent to the algebraical sum of the components of the system. It can be shown for two kinds of glass, such as the above; the chromatic aberration can be destroyed, or actinism (the coincidence of chemical and visual foci) be maintained; the glasses must be unequally dispersive, one convergent or positive, and the other divergent or negative. The system can be made free from chromatic aberration, and convergent if the lens formed of the less dispersive power is positive, and is divergent if the lens formed of the less dispersive power is negative. In every case the ultimate rays from the lens converge to form a real image, so that (unless in the lens system

a negative element is introduced as a corrector) it will be found the positive element is always composed of the less dispersive medium.

Recent improvements in glass manufacture necessitate the expressions of "positive" and "negative" elements in lens systems, instead of the flint and crown, and to these I am about to refer. My late grandfather, in a paper contributed to this Society on *Practical Illustrations of the Achromatic Telescope*, says of glass then known:—"The flint is easily distinguished from the crown by its superior specific gravity, arising from the quantity of lead which enters into its composition. Thus the glass which is called flint glass has, in fact, a smaller proportion of silica than crown. It obtained its title from the care employed in selecting the flint with a view to the purity of the glass, and the term has since become so extensively adopted as to be now almost European." Again, "Discs of homogeneous flint glass, more than four or five inches in diameter, are exceedingly rare and very costly." The advances in the art of glass making have been very great since that time. By the skill and enterprise of Messrs. Chance, of Birmingham, Pfeil, of Paris, and most recently the elaborate work of Professor Abbe, assisted by Messrs. Schott & Gen, of Jena, the means at the optician's disposal is now placed in a much more satisfactory position.

In this country much valuable work has been accomplished by Dr. John Hopkinson and Professor Stokes, in obtaining convenient methods of expressing the measure of the irrationality of combinations of various glasses made by Messrs. Chance, of Birmingham. Dr. Hopkinson contributed a very important paper, important especially to opticians, on this subject to the Royal Society in 1877, and, in conjunction with my late father, worked out some important and valuable improvements in glasses for special photographic purposes, and succeeded in practically curing several of the glasses then made from "sweating." Sir Gabriel Stokes, too, suggested a titano-silicic crown that should be perfectly achromatic with a flint; this glass, however, was not found to be of much practical value. To express the irrationality, Dr. Hopkinson found a convenient formula that more accurately represented the facts from observations than the direct method of curve drawing, as the errors in this case would be greater than those of observation. I refer those interested to the paper, but give you the results of that formula, which serve to show how little there was to choose between the ordinary glasses made by Messrs. Chance. The figures show the measure of irrationality in a combination of each combined with a standard:—

Hard crown.	Soft crown.	Titanic crown.	Light flint.	Dense flint.	Extra dense flint.	Double extra flint.
—11·7	—10·7	—9·4	—9·4	—11·8	—11·9	—13·2

It will be interesting to compare some of the new glasses from Jena with these; and although they are presented in a less elegant form, the prospectus is a very practical representation of the qualities of the glasses, so I give the data of Chance's glasses in a similar form to those of Jena; but we will first make a preliminary investigation as to the conditions to be arrived at.

The dispersion, then, of colour produced by a positive or convex lens, may be neutralised by the addition of a negative or concave one, without cancelling the deviation of the rays, as the positive and negative lenses act with opposite effect. In other words, a compound lens may, by the proper adjustment of the *powers* of the separate lenses, be made achromatic or actinic, although if irrationality in the dispersions exist, only the union of *n* definite number of species can be combined, according to the number of different media forming the compound lens.

If the radii of a lens are *r* and *s*, in general approximation,

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{r} + \frac{1}{s}\right).$$

Herschel terms the reciprocal of the focal length the *power* of a lens, and this is seen to depend on $(\mu - 1)$, which we may take as the measure of the refracting power of the substance of which the lens is composed, and the second $\left(\frac{1}{r} + \frac{1}{s}\right)$ the simplest measure of the joint curvature.

To determine the relation between the focal lengths of two lenses that shall be achromatic or actinic when in contact:—

Let $\frac{1}{\rho}$ represent $\left(\frac{1}{r} + \frac{1}{s}\right)$, and μ_1 μ_2 the indices of refraction for the two lenses for one species of rays.

Then if u be the distance from which the pencil originally diverged,

$$\frac{1}{v_2} = \frac{\mu_1 - 1}{\rho_1} + \frac{\mu_2 - 1}{\rho_2} - \frac{1}{u}$$

and similarly, if μ' represent the index of refraction for another species of rays,

$$\frac{1}{v_2} = \frac{\mu'_1 - 1}{\rho_1} + \frac{\mu'_2 - 1}{\rho_2} - \frac{1}{u}.$$

As v_2 is to be the same for both species, we get by subtraction, term by term and representing $\mu' - \mu$ by $\Delta\mu$, we have

$$\frac{\Delta\mu_1}{f_1} + \frac{\Delta\mu_2}{f_2} = 0, \quad \text{or} \quad -f_2 = f_1 \frac{\Delta\mu_2}{\Delta\mu_1}.$$

Now in general $f = \frac{\rho}{\mu - 1}$; $\quad \therefore \quad -f_2 = f_1 \cdot \frac{\Delta\mu_2}{\mu_2 - 1} : \frac{\Delta\mu_1}{\Delta\mu_1 - 1}$.

Therefore the focal length of lenses are directly, or their powers inversely, as the dispersive powers of the media of which they consist.

Again, since

$$\frac{1}{f} = (\mu - 1)\left(\frac{1}{r} + \frac{1}{s}\right); \quad \Delta\mu \frac{1}{f} = \Delta\mu\left(\frac{1}{r} + \frac{1}{s}\right), \quad = \frac{\Delta\mu}{\mu - 1} \cdot \frac{1}{f}.$$

That is to say, the chromatic variation of the power of a lens is obtained by multiplying it by the dispersive power of the medium, or

$$f_1 : -f_2 :: \frac{\Delta\mu_1}{\mu_1 - 1} : \frac{\Delta\mu_2}{\mu_2 - 1} \ldots\ldots (1).$$

In like manner, by adding a third species of glass, we can satisfy a third condition, viz., that the third species should be united to the two former. And in general

$$\Delta\mu \cdot \frac{1}{f_1 f_2 \ldots f_n} = n \frac{\Delta\mu}{\mu - 1} \cdot \frac{1}{f_1 f_2 \ldots f_n}.$$

The prospectus published by the Laboratory at Jena is presented in a very practical form to opticians; the refractive index for the brightest line D being given, and the differences of the refractive indices for the four intervals, CF, A'D, DF, and FG'. The interval CF (containing the brightest portion) is sufficient to characterise the medium dispersion, and from the proportion of this to the value $\mu_D - 1$ there is given in a separate column the reciprocal of the relative dispersions or of $\left(\frac{\Delta\mu}{\mu - 1}\right)$.

The proportion of partial dispersions in the intervals A_1D, DF, FG', are a sufficient guide to judge of the possibilities of successful combinations for achromatism. There are also given the numbers obtained by dividing these intervals of partial dispersion by the amount of medium dispersion for the interval CF, and a comparison of these quotients will show the tendency and amount of the residual secondary spectrum. The identity of corresponding quotients proves the possibility of achromatising without secondary colour.

Kinds of Glass.	Refractive Index for D.	Medium Dispersion CF.	$\frac{\mu - 1}{\Delta\mu}$	Partial Dispersion. A' to D.	D to F.	F to G'.	Specific Gravity.
CHANCE'S							
Hard crown	1·5179	·00980	60·2	·00553 / ·643	·00605 / ·703	·00487 / ·566	2·49
Soft crown	1·5151	·00910	58·6	·00577 / ·634	·00642 / ·705	·00521 / ·572	2·55
Titanic crown	1·5432	·01021	53·2	*·00491 / ·480	·00722 / ·707	·00634 / ·622	2·55
Light flint	1·5739	·01395	41·4	·00853 / ·615	·00987 / ·713	·00811 / ·585	3·22
Dense flint	1·6262	·01709	36·2	*·00870 / ·509	·01229 / ·714	·01122 / ·656	3·65
Extra dense flint	1·6469	·01919	33·8	·01152 / ·600	·01672 / ·714	·01140 / ·615	3·87
Double dense flint	1·7174	·02434	29·5	·01439 / ·591	·01749 / ·718	·01521 / ·625	4·49
JENA'S							
Silicate crown of high refractive power	1·5238	·00972	60·2	·00580 / ·642	·00614 / ·704	·00494 / ·566	2·53
Light borate crown	1·5047	·00840	60·0	·00590 / ·667	·00587 / ·700	·00466 / ·555	2·24†
Silicate glass	1·5308	·01049	51·2	·00659 / ·628	·00743 / ·708	·00610 / ·582	2·76
Borate flint	1·5736	·01129	50·8	·00728 / ·645	·00795 / ·704	·00644 / ·571	2·82†
Medium phosphate crown	1·5500	·00835	66·0	·00546 / ·654	·00587 / ·702	·00466 / ·557	3·07
Borate flint	1·5303	·00906	55·2	·00674 / ·656	·00689 / ·702	·00561 / ·583	2·56
Dense barium phosphate crown	1·5760	·00884	65·2	·00570 / ·644	·00622 / ·703	·00500 / ·565	3·35†
Calcium silicate crown	1·5179	·00980	60·2	·00553 / ·643	·00605 / ·703	·00487 / ·566	2·49
Boro-silicate flint	1·5303	·01114	49·4	·00710 / ·637	·00795 / ·706	·00544 / ·578	2·81

In the older products of glass factories it was quite sufficient to take the specific gravity of the various glasses as a near approximation to

* These intervals are taken from B to D, D to F, and F to G.

† These glasses are very soft or unstable when exposed to the air, and should be protected in use.

any alteration in the optical properties of different meltings: a greater density indicating an increase of refractive index and dispersive power.

The figures in the list taken from the prospectus from Jena show that glasses are made of nearly equal relative dispersion, with considerable differences in partial dispersion, and, again, others in which the partial dispersion is almost identical, with considerable variation in the relative dispersion. In those instances it is evident that the secondary spectrum can be abolished. There is, however, a residual tertiary spectrum in the couples referred to, but it is quite unimportant compared to the secondary spectrum left in a combination of ordinary silicate "crown" and "flint" glasses. In photographic lenses the object is to get all the chemically and visually active rays possible together, and with certain of the glasses of lower dispersion improvements may yet be made by a better correction, both in the chromatic and spherical aberrations of the excentrical pencils in lens systems.

The first approximations in theory, both for aplanatism and actinism, are simple enough when the lenses of the systems are considered *thin*, and second approximations, for the central pencils, are given in most of the text-books in which *thickness* is taken into account, and are easily intelligible. In lenses required to be both aplanatic and actinic, we are not limited only to the central pencils, and it is of the highest importance that all incidences for the lens should give the same results as the central pencils, and it is the inquiry into the forms best suited to accomplish this that constitutes the optician's great difficulty.

As a matter of fact, it is impossible to construct an aplanatic lens that is free from chromatic aberration for a central pencil that shall be so when a pencil of rays meets the lens obliquely. Lenses may be considered as made up of an infinite number of prisms, and, as you are aware, achromatism is only possible with combined prisms for one particular incidence. Now a parallel ray and an oblique ray must of necessity have different incidences on the surface of a system, and hence if it is actinic for the parallel ray, it cannot be for the oblique ray, strictly speaking.

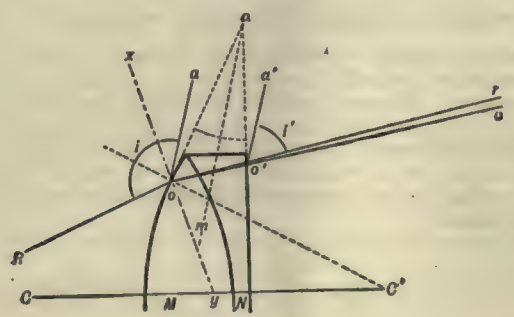


Fig. 2.

Let us examine a case geometrically for a parallel ray and an oblique ray. For simplicity take an equi-convex lens achromatised by a concave-plane one, and trace the course of these rays through the combination. The ray R, parallel to the axis, and the ray R^1, incident obliquely to the axis, may be considered as passing through the same prism, the angles i and i', formed by the rays R O r, are equal at incidence and emergence in this case; but the same relation evidently does not exist, for the ray a' o v, in which the angles, i and i', are very unequal, and therefore this ray cannot be achromatic at the same time.

Forms of lenses than that most nearly approximate to the conditions throughout of equal incidences and refractions at emergence will conform to the best conditions for actinism as well as aplanatism, as we shall see presently.

We have found, then, from first principles alone, that the main condition for actinism is only one of focal length to be ascribed to the various lenses of the system, and for the best results the powers of these components must be rigidly maintained, whatever may be the ultimate form or selection of curvatures adopted to best suit particular applications.

II.—The Best Selection of Curves Ascribed to the Material.

In photographic lenses the curves ascribed to the lenses are spherical, and this form of curve gives rise to what is known as spherical aberration, or error, and its effects in single (uncombined or uncorrected) lenses are (*a*) indistinctness of the image formed for the axial pencil, (*b*) curvature of field, (*c*) astigmatism, (*d*) distortion. A perfect photographic lens would be corrected for all these errors; the corrections are approximated by combinations of lenses, and we will proceed to examine the conditions best suited to accomplish each.

(*a*) We have seen that no single lens can be made free from chromatic aberration, nor can it be free from spherical aberration. For a given material of definite refractive index the transversal and longitudinal measurements of the aberration vary with the shape of the lens; and, again, the spherical aberration varies with the aperture and the index of refraction of the glass.

For convenience in arriving at accurate results, it is best to separate the smaller errors, shown by a second approximation, from the main or first approximation. Thus, to arrive at a first approximation, we have the well-known formula connecting the radii and refractive index of the material with the focal length:—

$$\frac{1}{f}=(\mu-1)\left\{\frac{1}{r}+\frac{1}{s}\right\}.$$

Then, in a second approximation, we have two additional corrections to consider, viz., the thickness of the lens and the measure of aberration, t being the thickness, and y the semi-aperture—

$$\frac{1}{f}=(\mu-1)\left\{\frac{1}{r}+\frac{1}{s}\right\}-\frac{(\mu-1)^2}{\mu}\frac{ft^2}{r^3}-\frac{\mu-1}{2\mu^2}\left\{\frac{1}{r^3}+\left(\frac{1}{s}+\frac{\mu+1}{f}\right)\left(\frac{1}{s}+\frac{1}{f}\right)^2\right\}f^3\frac{y^2}{f} \quad \ldots\ldots (2)$$

the negative signs indicating a diminution of the first approximate value.

The third term cannot be made nothing for any known material, but it is interesting to make this quantity a minimum with definite media of different refractive indices. In most text-books this is done for glass of the nominal refractive index $\mu=1{\cdot}5$. Taking a definite focal length and aperture for parallel rays, we have to decide what values to ascribe to the radii r and s, to satisfy the condition.

Calling the reciprocals of the focal length and the radii F, R, and S we have

$$R=-S+\frac{F}{\mu-1},$$

and using this notation,

$$R^3+[S+(\mu+1)F](S+F)^2=\text{minimum}.$$

Differentiating, and substituting

$$-1 \quad \text{for} \quad \frac{dR}{dS},$$

$$-3R^3+2[S+(\mu+1)F](S+F)+(S+F)^2=0,$$

and substituting again

$$-S+\frac{F}{\mu-1} \quad \text{for} \quad R,$$

we get

$$\left\{\frac{6}{\mu-1}+2\mu+6\right\}S=\left\{\frac{3}{(\mu-1)^2}-2\mu-3\right\}F.$$

Here, if $\mu=1{\cdot}5$, $21S=6F$, and hence,

$$\frac{1}{s}=\frac{2}{7f}, \quad \frac{1}{r}=\frac{12}{7f}, \quad \text{or} \quad r:s::1:6;$$

commonly known as the crossed lens.

Supposing the refractive index were higher, say 1·6. Here, $r:s::1:15$, to satisfy the above condition, and the lens assumes a shape nearer the convexo-plane lens.

For a given glass of known index of refraction, and assuming various ratios between the radii of curvatures, we can from equation (2) find at once expressions that show the amount of aberration in any chosen form. In speaking of lenses it is essential that the term used to describe the lens should define the surface on which the pencil of rays is incident. Thus, a plano-convex lens means that the rays are incident upon the plane side, and a convexo-plane lens, that the rays are incident upon the convex side.

Now, taking the usual table thus calculated for ordinary forms of single lenses (for parallel rays), in which the refractive index $\mu=1{\cdot}5$, and including the correction for thickness, let us see what we can learn here.

	Distance of least circle of aberration from approximate focus.	Diameter of least circle of aberration.
Plano-convex lens	$\frac{27\,y^2}{8\,f}$	$\frac{9\,y^3}{4\,f^2}$
Equi-convex lens	$\frac{1}{6}\,t+\frac{5\,y^2}{4\,f}$	$\frac{5\,y^3}{4\,f^2}$
Convexo-plane lens	$\frac{2}{3}\,t+\frac{7\,y^2}{8\,f}$	$\frac{7\,y^3}{12\,f^2}$
Crossed lens.....	$\frac{24}{25}\,t+\frac{45\,y^2}{56\,f}$	$\frac{15\,y^3}{28\,f^2}$

We see that in each change of form the position and diameter of the least circle of aberration differs; the longitudinal aberration increases or

diminishes as the square of the diameter of the aperture and inversely as the focal length, and the least circle of aberration is proportional to the cube of the aperture, and inversely as the square of the focal length. Thus, for two lenses similar in radii and glass, but one having twice the diameter of the other, the larger lens will have a longitudinal aberration four times as great, and the least circle of aberration will be eight times as great; and, again, of two lenses of the same aperture, but one double the focal length of the other, the longitudinal aberration will here be the half (or inversely as the focus), and the diameter of the least circle of aberration the quarter (or inversely as the square of the focus).

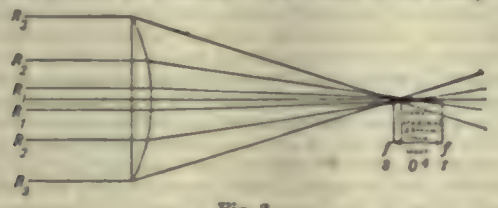


Fig. 3.

Thus to diminish aberration in a single lens the only remedy is to stop it down, but this can never entirely cure it. Now with a given material we have for a definite focal length the best form to ascribe to the lens to reduce the aberration of the central or axial pencil to a minimum, and we can further improve this by stopping the lens down. For photographic purposes we have now to consider the best form to ascribe to this lens to fulfil the other conditions that are also required for the formation of a distinct image. These investigations with a single lens are fully dealt with in Sir G. Airy's paper "On the Spherical Aberration of Lenses," and for a fuller investigation I must refer you to it. The steps necessary are (1) to find proportion of the tangents of the angles made by the axis of a pencil with the axis of a lens before and after refraction; (2) the distance from the lens of the plane perpendicular to the axis of the lens at which the convergence of the rays, in a perpendicular or vertical plane, takes place; and (3) the distance from the lens of the plain perpendicular to the axis, and in a horizontal plane at which the convergence of the rays takes place. The difference of the positions of these planes of the primary and secondary foci gives rise to the effect of astigmatism. A geometrical illustration will probably explain the matter more clearly, and I think you will find these preliminary investigations of considerable use in the more complicated ones of combinations and systems of lenses to be dealt with later.

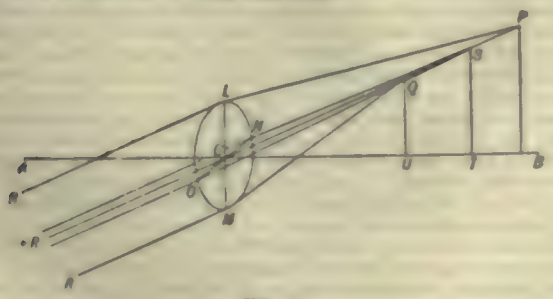


Fig. 4.

The effect of astigmatism in lenses appears to be little understood, so I offer you the following practical interpretation of the theoretical deductions above referred to in connexion with Sir George Airy's admirable analytical treatise.

It has been frequently asked what coma and astigmatism are. Coma is astigmatism, the vertical focal plane being corrected pretty accurately throughout the plane of the image, but the horizontal focal points being situated, off the axis, in very widely different planes.

Take the plano-convex lens and the convexo-plane lens with a plate having a narrow slit cut across it in conjunction with the lens.

Now, in either case the vertical plane off the axis will have a certain curvature of the field, but the image for the oblique pencils will be distinct (in a sense). Now, if the plate be turned so as to take the horizontal focal plane at positions where the image was distinct for the vertical focal plane, it is no longer so for the horizontal plane, but a very strong coma is visible, with the plano-convex lens coma *out*, and with the convexo-plane coma *in*. Now the vertical plane has less curvature of field than the horizontal, so that by cutting off the horizontal and using the vertical, coma ceases.

I may mention here that if astigmatism in a single combination or any system of lenses were entirely cured, there should be the same focus for both planes.

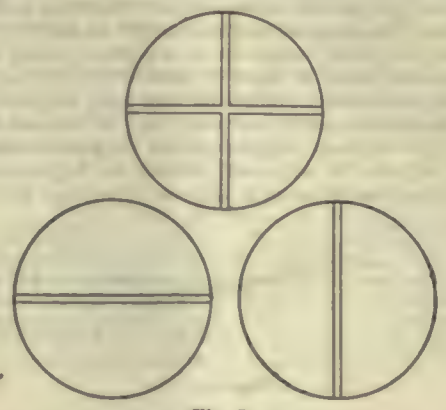


Fig. 5.

In testing lenses for astigmatism this is a very powerful method of finding the amount. The effects of observing a point of light are very interesting, as is also the use, in double combinations, of an astigmatic stop.

From the general formula deduced from the three investigations above, applied to a case to find the distance of the diaphragm and the radii of the surfaces most favourable to the formation of a distinct image, it is found that it is not possible to form an image perfectly distinct on a plane, although a distinct image can be formed on a curved spherical surface, the curvature of which is dependent on the refractive index and the focal length; in fact, its radius is μ F.

In these two cases (shown on blackboard), the diaphragm in one case is situated behind the lens at a distance

$$\frac{\mu - 1}{\mu^2 - \mu - 1} f.$$

$$\text{Radius R} = \frac{\mu - 1}{\mu^2} f. \qquad \text{Radius S} = -\frac{1}{\mu - 1} f.$$

The other case is the plano-convex lens, where the distance of the diaphragm

$$= \frac{\mu - 1}{\mu} f, \quad r = \infty, \quad s = (\mu - 1) f.$$

And as the curvature of field is dependent on μ, the higher the refractive index the less curved will the field become.

The effect of the diaphragm has a most important bearing on astigmatism, curvature of field, and distortion. In connexion with astigmatism, the use of the diaphragm is the only means, in a single lens or system of lenses, of diminishing it if it should exist. On curvature of field and distortion it acts in exactly opposite directions; in single lenses or single cemented combinations of more than one lens.

Take the case of the plano-convex lens above with a small diaphragm in contact. The curvature of field here will be very considerable, but the distortion practically *nil*. Now the further the diaphragm is removed from the lens the greater becomes the distortion, but the less the curvature. The following illustration will explain the effect of the diaphragm on curvature.

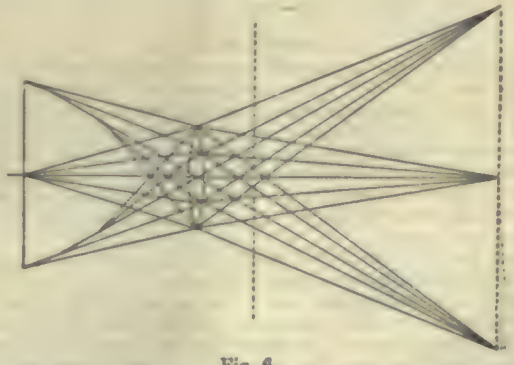


Fig. 6.

It will be seen that by limiting the aperture the image-forming rays for each small pencil are closer together and are not interfered with by those that have shorter foci, and would meet the lens at far greater refracting

angles if the full aperture were employed. The further the diaphragm is removed the flatter does the field become, but more distortion is introduced.

(*d*) Distortion. The usual and simplest manner to describe this is to find the appearance after refraction of a square grating when the diaphragm, supposed small, is placed in front of the lens, and the field "flat" or cured of curvature. It will be seen from the accompanying figure where the refracting angle is greatest, viz., the furthest away from the axis, the pencils are more refracted towards the axis than they are as they approach the axis, the axis itself suffering no displacement. The single rays of course may be taken as the axes of pencils. You will thus

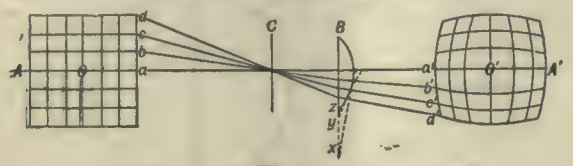


Fig. 7.

see that the pencils representing the lines become convergent towards the axis. This distortion is known as "barrel-shape" distortion. The opposite distortion, called pin-cushion, occurs if the diaphragm be placed behind the lens, as in the following figure, where there will be seen a

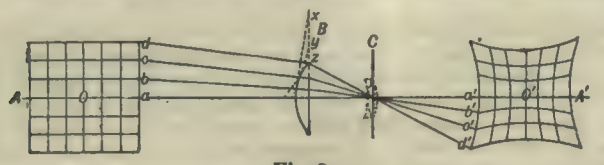


Fig. 8.

divergence from the axis, becoming more and more marked as the refracting angles become greater towards the edge of the lens. The "barrel-shape" distortion is generally considered the less disagreeable of the two, and hence the diaphragm is usually placed in front of the single lenses. The following figure illustrates the cure of distortion by opposing the errors above referred to in the separate lenses by their combination, but it must be understood that although this is perhaps the simplest form of making a non-distorting or rectilinear lens, it is not the

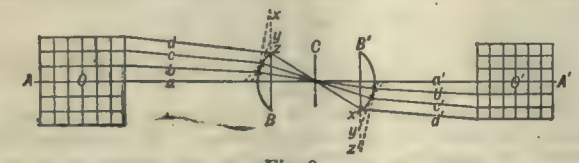


Fig. 9.

only way in which the cure of distortion is attained, but is sufficient to explain by its simplicity the general principle involved.

Being now familiar with the effects of spherical aberration as produced by single lenses, and the general principles adopted to eliminate these errors, we will proceed to investigate how combinations of lenses may still further and better tend to annihilate the errors of form.

T. R. Dallmeyer.

(To be concluded.)

Discussion.

Mr. Conrad Beck said they were all very much indebted to Mr. Dallmeyer, but he did not feel that he had any remarks to make without entering on a discussion of technical points which would be quite out of place. He thought, however, it was a slip to say that in correcting for spherical aberration and achromatism there was only one form with two kinds of glass, and that the second root of the quadratic was generally imaginary. His impression was that whenever there was one form there was always another; but, so far as opticians were concerned, it generally was imaginary, because the lens would have practically no aperture.

Mr. Hurry having referred to the immense progress which had been made in photography since the first attempts by Daguerre,

Mr. Taylor (Leicester) said the value of this paper lay in the information it gave the members, which would enable them to follow intelligently the methods used by opticians in their work. Practical men were deeply interested in it, but he did not think they could discuss it in such a way as to be interesting to the meeting.

Mr. W. E. Debenham said he was very glad to hear the high tribute paid to Professor Petzval, but for whose efforts photography would not have made much advance, on account of the slowness of any other combination. Petzval and Steinheil were the two great inventors in this matter, and the combination introduced by the latter had been adopted by every optician, and within the last twenty years more lenses had been manufactured on that system than on any other. He did not think Petzval's work had ever been improved, which was very remarkable, considering the length of time it had been before the world. The variation introduced by the late Mr. Dallmeyer had, perhaps, certain advantages, but, balancing one thing against another, he did not think his system was, on the whole, superior.

Mr. J. Traill Taylor, with a view of directing the discussion into a more practical channel, asked if Mr. Dallmeyer could state how the focal length in a compound lens was to be measured, according to the theory of the nodal points introduced by Gauss. Taking the case of a rapid rectilinear, from what point in the combination should the focus for the distant rays be measured? He thought theory and practice did not quite agree on this point. It was well known that, in the case of a single combination, the nodal point was practically on the centre of the convex surface in a plano-convex lens, and in a meniscus a little beyond it; but in the case of a combination Mr. Carey Lea gave, on the Gauss theory, a point between the lenses a little nearer the back lens than the mechanical centre. But you might assume a combination of two lenses, each of them twenty inches in focus, and separated by such a distance as to bring the posterior lens close up to the plane of representation, the focus of that combination would evidently be measurable from a point very near the front lens; and, if so, what became of the theory of Carey Lea, Secretan, and many others? Many complaints were made about the sweating of glass, and he had a very good example of it in a lens which, even when wrapped in paper, would become quite misty in a very short time. Were there any means by which that could be obviated? Some had recommended boiling the lens as a means of removing the sweating principle from the surface.

Mr. Beck said the difference between theory and practice, with regard to the Gauss points, arose chiefly from not recognising that the focus on the Gauss system was not measured from one point, but from two. Those two points became one in a very thin lens, and it was very easy to teach students that the focus should be measured from the centre or point in the lens, and to assume that all lenses were thin. For this reason most of the text-books assumed that the focus was measured from what they called the optical centre, whereas it should be measured from the position in a compound lens where a thin lens would give the same optical effect. The Gauss points were planes, the principal planes, and in a rapid rectilinear lens those would, each of them, be a little bit on either side of the centre as a rule, if they were perfectly symmetrical; therefore the focus should be measured from a point slightly nearer the back lens than the centre of the combination. In every compound lens there were two planes, and in a single landscape lens of the kind generally in use the focus was measured from two planes, both of which as a rule were outside the lens, and the position of those planes could be varied considerably, according to the way in which the lens was made. With regard to the new glasses from Jena, he might mention some of the difficulties that occurred in using them. Their great feature was that certain of them had very high refraction to very low dispersion, and therefore a pair of cemented lenses could be obtained which would more nearly approach to a concentric lens, or would more nearly refract the oblique pencil in the same manner as the central ones. He believed a patent had been taken out for such a lens, but whether it would hold good was another question, because these glasses could only be made achromatic by using them in the patented manner. The great difficulty at present was that, with the glasses as now made, the lenses had to be made so nearly of the same focus that there was great difficulty in making them commercially, and the glasses most useful for this particular purpose would not stand the action of the air. At the same time an enormous field had been opened up by the introduction of these glasses, and the calculations were extremely laborious. There were as many as 1900 different kinds, all of which had to be thoroughly worked out before it could be said that no further improvements could be made. Slight improvements had been made in photographic lenses since their introduction, but whether the principle of curing astigmatism could be carried to as great an extent as some were sanguine enough to hope, would depend very largely on whether the manufacturers could carry their experiments a little further, and produce glass rather more extreme still.

Mr. Lascelles Scott said, when the first accounts reached this country of the researches of Abbe, of Jena, a paragraph went the round of the scientific papers to the effect that some wonderful photographic lenses were coming which would be chemically refractive, that although the surfaces would be nearly flat, yet from a difference in their density and refractive power they would have the power of converging or diverging the rays of light. Nothing had been heard of this lately, and it would be interesting to many to know if there was any hope in that direction. He would also ask if any experiments had been made with tinted glasses with a view to greater rapidity in cutting off the red and some of the yellow rays. He had found that, with a dilute solution of ammonio-sulphate of copper placed in front of a lens, there was a saving of from five up to twenty or twenty-five per cent. in the exposure required, compared with light transmitted through pure water.

Mr. Dallmeyer, in reply, said he might perhaps have been not quite accurate in what he said about the imaginary root, but he thought Mr. Beck understood what he meant. With regard to particular glasses, it would be better, certainly, if they could get a greater difference between the dispersions with the refractive

indices as they were. Most of the glass now showed about the same dispersive power, and had convenient refractive indices for the formation of positive images, but if the dispersive powers varied more it would be an advantage. He thought Mr. Traill Taylor knew all about the Gauss points, because he had published three admirable methods of finding the point referred to in a double combination. One was by taking the angular measurements to get at the optical centre; another was to focus the object for equal size of object and image, and then to wheel it in to the parallel rays and take the measurement; and a third which he had himself suggested. There was a great deal of sweating some years ago, until Dr. Hopkinson made his experiments. Of course, if glass had this fault very badly, opticians would not use it: as Mr. Beck said, they could not use some of these glasses from Jena from which so much was expected. The only way was to sandwich them in between other glasses which would stand the effects of the atmosphere. He did not want to refer to patent lenses, but Mr. Beck had stated what was exactly the case: if you wanted a positive image, and such glasses were used, there could be no good claim to make them in a concave form. He did not want to discuss the forms of lenses, but it was a necessity with certain glasses that there should be an exterior concave element. The addition of tinted glass was a very old way of using lenses, but he thought it had been abandoned. The idea was to use a blue tint to get the actinic ray; but though you used the blue, the green and other portions of the spectrum, which also acted on the chemical salts, were not used. A powerful portion of the spectrum was used, but not the whole of it, as when you used white light. It was better to use the whole than only a part, until you came to the yellow or chromatic glass, in which a great deal was done for bringing out the colours that were non-actinic. He always should and did consider Petzval the prince of mathematical opticians, but he was also proud of his father's improvements, which had been appreciated by the optical world generally.

The CHAIRMAN said he had always taken it that the way to measure the focal length of double lenses was to take a pinhole, and not a single lens, as a criterion. If you took with a pinhole a picture the same size as the double combination would give, the distance of the pinhole from the screen was the focal length of the combination, and you had to measure back from the screen to between the lenses to find the point. It varied according as you had a near object or a distant one. He had had some experience of the Jena glass, and it was the worst of all for sweating; it would not stand the atmosphere at all. Of course, the way to obviate that would be to sandwich it, and he had had excellent proof of the efficiency of that method. Some time ago he wished for a lens made for a special purpose, in which rock salt should form a part, and he got a friend to make him two concave lenses, between which was placed one of rock salt. Every one knew how deliquescent that was, but it was as perfect now as it was five years ago. The focal length of lenses differed according to the part of the picture you measured from; and on this point there was fine scope for argument. You might say the focus should be taken from the centre of the lens, or from the side of the picture; it did not always follow that you focussed from the centre; you might focus half way between the centre and the side. He was rather surprised to hear that the use of a solution of ammonio-sulphate of copper enabled the exposure to be decreased, because a great many chemically active rays would be cut off by that solution. He could understand that in a case where you were using iodide of silver such a substance might possibly lessen the exposure, because the red and yellow rays had a reversing action where the non-reducing action took place as far as the line G and the ultra violet. In fact, some experiments of his own seemed to show a difference of about one or a half per cent. in iodide of silver when all but the active rays from G to the ultra violet were cut off. But he should not have expected that it would decrease the exposure by twenty-five per cent., and should not advise it to be practised except experimentally. He concluded by proposing a vote of thanks to Mr. Dallmeyer for his extremely able paper, which was carried unanimously.

THE EXHIBITION OF PHOTOGRAPHS AT NEWCASTLE.

So much interest has been shown in the above exhibition, that an extra week was decided upon, and the show consequently closes on the 10th inst. Nearly every evening since the opening has seen a lantern demonstration, sometimes accompanied by a lecture. Mr. Paul Lange had a full house, and Mr. W. D. Welford also received a bumper, the latter's admirable set of slides, "Detective," were highly appreciated, and the display further enhanced by Mr. Welford's happy descriptive style.

Mr J. P. Gibson, on Friday the 2nd, had a large and appreciative audience for his lecture on the "Antiquities and Scenery of Northumberland." The President of the Society introduced Mr. J. P. Gibson, and very correctly said that "no man knew more of the subject than did Mr. Gibson, and no one was more capable of reproducing the scenery to which the lecture referred." The slides, some 150 in number, were the result, no doubt, of many years' wandering over and around historic Hexham; remnants of Celtic and Saxon origin, remains of Roman habitations followed each other quickly, Mr. Gibson lucidly pointing out interesting features and details *en passant*. Then came a series of beautiful river scenery in the style so well known by all who have seen the lecturer's work. The display was so successful that a repetition will be given on the 9th.

On Monday night Mr. Wade's series of slides were put through the lantern, and on Wednesday night Mr. Alderman Barkas, F.G.S., delivered in his own inimitable style a lecture on "Stellar Photography," illustrated by a fine set of slides.

The exhibition has been a great success, and though financially no great benefit is likely to accrue to the local Society, the proceeds from the catalogue, entrance fees, and commission on sales (which have been numerous) should be a preventive of any loss, while the prestige and standing of the Society should be much increased.

Foreign Notes and News.

M. MICHELIN, a chemist of Niort, has introduced a plan which may be of some service to travelling photographers. He has put up concentrated developing solutions in capsules. When required for use two capsules are broken, and their contents emptied into 300-400 c.c. of water, and a developer is ready. These capsules have hitherto been made only of pyro, but M. Michelin promises others of hydroquinone, eikonogen, &c.

HERR VOIGT employs eikonogen as follows:—

SOLUTION I.

Water	500 c.c.
Sodium sulphite	25 grammes.
Powdered eikonogen	5-6 ,,

Twenty c.c. of sodium sulphite solution are added after the above has completely dissolved.

SOLUTION II.

Water	500 c.c.
Sodium carbonate	20 grammes.
Potassium carbonate	5 ,,

Thirty c.c. of Solution I. are poured over the plate, and five c.c. of Solution II. then added.

THE death is announced of M. Péligot, President of the French Photographic Society. The deceased gentleman succumbed to an illness from which he had suffered for a long time, and which prevented him from taking any part in the proceedings of the Society. His death is nevertheless a serious loss for science, and not the less so that his eminence is said to have been only equalled by his modesty.

A RATHER interesting lecture on *silhouettes* was delivered by Herr Einsle before a recent meeting of the Vienna Photographic Society. Herr Einsle treated the subject very exhaustively, beginning with the history of the process in the time of the Greeks and Romans! He became more practical, however, when he described his own experiments in attempting to photograph shadow pictures; and the account given of a method of silhouetting lace on a ground-glass screen and then photographing, by which means a capital method of reproducing patterns seems to have been devised, may turn out to be of value to manufacturers.

AMONGST the recent communications from the Vienna Photographic Laboratory is an interesting paper by A. Lainer, on the employment of the so-called reducing salt (crude hydroxylamine) for obtaining silver from photographic residues. Hydroxlamine in the crude form is comparatively cheap, and appears to be quite as serviceable for the above purpose as the pure compound.

LIESEGANG has recently made the following experiment on the effect of ammonia vapour on prints on various kinds of paper:—A number of proofs toned and fixed on albumen, chloride of silver, gelatine, chloride of silver collodion, bromide and platinum papers, were placed together in a vessel filled with damp ammonia. The following was the result after two months' action of the ammonia in the dark:—The albumen print was quite gone, only traces of the deepest shadows remaining visible. The chloride of silver collodion was less altered, and though weaker, still showed all details. The chloride of silver gelatine (Aristotype) was, strange to say, intensified, showing a beautiful warm brown tone, such as prolonged toning in the gold bath might produce, while the whites and the details had not suffered at all. The bromide and platinum paper remained unaltered.

THE following is a specimen of the little jokes with which Liesegang occasionally enlivens his readers; it is a receipt for killing flies. It runs:—"Point at the flies a photographic apparatus. The insects on perceiving what you are doing will think they are going to have their portraits taken, and will consequently keep quite still. Make use of the opportunity thus afforded to spificate them!"

A LENGTHY communication to the *Photographische Rundschau* contains an account of Herr von Schumann's recent experiments in spectral photo-

graphy. His paper is mainly interesting on account of the progress, of which it gives a description, made in photographing the extreme violet rays. After working for a long time with quartz prisms and lenses, Herr Schumann had an opportunity of experimenting with fluorite, which gave better results; but he subsequently discovered that by using thinner lenses and passing the light through the prism as near the edge as possible, quartz might be made to yield results almost as good.

THEY were sitting in the shady garden of a German country inn, and indulging in one of the most innocent and agreeable of amusements—the discussion of things they did not understand. "What tremendous progress they make in photography at the present day!" exclaimed the Socrates of the *symposium*, and extracted a ferrotype from his coat pocket as he spoke. "Paper photographs don't last, as you know," he continued, "so they have invented something new, and photograph on sheet iron. This little thing was done in ten minutes." "Yes, but it is by no means pretty," exclaimed the spirit of negation. "What does that matter?" replied the first: "it is durable. Only think, it is *sheet iron!* A wonderful invention!"

LIEBREICH gives the following account of a rather ingenious invention of his, which he calls an actinometric balance:—The pans of an ordinary decimal balance are replaced by two stoppered glass vessels; the beam is formed of a glass tube connecting the two. One of the vessels is filled with oxalate solution, the other with caustic potash. On placing the balance in the light, whose intensity is to be measured, the oxalic acid is oxidised, forming carbonic acid, which escapes and is absorbed by the caustic potash in the other vessel. One of the vessels thus becomes heavier, and the other lighter. By estimating the alteration in weight a means is afforded of measuring the intensity of the light.

Our Editorial Table.

MIALL'S "PERFECT" SHEATH.

FROM Mr. Frank Miall, 18, Shelgate-road, Clapham Junction, we have received specimens of a new sheath invented by him for holding dry plates. It differs from those now used in many forms of hand cameras in that whereas the latter or old form consists of a thin metallic plate, open at top, and having turnover sides and bottom, the plates being free to fall out when inverted, in the new form there is a bottom turnover, but no side ones. The plate is kept in its place by being merely stepped into the lower groove, and a couple of catches being turned it is firmly pressed against the thin blackened metallic back. It is suitable for either thick or thin plates, and there is neither trouble in getting them in and out, nor any need to handle the plate so as to damage the surface. The invention is patented, and there are various applications of the principle. Although Mr. Miall has constructed the "Perfect" sheath primarily for use with his "Facile" camera (sold by Mr. Fallowfield), yet it is applicable to every one in which sheaths are employed.

LIMITED FROM UNLIMITED LIABILITY IN BUSINESS.

THIS pamphlet, by Messrs. Hopcraft & Co., is intended to demonstrate the advantage of carrying on business under the protection of the Joint Stock Companies' Act. It contains numerous notes on the conversion of private firms into joint stock companies. Those who want to know all about limited liability should read it. Price 1s. Jenkinson & Co, 37, Walbrook, E.C.

MATT-OPAL-TYPE.

MESSRS. WADDINGSWORTH & BOWN, of Wellington, New Zealand, send us, through Messrs. Mawson & Swan, specimens of a new style of printing they have patented. It is on paper which, although having a dead surface, is yet very fine and smooth, the tones are black and brilliant, and there is an entire absence of any sinking-in of the image into the paper. It reminds us more of the Bromkerhoff porcelain paper of twenty-five years ago than anything we have seen. We presume that the English firm named are the agents, although we cannot speak of this with certainty.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6461.—"Method of and Apparatus for Treating Atmospheric Air to Obtain Oxygen therefrom." Complete specification. E. NEALE.—*Dated April 28, 1890.*

No. 6604.—"Improvements in Obtaining Oxygen Gas from Atmospheric Air." Communicated by F. Salomon. Complete specification. A. LEWCOCK.—*Dated April 29, 1890.*

No. 6617.—"Improvements in Photographic Printing Frames." F. TAYLOR.—*Dated April 30, 1890.*

No. 6625.—"Improvements in Registering Apparatus for Photographic Exposures." J. PARKINSON, S. FAWCETT, and C. F. PARKINSON.—*Dated May 2, 1890.*

No. 6661.—"Improvements in Stereoscopic Diagrams and Slides." G. PERROTT.—*Dated May 5, 1890.*

PATENTS COMPLETED.

IMPROVEMENTS IN SHUTTERS FOR PHOTOGRAPHIC CAMERAS.

No. 10,564. JAMES KERSHAW, 47, Spring Gardens, Buxton, Derbyshire.—*April 12, 1890.*

THE improvements which are the subject of this invention relate to the means employed for closing the opening (blind in the shutter of a photographic camera, and the object of this invention is to construct a shutter that may be used either as an instantaneous shutter or as a time shutter when an interval of time for exposure is required in lieu of instantaneous exposure.

In this invention, for the purposes as hereinbefore set forth, I construct a shutter in which is a spring blind, with an aperture for exposure of light to sensitive plate. By means of a gravitation lever, in combination with a ratchet wheel on end of liberating roller of spring blind, as described in the specification of my invention for which letters patent for Great Britain were granted to me bearing date the 21st day of April, A.D. 1886, and numbered 5054, the spring blind in shutter may be closed instantaneously.

For the purpose of obtaining an interval of time for exposure when instantaneous exposure is not required, I employ a secondary lever of angular shape in combination with the aforesaid gravitation lever. I suspend this secondary lever to a stud formed on a spring plate which I attach to side of shutter in proximity to gravitation lever. I form an angular slot, or cam groove, in the secondary lever, through which I pass a stud, which is attached to gravitation lever. On end of liberating roller of spring blind, I form or attach a worm, which, when said liberating roller is rendered by the operator in order to wind the blind on said roller preparatory to exposure, actuates a worm wheel affixed to side of shutter. I form this worm wheel with a hole in the face thereof, into which a stud, attached to aforesaid spring plate, is caused to enter by action of spring plate when ratchet wheel is rendered, and the before-mentioned hole comes opposite stud in spring plate. I attach a pawl to aforesaid spring plate, which engages with and prevents rotation of ratchet wheel affixed to end of blind roller immediately said stud enters hole in face of worm wheel, but not at any other time.

When it is required to close the spring blind instantaneously, the hereinbefore described secondary lever remains inactive, and the spring blind in shutter is instantaneously closed by one compression of the bulb which is attached to pneumatic valve acting on gravitation lever; but when it is preferred to obtain an interval of time for exposure, said secondary lever, in which is a cam groove, is set at an angle which necessitates a second compression of air bulb in order to close blind or shutter, the first compression causing the blind to open and remain open until the second compression of air bulb, which releases pawl from ratchet wheel, by return of secondary lever to its original position, and thus permits the spring blind to close.

To obviate movement in shutting blind when said blind is required to be kept open to obtain a longer exposure, I place in liberating roller a coil spring with a resistance which is sufficient to neutralise the action of spring contained in bottom of revolving roller for blind, but is sufficient to prevent concussion.

When it is required to give more exposure to the foreground than to the sky, I make the aperture in blind to open from bottom of shutter by placing the coil spring in revolving roller in upper part of shutter, by which means the blind is caused to pass from liberating roller contained in upper part of shutter over intermediate roller at bottom of shutter, and returning upwards as wound on receiving roller.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 12	North Middlesex Club	Jubilee Hall, Hartnoll Rise, N.
" 13	Camera Club	54, Pall Mall East.
" 13	Derby	Society's Rooms, Derwent-buildings.
" 13	Bradford	St. Lawrence-street.
" 14	Manchester Amateur	Manchester Athenæum.
" 15	Ealing Club	The Studio, Chandos-lane, Ealing.
" 14	Photographic Club	Amberley's Rooms, Fleet-street, E.C.
" 15	London and Provincial	Masonic Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 1.—Mr. J. Traill Taylor in the chair.

Mr. H. M. Hastings showed a series of views of Salisbury Cathedral, taken last year. The exposures for the most part, had been developed with the brush.

Mr. A. L. HENDERSON suggested, as a means for avoiding halation, that the plate previous to being coated with emulsion, should be covered with a backing and containing material. In the wet collodion days he had often, for the same purpose, inked a negative on black glass and stripped the film afterwards.

Mr. A. BROTHERS thought a preliminary coating with coloured gelatine would be better.

Mr. F. A. BRIDGE, as evidence of the precaution necessary to be taken with instantaneous plates, said that recently he had developed two plates, one instantaneous and one ordinary, without removing the backing that he had employed, and found that the light from the dark-room window had registered an impression of the streaks of the backing material on the instantaneous plate and not upon the other.

The CHAIRMAN referred to a yellow screen of very convenient form made by Mr. Hare. Homogeneous pea metal of various shades was enclosed and published in sheets thin enough to be inserted in the diaphragm slot. A piece was cut just long enough to serve as two diaphragms as well as colour screens for coating bluish paper upon it in which circular openings of different sizes had been cut at the two ends.

Mr. HEMPHILL showed a stereoscopic plate exposed in Jamaica. There was an hour's fullness of the plate, but extending much more over one half than the other; a shaded part somewhat resembling an upper hand of about half the natural size.

The CHAIRMAN had no doubt that it was the photographer's own hand interposing between the camera and the sunlight.

Mr. HEMPHILL did not agree with this suggestion, the same thing had happened so frequently, but other members were of the Chairman's opinion.

Mr. A. COWAN said that it had many times been mentioned that skreengum solution changed colour by keeping; he now showed two bottles of solution, one quite colourless and the other as black as ink. They had formed part of the same solution, but the dark portion had been bottled off to fill the plates when first made, whilst the black portion was what was left in the bottom of the large stock bottle after the remainder had been used off at intervals. It appeared, therefore, that it was not the keeping itself that was injurious, but the access of air. When, therefore, a large bottle of solution was broken into, the unused part should be decanted into a smaller bottle.

Mr. HARRISON inquired as to the restraining power of bromide with eikonogen.

Mr. COWAN referred to some previous experiments that he had brought up where the exposures had intentionally been very excessive, but a few ccs. of bromide had saved the pictures.

Mr. HARRISON said that he had tried a developing agent called graphol; the image was like one developed with a mixture of eikonogen and alkaligen; it began to develop almost instantly, and took about three minutes to complete.

A question was read:—"When a piece of platinotype paper for either hot or cold bath process is exposed under a negative there is a visible image, but when paper is coated with silver oxalate or chloride of iron and ammonia there is no visible image. What is the cause of the difference?"

The CHAIRMAN said that that involved the question as to what is the precipitation of the platinotype paper, and eventually consideration of the question was postponed to another meeting.

Mr. HARRISON brought up the result of some experiments with an acid solution of silvernitrate as recommended by Dr. Vaughn. He was not prepared to say whether he preferred it to the original formulæ, but would experiment further. The time of development was from ten to thirty minutes.

Mr. P. HENDERY had been informed that a piece of commercial sensitised paper became, after coating with gelatine, quite insensitive to light; could any of the members explain this?

Mr. HARRISON thought that the statement was a mistaken one. The sensitiveness might be greatly diminished, but would remain to some extent.

CAMERA CLUB.

MAY 1.—Mr. T. R. DALLMEYER in the chair.

Captain W. de W. ABNEY read a paper on *Pinkotype*. In his lecture he gave the formulæ for arriving at the best colour of pinkotype for any orthochromatic and sensitiser, how it was that by the elimination of the skin of the pinkotype diffraction phenomena became important and caused greater blurring than with a simple negative. Turning light from the most chemically active part of the spectrum—blued light—it was shown that for an exposure of just twelve as upon one of nine-tenths of an hour would give the same diffusion. After it was further shown that near objects and far objects are differently sharp to a slight degree according to the size of the lens used. Some actual examples of points from negatives taken with platinotype of varying colour were exhibited. That taken with the spectrum illuminated by blueing was the least blurred; one taken with the combined hues—the three fundamentals of an hue—showed a very large amount of blurring. In conclusion, Captain ABNEY expressed his preference for sharp pictures and photographs, and pointed out that the amount of blurring allowable to give an appearance of sharpness to the eye depended upon the distance from which the picture was viewed.

An animated discussion followed.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

At the adjourned annual general meeting held on Friday, May 2, at 192, Aldersgate-street, E.C., the President (Mr. J. Traill Taylor) in the chair, the CHAIRMAN, on opening the proceedings, said that business of the evening was the election of officers for the ensuing year. The new rules which had been passed by the meeting held on February 14 had now received the sanction of the Registrar-General of Friendly Societies, and the Association was now enrolled as a body so bound by them.

The election was then proceeded with, the following gentlemen were unanimously elected officers of the Association:—*President*—Mr. J. Traill Taylor. *Vice-Presidents*—Captain W. de W. Abney, F.R.S., and Mr. W. A. Bird. *Treasurer*—Sir John Conroy, F.C.S. *Chancellor*—Mr. Sam. H. Johnson. *Secretary*—Mr. William Bedford. *Auditors*—Mr. S. Collins, F.R.C.S., and Mr. E. F. Sharpe. *Committee*—Messrs. A. Marshall, J. D. Williamson, J. N. Sedlik, and E. A. Wyndham-Quin. Messrs. W. Bolt, E. W. Purdy, H. J. White, and J. W. Sedgwick. The Hon. Solicitor, Mr. William Bedford, was also re-appointed, and the election of Mr. H. J. Beasley to the post of Hon. Secretary confirmed.

The meeting terminated by passing votes of thanks to the various officers for the past year and to the Hon. Solicitor for his special services.

Twelve new subscribers were enrolled.

All communications should be addressed to the Hon. Secretary, Mr. H. J. Beasley, 65 and 66, Chancery lane.

HOLBORN CAMERA CLUB.

MAY 2.—Mr. T. O. DEAR in the chair.

Miss L. HARE was elected a member.

Mr. E. H. HAWKINS then read a paper from *Abraham's Annual* by Mr. Andrew Pringle, entitled *Points in Albumen Printing*. Mr. Pringle recommends for washing prints "a sheet of glass, a rose tap, a squeegee, and plenty of elbow grease," as a preliminary, and the washing machine afterwards.

Mr. PEARMAIN thought that squeegeeing would be likely to tear the prints. It was suggested that a roller squeegee would probably meet the difficulty.

Mr. F. HARRIS stated that, as a rule, professionals used freshly sensitised instead of the commercial paper, and said that his idea of the cause of fading was insufficient fixing, and advised beginners to print deeply and fix for at least twenty minutes.

Mr. COWAN recommended fixing in two baths, ten minutes in each, and then washing for twelve hours in running water. He had not met with blisters till after toning, when the first washing water was colder than the last fixing bath. He remedied the blisters by using water of the same temperature as the fixing solution and gradually cooling down.

Next Friday the President (Mr. T. C. Hepworth) will give a lecture on *Lantern Slides*, illustrated by the optical lantern.

SHEFFIELD CAMERA CLUB.

THE usual monthly meeting was held on April 25, when a students' night was given. Members were invited to bring objects of interest to be developed by those present. A number of plates were developed by several of the members.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

APRIL 24.—Mr. H. A. H. PRICE (President) in the chair.

Mr. and Mrs. Charles Miller were elected members.

Mr. E. HENDERSON was then called upon to read his paper on *The Carbon Printing Process*.

He said:—Carbon printing appears to receive less attention from amateurs than any other method of printing. The reason why this beautiful process is so neglected is, I think, because an impression prevails that the process is complicated, troublesome, and uncertain. To read a description of the method of working certainly might give one this impression; but the operations are all extremely simple, and with the introduction of the stripping and subbed tissue, giving negatives that can be printed twice either side, a second transfer is unnecessary, and thus the process is greatly simplified. The advantages of the carbon process are many—first, it is undoubtedly permanent. 2nd. Prints may be made in any desired colour. 3rd. Absolute uniformity of tone. 4th. It can be adapted to all classes of negatives by variation in the strength of the sensitising solution. A thin and feeble negative will, give a brilliant and rich print by using a weak bath for sensitising, and a hard, dense negative will yield a soft and delicate print by increasing the strength of the solution. 5th. The results obtained by this process are equal, if not superior, to those obtained by any other method. Against all these advantages we can only set down two disadvantages. The first is that the sensitised tissue will not keep in a ready prepared state for many days; it keeping, a decomposition takes place which renders the tissue partly or entirely insoluble. Secondly, the action of light on the tissue is invisible, so that examination will not enable us to ascertain the progress of depth of printing; but by means of the actinometer we are enabled to gauge accurately the time required to them, the image, we find this cannot be considered as a serious objection or difficulty. The carbon process is based upon the property of gelatine, gum, and similar substances, when mixed with bichromate of potassium, becoming insoluble under the action of light. Briefly described, the carbon process consists in adding carbon in the form of lampblack or other finely divided colouring matter to a mixture of gelatine, which is evenly spread upon paper. This forms what is technically termed carbon tissue, which is rendered sensitive to light by immersion in a solution of bichromate of potassium. After exposure under a negative this paper is soaked in warm water, the portion of the gelatine rendered by light insoluble in the water, while the unsoluble portion, or that which has been acted upon by light, together with the superfluous colouring matter, remains attached to the paper, forming the varied gradations of light and shade in the picture. The valuable discovery of Poitevin and Lambert, of Lyons, was introduced into practical use by Swan. The gelatine tissue, after exposure, was squeezed by means of an indiarubber squeegee in a sheet paper. After the rubber sheet was thoroughly dry the print was immersed in hot water, and the paper which formed the original support of the gelatine film was washed away with the soluble gelatine, leaving the reversed picture attached by means of the rubber solution to the second sheet of paper. It is, of course, obvious that this gave a reversed image, requiring a re-reversal, which was effected by sticking the paper last downward to another sheet of paper by means of gelatine. When thoroughly dry the upper sheet of paper was removed by softening the rubber cement with benzole, leaving the image in picture now properly reversed on a sheet of paper. This method, though yielding fine results, was troublesome, slow, and costly; and it restricted the printer, by the many simple methods of double transfer, to bring the process to perfection. To fully and clearly describe the operations of manipulation and transfer would occupy more time than to give a practical demonstration of working. I will therefore now transfer and develop a few prints, both on glass

as transparencies and on paper as ordinary prints. This, I think, will give a better insight into the process than could be done by pages of description.

A vote of thanks was accorded to Mr. Brightman for his demonstrations of the carbon process, which awakened in those present a feeling of new interest in the subject and surprise that so simple and advantageous a process should have received hitherto so little attention.

GLOUCESTERSHIRE PHOTOGRAPHIC SOCIETY.

APRIL 28.—Annual meeting.—The President (Mr. W. B. Wood) in the chair.

The Hon. Secretary's report showed an increase of sixteen members during the year. The Hon. Treasurer's report showed a satisfactory condition of the Society's finances.

The President, Vice-President, Treasurer, and Committee of last year were re-elected. Mr. A. H. Clinch was elected Hon. Secretary. The retiring Secretary (Mr. F. H. Burr) and the Rev. Mowbray Trotter were added to the Committee.

The presentation print for 1890 was selected, this being a 15×12 platinum print, *View on the Lyme*, by W. C. Beetham.

The triennial exhibition (open) will be held in October or November, and prospectuses in accord with recently expressed ideas will shortly be issued.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

MAY 2.—A lecture was given by Mr. J. P. GIBSON, under the auspices of the International Photographic Exhibition, the subject being *Northumberland: its Antiquities and River Scenery*. Mr. Gibson showed a splendid collection of over one hundred and fifty lantern slides which he had taken from views.

There was a large audience, and the impression created by the lecturer and his slides was favourable in the extreme.

BATH PHOTOGRAPHIC SOCIETY.

APRIL 30.—Mr. W. Pumphrey (President) in the chair.

Mr. J. A. Howe was elected a member.

Mr. G. F. POWELL read a paper on *Stereoscopic Photography*. He said:—As I feel much interested in stereoscopic photography, I will endeavour to say a few words upon the subject. First of all, I begin with a lament that this branch of photography is not so popular as it deserves to be, and surprise that it has so long remained so. Secondly, I will try to account for its unpopularity:—1st. Fashion; it was once very popular, but fashion changes, and the pendulum has swung to the opposite side. 2nd. The degeneration of the substance and style; of course I do not refer to the very beautiful glass transparencies which many remember with keen pleasure, but to the absurd and vulgar groups, &c., which must have gone far to discredit the stereoscope in some minds. 3rd. I think many admirers of the stereoscopic picture must have been sadly disappointed by the slides sold, for doubtless many have been taken in by the fraud of making a so-called stereoscopic slide without the double negative. Such it is almost needless to say were flat as a single picture, and to this we should again refer. These three causes have, let us hope, worked their own cure. The pendulum of fashion is on its return, the vulgar style is ignominously dismissed, and as a rule photography is too much to the fore for unscrupulous dealers to pass off bad work on the public. This brings us to what a stereoscopic slide is, or rather should be, viz., two separately taken pictures taken from the opposite angles at the base of a triangle the sides of which should converge to a point as nearly as possible the most distant in the view to which the camera is directed; the length of the base of the triangle varies considerably with the subject. A good rule is for ordinary work, to have the lenses (if a pair is used in a rigid front) two and three-quarter inches apart, centre to centre, this being about the distance apart centre to centre of the eyes. A better plan is to have a special front with double racks and pinion, by which the lenses can be brought nearer or set further apart as required. Of course, when the two pictures are taken upon the same plate the camera must have a central partition to prevent blurring or overlapping of the two pictures in the centre; a single lens may be used if a sufficiently long sliding front is adapted which will allow the lens to be moved laterally from centre to centre of the halved plate, but this will only do for still-life or possibly for portraiture, but if this branch of photography is to be carried out satisfactorily twin lenses are absolutely necessary, inasmuch as it is impossible to take moving objects for the stereoscope with one lens; and sea-pieces lose all their value if a wave, for instance, is not taken by both lenses at the same instant. The base of our triangle, or distance between the lenses, will vary slightly in ordinary land or seascapes, according to the distance from the camera of some of the near as well as distant objects. And here I would remark that near objects are necessary to the success of the pictures, the principle of the stereoscope being what I call relative displacement of objects one to another when viewed by either eye or either lens separately. Hold up your finger or other small object before any other object, look with one eye and then with the other, and in turn different parts of the background will be covered by what is held up, so that with both eyes you, as it were, look round the near object or objects. This, though crudely explained, will possibly illustrate the principle of the stereoscope, and show that two separately taken pictures are necessary. When well-placed or selected foreground objects are secured in a picture, the result in the stereoscope is that other objects and parts of the composition will fall back or assume their relative positions, and the effect desired is obtained; for some subjects (principally scientific) the base of the triangle, or distance apart of the points for taking the two pictures, is considerable—some thiry or forty yards for the Pyramids to many hundreds of miles for the moon; and this reminds me that stereoscopic work can be accomplished by a quarter or 5×4 camera, and taking two pictures by placing the camera at the different points as required, for ordinary work, at the opposite ends of a graduated board fastened to the top of the tripod. Any process for negative taking or printing will do for the work, but I consider that the transparency for the stereoscope to be the perfection of photography; the roundness of life i given by the stereoscope to a friend's likeness, to a bit of lovely scenery, snow, hoar frost, or ice which might pass unnoticed in the flat photograph, but which is absolutely charming in this instrument. Too much contrast is undesirable, and what looks flat and wanting in pluck and crispness outside the instrument may be exactly right inside. The stereoscopic photographer can often choose charming bits which as single pictures would be passed over. To return to the negative, presuming it is double, on the single plate being taken as usual upside down, on placing it picturewise the right and left pictures are reversed, and must be cut asunder for mounting, or the effect is the reverse of what is desired, or pseudoscopic. There is a way of folding a double-length strip of paper and printing two copies, by which means the paper can be cut in the middle and save the double mounting, but this requires calculation and care, hardly worth an amateur's while, though valuable where many prints are required off the same negative. Glass transparencies, too, require great nicety and care, which will be amply repaid. A word as to subject. Choose such as are likely to please generally, and not one's self alone, and such as will as far as possible explain themselves. Of the usefulness of photography there is no doubt, and we were eloquently reminded of this by our Vice-President early in the history of our Society, and on this ground photography is one of the most defensible of hobbies; and may not the usefulness of stereoscopic photography be much extended—for travellers, for instance, to describe goods for sale—the better to illustrate the details of machinery, &c., and to explain the relative position of things to each other? indeed, it is difficult to over-estimate the uses to which the stereoscopic picture may be put. And now, in conclusion, may we not as a Society take up this new branch of photography with vigour? I believe we are on the eve of a new start in stereoscopic work, and shall we not as a Society be among the pioneers? Professionals would, I believe, find it "pay" for portraiture, and amateurs will relish with keen enjoyment the work to which some are strangers. I fear that I have only said what many knew before, but in starting I hoped your expectations were not high, and if you are not disappointed, I am satisfied.

The CHAIRMAN, said it was true stereoscopes had gone out of fashion, but pictures when suitably prepared to be viewed in them appeared more realistic than photographs generally. He thought the angle of base should be kept small, not exceeding the distance between the eyes.

Mr. DUGDALE thought the reason stereoscopic photographs fell into disuse was largely due to the pictures being too wide—two and a half inches was a convenient size. This gentleman showed a large collection of slides, and brought stereoscopes to view them by.

Mr. COGAN showed transparencies by the Taupenot process. These were also shown in the lantern.

The CHAIRMAN then exhibited a large series of transparencies by means of the lantern. The subjects were illustrative of scenes in the Channel Islands.

Mr. AUSTIN J. KING thought stereoscopic photography might come again to the front if more perfect instruments were provided. The difficulty of adjusting ones sight to a particular form of instrument was an obstacle, for the two eyes do not focus quite the same. If both eyes do not adjust themselves, then the effect of rotundity does not become evident.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

MAY 1.—General meeting.—Mr. G. G. Maclaren in the chair.

The manipulations of the new printing process, "kallitype," were demonstrated. On the whole, the process is exceedingly simple, presenting few difficulties, prints very fast, and is very moderate in price.

A negative of the font in St. Mary's, Broughty Ferry, was shown. A small portion of two stained-glass windows were included in the upper corners of the negative, and on the left side of the font near the foot there was a reflection of a panel of the window to the right. No explanation could be given as to the cause of the reflected image.

A presentation copy of Dr. Emerson's work, *East Anglian Life*, was acknowledged.

The following office-bearers were elected for the session 1890 and 1891:—*President:* Mr. John Mathewson.—*Vice-Presidents:* Messrs. J. D. Cox and W. M. Martin.—*Council:* Messrs. W. Bertie, W. F. Hill, P. Kerr, G. D. Macdougald, G. G. Maclaren, W. Salmond, A. Stewart, W. D. Valentine, J. Welsh, and T. L. Wynd.—*Secretary and Treasurer:* Mr. V. C. Baird, Broughty Ferry, N. B.

PHOTOGRAPHIC SOCIETY OF JAPAN.

APRIL 24.—In the rooms of the Geographical Society, Kyo-bashi, Tokyo,—Mr. Edmond Holmes in the chair.

The following were elected members:—Messrs. R. W. Borthwick, H. Deakin, J. McDonald, C. Pope, T. P. Solomon, and A. C. Stern.

Mr. C. D. WEST showed a number of prints toned by Clark's new platinum toning process. In many cases there were alongside of the platinum-toned prints others from the same negatives toned with gold in the ordinary way. The platinum tones were blacker than the gold. There was some difference of opinion as to which were the pleasanter, but on the whole the verdict was in favour of the platinum. Mr. West explained that there was reason to believe the platinum-toned prints were more permanent than others. He found it inadvisable to use nitric acid in the bath, as recommended by Mr. Clark, at least with albumenised paper, as it gave very yellow high lights. He preferred citric acid, and a bath comparatively weak in the platinum salt. The following formula was given:—To each ounce of water add one half grain of chloro-platinite of potassium and four or five grains of citric acid. This bath keeps well.

Mr. A. J. HARE showed a number of prints toned in a way a little different from the usual one. The modification consisted in dissolving a quantity of common salt in any ordinary toning bath. The prints then went direct from the printing frames to the toning bath, and from the toning to the fixing bath, there being no intermediate washing. The following advantages were claimed

for the modified process. Less over-printing is necessary, there is considerable saving of time, the tones are richer than when the paper is washed before reaching the toning bath, and there is much less tendency to run to "mealiness" in the shadows in the case of toning to a deep purple or black. The prints shown were done on the ready-sensitised paper of the Japan Dry Plate Company, and the tones were pronounced exceedingly fine.

Mr. W. K. BURTON showed a sample of the more recently manufactured eikonogen. He had received a dozen or two of bottles of the substance, and in every case but one the colour of the chemical was nearly white; in the case of one single bottle, however, the eikonogen had turned quite black, although this particular bottle appeared to be as securely luted as the others. Mr. Burton had found this new eikonogen distinctly superior to the old, and considered that it had clear advantages over pyro for some kinds of photographic work.

A demonstration of *Photo-zincography* was then given by Messrs. W. K. BURTON and Y. ISAWA. This is a process whereby blocks ready to be put up alongside of type can be photographically produced from any line drawing or sketch. The following is a very brief description of the various steps of the process, when, for example, it is wished to get a block from a photograph:—A very light print is taken from the negative on common photographic paper, but is neither toned nor fixed. The outline is gone over with a pen and the best quality of Chinese ink, and as much line shading is put in as may seem desirable, after which the print is put in a bath of a solution of bichloride of mercury. This quickly makes the photograph entirely disappear, the line sketch only remaining. If a photograph is not to be used, the artist sketches directly with black ink on pure white paper. In either case the result is the same as a line sketch that is copied in the camera, the wet process being used by preference. The negative must be reversed, and the reversal is secured either by using a reversing mirror in copying, or by stripping the film of the negative from the glass and turning it over. A polished zinc plate is next coated with a mixture of albumen, water, and bichromate of either ammonium or potassium, and when dry is exposed under the negative, a faintly visible image resulting. The plate is then covered with a very thin uniform coating of a greasy ink, applied by a roller, and is dipped in water. In a minute or two the ink begins to leave all the plate but those parts representing the lines, and the action being helped by rubbing gently with a piece of cotton wool, there is soon an image in printers' ink on the zinc plate. The plate is dried, and a quantity of powdered resin is dusted over it; this sticks to the greasy lines, but not to the rest of the surface, and a slight heating is enough to incorporate it with the ink. There is now a sufficient "resist" to make it possible to etch away some of the metal between the lines, and the plate accordingly goes into a bath of weak nitric acid. There is only one reason why the etching should not be continued till the whole of the necessary relief is got at in one operation, and that is that the acid has a tendency to "undercut" the lines. It is, therefore, necessary to protect the edges as well as the tops of the lines. To effect this protection the plate is taken from the bath after a very little relief has been got, is dried, and is heated just to that point at which powdered resin will stick to the lines, but not to the rest of the plate. The plate is then again powdered with resin, and when the lines have taken all that they will, it is heated enough to melt the resin and make it run down the sides of the lines. The plate then stands an etching in a somewhat stronger bath, and the process is repeated five to ten times, according to the coarseness or fineness of the work. The lines then get are firm and solid, but there are generally slight ridges running along the sides of them, produced by the different etchings. To get rid of these the plate is cleansed of all resin, and is inked up with a smooth roller which touches only the tops of the lines. The operation of dusting with resin and heating is once more gone through, and the plate has its last etching—or last but one, for it is sometimes advisable to repeat this etching twice—when it is ready to be trimmed and mounted type-high for the printer. Samples of every stage of the process, from the original negative to a block that has been printed in a machine, and prints from them, were shown, and the process of developing the image on the zinc and of etching was demonstrated. The demonstrators explained that it was claimed that the whole process, from the taking of a photograph to the production of a finished block, could be gone through in two hours in England. They doubted this, but could easily do the work in from six to eight hours. The block really could be produced in two hours from the time of taking the exposed zinc plate from the printing frame. They further explained that the advantage of the process was that an exact copy of any line subject, no matter how complicated, could be made in a few hours, either of the same size as the original, or smaller, or larger.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE ACTION OF LIGHT ON SILVER CHLORIDE.

To the EDITOR.

SIR,—I would ask your indulgence for a few words in response to your remarks on pp. 193-195, although I will be as brief as possible.

As regards my allusion to Mr. Hodgkinson's conclusion, I can by no means admit that my method of investigation excludes the possibility of forming an oxychloride, for the reason that my hydrogen was not dried, and whatever oxygen might be required for the purpose would be furnished by the moisture present. It does not appear to me that the formation of an oxychloride would be so "miraculous" under these circumstances as it would in a current of absolutely dry oxygen for example. Really, I had no desire to "smash that hypothesis;" I only wished to determine if it were true.

As for the explanation you have suggested of Von Bibra's failure to detect a loss in weight, it is so simple that one wonders why it has not been thought of before. But it may be asked incidentally why did the chloride in his experiment turn dark, if the chlorine "recombined almost as rapidly as it was disengaged?" Not being able to understand the course of such a continuous decomposition and recomposition, I am disposed to hold to my original explanation of the inappreciable loss of weight.

Now, why did I use hydrogen? For several reasons, but, primarily, because I desired to use a gas which would combine with chlorine. I had in mind certain old notions concerning haloid absorbents in developing, and I thought it just possible that hydrogen might assist the action of light by taking away the chlorine as fast as it was set free. I did not know that hydrogen was "a powerful reducer of silver chloride" under the conditions of my experiment. The extreme severity of your strictures upon my ignorance of this elementary fact, as you regard it, leads me to think that you are not quite sure of it yourself. Perhaps, Mr. Editor, you will be good enough to tell your numerous readers, as well as your present correspondent, what is the ultimate result of the action of hydrogen in sunlight upon silver chloride—for this is what you say would have been "easily predicted."

I most humbly protest that I am not such a novice in chemical investigation as to have overlooked any direct action of the gas upon the chloride. The effects I have reported are due to the action of light, otherwise I should have used nitrogen, which was mentioned in my earliest notes on the subject. The results of the experiments are themselves sufficient evidence that the hydrogen has no noticeable direct reducing action, for it will be seen that slips 3 and 8, which show the greatest loss in weight, were not exposed in hydrogen but in air. I regret that you should have overlooked the fact that these two experiments were conducted in precisely the manner you have advised. In my later experiments, still in progress, I have not used hydrogen, merely because there was no advantage in doing so. Having found that the chlorine set free was practically equal to the quantity collected, I deferred further experiments in this direction until after I might determine the ultimate action of light upon the chloride.

Finally, Mr. Editor, though it may seem to you presumptuous, I do hope "to effect single-handed what has baffled hundreds during half a century," not because I am more wise or skilful than they, but because I happen to have thought of a plan of investigation which promises good results. Whether I succeed or not is of no grave consequence, if I can add my mite to what is already known. If I fail, the problem will still be open for some individual, "single-handed," to solve in another way. Your reproof of my presumption does not greatly disturb my peace of mind, since most of the discoveries of science have not been made by companies or battalions of men, but by individuals "single-handed."

I had closed and signed this letter here when I first saw the communication of Mr. Bothamley on pp. 222, 223, which demands a few words in reply. The point concerning the drying of silver chloride over sulphuric acid is well taken, but it was not overlooked by me. My chloride films are so very thin that they could scarcely retain a weighable quantity of water after standing over sulphuric acid; but I have tested the matter, experimentally, by heating the slips, although not sufficiently to fuse the chloride, and found no noticeable change in weight.

If Mr. Bothamley had considered the matter more carefully, he would have seen, I am sure, that I purposely used undried hydrogen gas. Indeed, it is doubtful if the pure dry chloride would discolour at all in pure dry hydrogen, although it was, and still is, my intention to try the experiment. But it is certainly curious to compare your remarks, Mr. Editor, with those of Mr. Bothamley upon this point. You say that oxygen was excluded, and that the formation of an oxychloride would have been "miraculous" under the conditions. Mr. Bothamley takes the very opposite view, and actually criticises me for doing precisely what I set out to do. When I wish to learn if an oxychloride is formed, I do not exclude oxygen by using dry hydrogen, as Mr. Bothamley seems to think I should have done. It does seem as though a little more care would save my critics from such serious blunders.

In regard to the two statements which Mr. Bothamley finds it difficult to reconcile, I need only ask him to note that the words "considerable loss" were used in contradistinction to merely "loss" in the cases referred to.

In the estimation of the chlorine set free by nitrate of silver, it is scarcely practicable to get a much closer agreement with the weight of chlorine lost than was shown in my experiments. Nevertheless, I am obliged to Mr. Bothamley for pointing out that the margin of error in this experiment is possibly too great to finally settle the question as to the absorption of oxygen. But inasmuch as the loss in weight of the slips was *greater* than the weight of chlorine collected, I do not see that my conclusions are affected by the slight discrepancy of ·5 milligramme in

the results. Obviously the purpose of this experiment was to test the oxychloride hypothesis, and if the hypothesis were true, the chlorine collected *should have exceeded* the loss in weight of the slips by the quantity of oxygen taken up.

Since my first article was written, I have made numerous experiments with exposed slips, and I find that nitric acid always removes a large proportion of silver. I shall have quantitative results to present before long; indeed, my original article was only a preliminary announcement of work which was and is still in progress.—I am, yours, &c.,

Washington, D.C., U.S.A., April 18, 1890. ROMYN HITCHCOCK.

"A FIXED EYE."

To the EDITOR.

SIR,—I am sorry to have overlooked the letter from your correspondent signed "C." May I refer him (through your columns) for answer to the *Camera Club Journal* for this month (May), which will probably be out by the time this letter appears? I have enlarged on my views of the parallel between vision and artistic treatment.—I am, yours, &c.,

THOMAS R. DALLMEYER.

25, *Newman-street, London, W., May* 1*st*, 1890.

KEEPING PROPERTIES OF GELATINE PLATES.

To the EDITOR.

SIR,—A friend, knowing my liking for old plates, lately gave me some boxes of Swan's plates, of ancient date. Among these was one the end of which was entirely rotted with damp—the outside wrapper, box, and packing paper of the top four plates, being, as you perceive, similarly affected. I was about to relegate the contents to my collection of waste glass, when I thought I would see how they behaved under development.

The top plate I cut in half, preserving the damaged portion as a specimen (No. 1). The other half I exposed under a negative for four seconds one foot from the gas. I developed with pyro and ammonia (having no quinol handy), the result being No. 2.

I then exposed the second plate (No. 3) on an open view (April 7) at 4.30 p.m.—aperture *f*-16, time one second—and developed with pyro and ammonia. There is no trace of iridescence, and the edges are perfectly clear glass; and except for the rotted portion of the film, the plate might be a recent one.

The third plate I cut in half, exposing the two portions under the same negative as with No. 2 for three seconds to the gas as before. These I developed with quinol and soda, and I think the slide No. 5 will compare not very unfavourably with slides made on the most recent plates.

In all cases during development the decayed portion of the films floated off as a very dirty scum, while the developer became almost black.

This particular box was labelled as having ten times the rapidity of wet collodion, and the date of manufacture (as I was informed by the firm) was May 17, 1880. The remaining nine plates I have kept for further experiments.—I am, yours, &c., E. HEALY.

[From an inspection of the results above described, we think that if the plate boxes had been kept in even a moderately dry place during these ten years, the plates would have been quite good in every respect.—ED.]

PHOTOGRAPHING IN EPPING FOREST.

To the EDITOR.

SIR,—Perhaps you can find room to publish enclosed letter. You will see it is only those that tout for business in the forest that require a license.—I am, yours, &c., A. E. SMITH.

90, *Queen Street, Cheapside, E.C., May* 3, 1890.

"SUPERINTENDENT'S OFFICE,
"THE WARREN,
"LOUGHTON, ESSEX.
"25*th August*, 1886.

"DEAR SIR,—No license or permission is required for taking views in Epping Forest, it is merely the men that make a business of taking photographs that require a license.—Faithfully yours, F. F. MCKENZIE.

"Mr. A. E. Smith."

To the EDITOR.

SIR,—The assumption of "G. H. S." that as a "part proprietor" of Epping Forest he is at liberty to do anything he pleases there, short of actual mischief, is irrational. A shareholder in the South-Eastern Railway might as well claim to plant a camera on the platform at Charing Cross Station. The Corporation of the City of London, as Conservators of the Forest, are empowered to make such regulations with reference thereto as they may deem expedient, and it is illegal to take photographs in the forest without their sanction, which is readily given upon application to the town clerk, Sir John Monckton, at the Guildhall.—I am, yours, &c.,

125, *St Paul's-road, Bow, E., May* 5*th*, 1890. HENRY EVERETT.

RECEIVED.—Price-list of Thomas Illingworth and Co., Photographic Printers and Dealers, 38, Sherriff-road, West Hampstead, N.W. Among many other things connected with printing in a variety of ways, this firm engages to refill roll-holders. They also keep some of the Scovill goods.

FRENCH CORRESPONDENCE.

The French Salon—May Day in Paris—A Way of Taking Photographs in the Streets—Is Hanging Healthy?—Death of M. Péligot—Marriage of Niepce's Granddaughter—Halation and its Cure—Another Hotel with Convenience for Developing—Natural Colour Proofs by M. Verescz—A Hand Camera—A Chromo-photographic Apparatus, &c.—Celluloid Films, Balagny's Process: Fatty-ink Printing—M. Vidal on Coloured Screens and Orthoscopic Dyes—Pinhole Camera—Developer Mixed with the Sensitive Emulsion—A Lecture on Reproducing Caverns by Photography.

"LE SALON" opened its doors last week to the admiring crowd of visitors. An exhibition of paintings is generally a rendezvous for the *élite* of Parisian society, but the success of the present *salon* has surpassed all former ones. Photography is a gainer by it, the reproductions of the paintings bring cash into the photographic artist's till, and it may be remarked that the photographs of the pictures exhibited are far superior to former work, no doubt owing to the now general custom of photographers to colour sensitise their plates in the numerous solutions now in the market.

May Day passed off in Paris more quietly than was hoped for by many of the trade who had hired windows to have the chance of a *cliché* of the demonstration, and perhaps of a revolution. But the day's proceedings passed off with hardly the semblance of a scuffle, much less a riot. The cameras could only take a shot now and then at the troops or passing policemen. No hope to get a negative of the heavy-mailed hand of the military in the act of dragooning the people. Fine weather has set the amateurs on the *qui vive;* it is astonishing the numbers that can be seen. Cameras on bicycles, cameras on tricycles, cameras in carriages, cameras in hand, cameras everywhere, can be seen in taking an airing in the magnificent "Bois de Boulogne." I see that a discussion took place on the 24th inst. before the London and Provincial Photographic Association on the best means of dealing with the crowds of curious onlookers who are apt to baulk the photographer in his efforts at obtaining views in cities. The idea of having a sham camera is novel, but photographers and amateurs do not, as a rule, go about by twos, and nothing would prevent some of the crowd standing before and gazing at the artist doing the work, to his great annoyance. Last year I was on a tour through Italy, and I found it almost impossible to get a negative; not only boys, but respectable men would persist in standing before my camera. It is true that not being master of the Italian language my endeavours to persuade and solicit them to stand aside had a contrary effect, and brought together a crowd, to my dismay. Nothing could be done but to take up my apparatus and go to my hotel. At Naples, not only were the lookers on troublesome, but impolite, and even insolent. *Je suis chez moi et je reste.* At last I got a double ladder made, about two yards high, and attached my camera on its top. From that moment I worked with ease and comfort; the idlers paid no more attention to me than to a man cleaning the glass of a gas lantern. In Paris I have very often used the same dodge with the same success. I hope this idea will save some of my readers from being annoyed by idlers. By-the-by, it is now prohibited for any foreigner to take photographic views in the streets of Paris.

It is a pity that "Jack Ketch" has not a monopoly, as he would now have the chance of becoming a millionaire. In Paris a number of persons suffering from spinal diseases obtain great relief from being hanged by the neck, not "until they be dead," but for two minutes at a time. Yesterday I paid an official visit to "Le Ministre de l'Instruction Publique," and I saw one of my colleagues there whom I had always seen a sufferer, near to death's door. This gentleman appeared in the best of health; I expressed my joy at his recovery, and he related to me that it was owing to the hanging system (recommended by several of the French doctors) that he now enjoyed such health that he had never dreamed of, nor hardly hoped for a year ago.

The Photographic Society of France has to mourn the loss of their President, M. Péligot, celebrated chemist, and member "de l'Institut." For a long time he has been unable, through illness, to take the chair at the monthly meetings, or to assist the Committee in their work. Not only has his death been a loss for the Society, but also for science in general, not to speak of his family and friends. This eminent and modest *savant* was respected and honoured by all who knew him. At the last meeting of the Soicety, which took place last Friday, M. Davanne, the chairman, read the speech which he delivered over the grave of M. Péligot, which was approved of by all the members.

The CHAIRMAN informed the Society that he assisted as their delegate at the wedding of the granddaughter of Niepce. M. Davanne then spoke of the interest which the Photographic Society of France took in the welfare of the descendants of the great inventor of photography. I have the pleasure, said he, to inform the Society that the bridegroom has offered one of the heirlooms of the family to the Society; it consists of two photographic proofs obtained by their illustrious ancestor. This document will be preserved in the archives of the Society as an historical record of the history of photography.

The subject of halation was then discussed, and took up very much time, but this will not be lost, as more attention will now be given to this subject, as it showed the necessity of backing every sensitive glass plate used in photography in order to have a perfectly pure negative. How this backing should be accomplished was the matter for discussion. At a former meeting of the Society, M. Cornu exhibited the results of his investigations on the subject, and counselled a mixture of two essences and a colouring substance, to be of the same index of refraction as the glass itself, and in optical contact therewith; this, said he, will completely neutralise the halo.

A member this evening said the remedy succeeded very well, but it was not practical, as the drying of the backing took such a length of time.

M. CHARDON proposed to make a piece of carbon paper adhere to the back of the plate. This was objected to as it is very difficult even with a squeegee to obtain adherence without air bells.

Messrs. Henry, of the Observatory, made a communication to the French "Académie des Sciences," in which they proposed to coat the back of the sensitive plate with collodion, tinted with chrysoidine; this, said they, will completely cure halation, and recommend its use to all astronomers who are occupied with the map of the heavens.

M. VIDAL said that he was sorry to differ in opinion with those gentlemen, but his experiments proved that chrysoidine would not quite guarantee freedom from halation. He then showed negatives which had been obtained with a backing of chrysoidine—the halo was visible. The use of a coloured collodion with chrysoidine, or a mixture of the analine salts, is not new. Professor Stebbing manufactured such a coating ten or twelve years ago; fortunately I found, he continued, a bottle containing some of his solution in a corner of my laboratory, and having tried it, I found it absorbed all the rays of the spectrum excepting the extreme red, but other colours than the chrysoidine entered into its composition.

The CHAIRMAN then asked Professor Stebbing if he intended to give the Society the formula. The latter replied that he should have been happy to do so, but the great losses he had sustained by the fire insurances compelled him to keep his secret if something could be made of it. Charity began at home.

Professor Stebbing then presented a bottle of coloured collodion to the Chairman, who passed it over to M. Chardon to be experimented upon.

The Society was informed that the "Hotel de l'Aigle Noir," at Fontainebleau, had organised a developing room for amateurs visiting that town. It is to be hoped that other hotels will follow the example.

M. LONDE was called upon to read the report of the commission on photographic lenses. The prize of 2000 francs, offered by the "Ministre de l'Instruction Publique," was divided between Messrs. Adolphe, Martin, and Berthiot.

Messrs. Gauthier and Villars presented coloured proofs on paper and on glass which had been obtained by M. François Vernez. These proofs in natural colours excited great interest, as a marked progress could be seen over the coloured proofs obtained formerly by Niepce de St. Victor and Becquerel, as those of M. François Vernez are capable of being fixed. Is it a step towards the colours being obtained in the camera?—that is the question.

M. le Commandant Fribourg presented a very pretty little hand camera.

M. le General Sebert presented a new chrono-photographic apparatus, composed of six cameras, the rapid shutters of which can open one after the other with any given rapidity. The General invented this apparatus more in view of the service it will render to the army and navy than for private purposes, but science is so diffused at the present day that no one knows what this invention may bring forth. The General then told us how a cannon ball or an *obus* could be photographed during its rapid flight. An electrical current, said he, departed from the apparatus, fired off the cannon, and at the same moment opened camera No. 1, and the five others followed. A number of proofs illustrating the firing off of a mine were shown round; they perfectly delineated the different periods, portraying every incident that occurred during the explosion. The gallant General then exhibited an apparatus which he had constructed to study the working rapidity of the different instantaneous shutters. He obtains this result by the vibrating of a tune fork and a falling shutter bearing a serrated surface, upon which the light, going through the tune fork as well as through the rapid shutter, makes, or traces, undulating or wave lines; the rapidity of the shutter can thus be calculated to the one-thousandth part of a second.

M. Grieshaber presented some new films on which the sensitive substance is spread upon celluloid. In order probably to prevent distortion or curling of the finished negative, the manufacturers, Messrs. Grafe & Jongla, have coated both sides of the film: they say that better results are obtained. It may in a great measure prevent halation; time will show if the extra expense of double coating is remunerative, or "if the game is worth the candle."

M. BALAGNY then gave a description of his new patent process for obtaining permanent prints in fatty ink from gelatino-bromide of silver films. I take, said he, a gelatino-bromide of silver film and plunge it for a certain time in a solution of bichromate of potash; when perfectly dry it is placed in a printing press under a negative and exposed for a few minutes to light. It is then taken out of the press and its back exposed to light for a few seconds. It is then thoroughly washed under the tap until all the soluble bichromate has been eliminated. It is then fixed to the table of the photo-lithographic press, and inked up, and proofs printed off at once. M. Balagny informed the Society that several proofs could be obtained from a negative which he had received an hour before. Several of the members bore witness to the truth of this assertion. In answer to a question—Will any sensitive film do? M. Balagny answered that he could not say, as he only employed those of M. Lumière, who manufactured them for the process, the only difference from the commercial ones being that a very strong substratum was employed, without which the sticking of the inking roller was liable to pull off the sensitive film from its support. The extreme fineness or sharpness of the picture is to be attributed to the gelatino-bromide of silver in the film as well as the remarkable rapidity of the process. A number of proofs were shown round, which obtained the approbation of the audience; M. Balagny was congratulated and complimented upon his undaunted perseverance and success. I had the honour of exhibiting some specimens of M. Balagny's work during my last visit to England. Any one interested in the future of fatty-ink printing can see some specimens by calling on the editor at the office of THE BRITISH JOURNAL OF PHOTOGRAPHY.

M. VIDAL then spoke on coloured screens and the way to use them. As professionals as well as amateurs are now being wakened up to the advantages of rendering plates colour sensitive, and the simple way in which this can be attained is becoming popularised, great attention was given to M. Vidal's explanations. Discretion and brains must be used to work "orthoscopically" prepared plates, for the indiscriminate use of screens will cause exaggerated effects worse than those obtained on the ordinary plates. The blue and the violet colours can be kept back, and the red brought out to a surprising degree, in fact, the sensitising bath must be made for the object in view; if for the reproduction of a picture in which the dominant be red, the bath must be prepared accordingly, and a certain coloured screen or screens employed. M. Vidal then exhibited a number of negatives in which he had inverted completely the colours, in others he had made certain tints to come out more or less at will, showing that he had studied fully the powers of "orthoscopic preparations," and that he was master of the process.

A number of proofs obtained by a pinhole camera were exhibited and highly praised.

A discussion took place upon some sensitive plates in which hydroquinone had been mixed with the emulsion, and all that was necessary to be done after exposure to develop them, is to plunge them into a solution of sucrate of lime—so says the manufacturer!

M. JOSEPH VALLOTT made a communication upon the best means of reproducing caverns by photography. After having mentioned the different artificial lights and their disadvantages, he informed us that he concluded pulverised magnesium as a flash light to be the best. He then exhibited the lamp he employed—an ordinary spirit or alcohol lamp. Through the centre of the wick passes a brass tube; this goes through the lamp and passes underneath, and a piece of indiarubber tube connects it with a pair of bellows. The tube passing through the wick is filled with magnesium by means of a small funnel; the lamp is lighted, and when the bellows is pressed upon, the pulverised metal is projected out of the tube, and in passing through the burning lamp catches fire; an immense blaze, which illuminates the whole cavern, allows the photograph to be obtained. M. Vallott illustrated his lecture by some very good slides, representing the interior of some of the most renowned caverns of France. A profusion of stalactites and stalagmites could be seen, and these wonders of nature admired without the pain, expense, and trouble of going to visit them in their dark and lonely homes.

E. STEBBING.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column, but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange quarter-plate camera, bellows body, and portrait lens by DALLMEYER, for a whole-plate view camera.—Address, G. THWAITES, 19, Dundonald-street, Edinburgh.

Good rapid rectilinear, 20×15, twenty-seven inches; want ditto, eighteen to twenty inches, or Optimus Euryscope, 12×10, in exchange.—Address, W., Studio, Beethoven-road, Hanwell, W.

Four backgrounds (exterior), flatted oil, eight feet by seven feet six inches, quite new, in exchange for detective or good half-plate camera.—Address, HARRY R. DICKENS, Wilmot-street, Ilkeston.

I will exchange whole-plate burnisher, with gas burner, nearly new, for interior or exterior backgrounds (linen) or half-plate bellows camera and slides.—Address, F. P. F., 90, Newington Green-road, Islington, N.

Wanted, hand or detective camera in exchange for concert flute, complete in case, perfect condition, or would exchange for good quarter-plate set, but should prefer detective.—Address, R., 62, Bangor-street, Carnarvon.

Tricycle, Coventry rotary pattern, good for carrying, will pass ordinary door, central geared, ball bearings to crank, driving wheel, and pedals, good condition; will exchange for 12×10 tourist camera, wide-angle lenses, large lens, or complete half-plate set.—Address, W. E. DERENHAM, Haverstock-hill, London.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

F. S. (Fulham.)—There is no such Society connected with photography.

B. T. O.—In making the emulsion do not add more than one grain of chrome alum to four or five ounces.

"BREEZY MARSHLAND."—Apply to Dr. P. H. Emerson, 10, Marlborough-crescent, Bedford-park, Chiswick, W.

J. MORISON.—Arrangements for the manufacture of the actinometer mentioned are pending; when completed due announcement will be made.

E. G. ARCHER wishes the address of the publisher, or his agent, of a series of views of the Isle of Man, known as the "Hudson's Series."—Will some reader oblige?

S. ELLEN.—Palladium would doubtless answer as well as platinum, but it would be far more expensive, even if the latter metal were more than double its present price; hence no advantage would be gained.

REV. C.—The best plan will be to add the emulsion to the silver waste. As there is so small a quantity of it, the time expended in trying to doctor it, even if successful (which is doubtful), will not repay you for the trouble.

PRINTER.—The desired tone may be obtained with the acetate bath, provided the negatives are of the right character. We believe this is the bath used by the firm named. The tone depends as much upon the negative as the toning bath.

C. J. C.—Dissolve the oxalate of potash in hot water, no difficulty will then be experienced in getting the full quantity in solution. With cold water the quantity can be dissolved, but the bottle will require a deal of shaking, and the operation becomes tedious.

CONSTANT READER (Baltimore).—We know nothing more of the material than we published at the time. It is not, so far as we are aware, yet an article of commerce. We agree with you that it would be useful for many purposes, provided its price were not prohibitive.

A. J. CORRIE.—Eikonogen does not suit all papers as a developer. With some it is very liable to produce fog or stains, which even bromide does not prevent. With some papers we have obtained good results without bromide, where we have not bromide has not assisted.

W. T. C.—1. A lens working with an aperture equal to *f*-16 is rapid enough for seascapes or beach pictures in a good light with rapid plates; but it would be too slow for London street scenes, unless under exceptional conditions of the light.—2. We never undertake to give opinions on the merits of different manufacturers' goods; it is against our rule.—3. All the makers named in the list are of high repute.—4. Select a lens of the "rapid" type.

R. A. (Manchester.)—From your description of the work to be done, no advantage would be gained by the use of orthochromatic plates. Use plates of medium rapidity, and give a very full exposure, and use plenty of bromide in the developer. The plates would be better if backed.

A. Cornell inquires if there is any difference between collotype, heliotype, artotype, photophane, and mezzotype.—They are all the same process under different names, but with, perhaps, slight modifications in the working. "The collotype process" would include the whole of them.

A. McC.—A sheet of green glass (cathedral green by preference) or green paper and a sheet of deep yellow or orange paper will prove useful for lighting the dark room. It gives a more pleasant light than ruby glass. We have just seen in the Eastman Company's showrooms two fabrics, one a deep orange colour and the other a light canary, which when used together form a very agreeable and safe light.

Ill Used.—If your local paper has utilised a copyright photograph of yours for one of its illustrations without your sanction, you have a remedy under the Copyright Act. The penalty is 10*l.* for every copy sold. As you say the paper is a "powerful concern with plenty of bounce," we advise you to consult a respectable solicitor, and not take the case in'o Court by yourself. According to your statement you have a clear case, and ought to recover heavy damages.

G. S. Ellis says:—"I should be pleased if you could tell me the kind of ink used for printing photographic mounts. I have had some printed with ordinary printing ink, but this comes off or smears when burnished."—Ordinary printing ink of good quality is what is generally used. That made with quick drying oil is best. No doubt if our correspondent's mounts be kept for a time in a dry room exposed to the atmosphere, the ink will become hard, and not "set off" or smear when the pictures are burnished.

G. V. writes as follows: "From the negative of a group of gentlemen taken by me a few years ago I have had made an enlarged head and bust portrait negative of one member of the group, who is now dead. Will prior publication of the group photograph prevent me from protecting this portrait by copyright? The original photograph was not copyrighted."—The portrait can be made copyright, but we believe any one will be at liberty to copy the portrait from one of the groups published before the copyright was registered. But we are not altogether sure on this point.

Warder asks if any one has the right, as a parishioner, to photograph the interior of a church without asking the permission of the rector.—This is a question of law, we imagine, and we therefore cannot give an opinion thereupon. We, however, suspect that the rector could prevent a photograph being taken if he chose; certainly he could when the building was open for divine service, and he, we think, could keep it closed at all other times. In our experience a polite letter to the vicar or rector of a church has always secured the permission to take photographs within the sacred edifice.

C. B. Vandeleur asks: "What is the best method of staining a camera dull black? I mean the outside, of course. The camera in question is a hand camera, and if stained the above colour would be less liable to attract attention."—In reply: Wood may be stained black by first washing it over with an infusion of logwood (made by boiling), following this by an application of a solution of protosulphate of iron. It may also be blackened by means of common spirit varnish thinned with alcohol, with which has been mixed lampblack in such proportion as may be determined by trial. Too little black will cause it to shine when dry, therefore add enough to ensure a dead surface.

Ignoramus asks: "What is the largest size stop that will work with a rapid rectilinear lens of one inch diameter and seven inches focal length, so as to cover the whole of a quarter-plate with perfect sharpness? Kindly give the size in the fraction of an inch (instead of *f*-0) since I intend making the stops myself, and should not know the exact size to make them according to that system of numbers, and have none to copy off."—This query cannot be answered from the data given. Few lenses behave alike as regards covering power. Let "Ignoramus" prepare a few cardboard stops having various apertures, and make trial of them, and having thus ascertained the one best suited, let him then make it in brass.

H. Bartholomew asks: "1. Can an ordinary whole-plate rectilinear lens of eleven-inch focus be altered to include a wide angle without destroying its properties as a narrow-angle lens?—2. What sort of a lens is a "Ross No. 2 Symmetrical" for taking groups out of doors?"—In reply: 1. By shortening the tube so as to bring the glasses closer together, and then using a small stop, the lenses can be made to cover a larger plate, and so include a wider angle. But when this is done the instrument will no longer be a quick-acting one. The best plan will be to have a separate mount made into which the glasses can be screwed when the lens is used as a wide-angle one. The original lens can then be retained intact.—2. Yes, if it be that of the rapid type.

W. De Frere writes: "1. I have just constructed a hand camera which I believe to be quite original; at any rate, I am not aware that there is another in the market worked on the same principle. I am thinking of making them for sale, but am afraid to do so for fear some part of the apparatus may be an infringement of some one's patent. In the event of this, is the patentee bound to give you notice to cease selling the instruments, or can he come down on you at once for damages? I would be glad if you can let me know the best way to find out if I shall be safe in offering the cameras for sale.—2. I have an Optimus Portable Symmetrical, and a R. R. lens; would the back combinations of these lenses give as good result as an ordinary single landscape lens?"—In reply: 1. Our correspondent should examine the patent specifications of cameras of this class, and if he does not discover any similarity to his own, let him send his camera to any of the London Societies for exhibition, when, if there is anything old in the principle of its construction, it will thus be ascertained. Patentees, as a rule, do not "come down" on one for an unintentional infringement without giving a previous friendly warning to desist from making.—2. The portions of these lenses answer as landscape lenses when suitably mounted.

Colour.—Why not get your friend to give you the necessary instructions? So far as we know, there is no work published on the subject. Some few years ago several persons obtained considerable sums by teaching this system of colouring, but we have heard nothing of them of late. The principle is this: A photograph is rendered transparent, say, with paraffin wax, and then coloured with ordinary colours from the back. The photograph is usually cemented in optical contact with glass prior to colouring.

Received.—E. and T. Underwood; Otto Schölzig.—In our next.

Hackney Photographic Society.—May 22, *Photographic Chemistry*, by Mr. E. J. Wall.

The Photographic Club.—Subject for discussion, Wednesday, May 14, *Photographic Definition*; May 21, *Photo-mechanical Processes*.

London and Provincial Photographic Association.—First Saturday outing, May 10, at Waltham. Trains from Liverpool-street at a quarter-past two and ten minutes to three.

West London Photographic Society.—The second annual smoking concert will be held at the Richmond Hotel, Shepherd's Bush-road, W., on Friday, May 9, 1890, at eight p.m.

Photographic Society of Great Britain.—Ordinary meeting, at 5A, Pall Mall East, on Tuesday, May 13, at eight p.m., when papers will be read:—*Reflected Images in Optical Combinations, and their Effect on the Brilliancy of the Final Image*, by T. R. Dallmeyer; and on *Photography with a Flash Light*, by W. England.

Proposed New Society in Ealing.—It is proposed to form a photographic society in Ealing. It is probable that suitable accommodation for meetings may be obtained at the Local Board Offices, and a convenient dark room fitted up for the use of members. Ladies and gentlemen wishing to join are requested to communicate with Mr. H. W. Peal, 2, Craven-terrace, Ealing, W.

Government Recognition of Zoological Photography.—It may interest our readers to know that the British Museum (South Kensington) authorities have just ordered a large number of the animal studies from life, and skeleton series, by Mr. Gambier Bolton, F.Z.S., to be framed and hung in the galleries of the Geological Section. This is believed to be one of the first instances on record, and shows that photography is slowly, but surely, making its way upward in the scientific world.

A "Julia Cameron" Exhibition.—The fifth of the series of photographic exhibitions at the Camera Club is now open to visitors on presentation of card. The exhibition consists of photographs by the late Mrs. Julia Cameron, and by the kind co-operation of Mr. H. H. Cameron, a fully representative collection is brought together. Amongst other pictures are included the portraits of Sir John Herschell, Lord Tennyson, and Robert Browning, produced by Mrs. Cameron more than twenty years ago. The pictures will be on view for about two months.

Silver Prospects.—The mere prospect of the Silver Bill becoming law has, says the *Graphic*, produced an electrical effect on American securities in both hemispheres. Silver, too, has advanced largely, if not by leaps and bounds, while the holders of India rupee paper are dreaming pleasant visions of substantially increased incomes. For the moment it certainly looks as if this Yankee adaptation of bi-metallism were a move in the right direction. It is the hereafter that presents such dire perplexities. The American Treasury is to buy four and a half ounces of silver every month, giving in exchange State notes which will be legal tender for Customs and other public dues. But to allay misgivings it is further enacted that note-holders may at any time demand payment in specie, and the Treasury can only make it in silver by giving so much of that metal as equals the face value of the notes presented for payment at the then current price of silver. Were the Treasury to have to face a run for the payment of notes, every hour would witness a fresh fall in the market value of silver, and consequently more and more of that metal would have to be given to the note-holders.

Trade Medals at Exhibitions.—This question has been much discussed of late, and, as far as the Britannia Works Company is concerned, a prompt and, we venture to claim, a most satisfactory settlement has been arrived at. We have our own opinion as to how far such medals have been of use in the past, but as soon as their abolition was mooted we readily fell in with what seemed the general wish, and henceforward no Ilford medals will be offered at exhibitions. We may here say that we have never offered a single one at any exhibition which was not first asked for, and therefore the societies who sought them must have felt they were necessary, or at least useful. We think, when this fact is borne in mind, that we have been most undeservedly maligned in the matter. Further, some of the best workers, both amateur and professional, have been most happy to compete for and accept our medals, and we are glad to know they consider the honour no unworthy one. The expense has been more than considerable, but as long as we felt we were serving any good purpose in thus assisting the Societies who asked for the medals, we did not consider the cost for one moment. We are as keenly interested in the advance of photography as any non-trader can be. We see the necessity for its being raised to a higher status, both as an art and a science, and as we are told that trade medals degrade it, we give them up at once.—*Photographic Scraps.*

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THE BRITISH

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SOME POINTS OF DARK-ROOM PRACTICE.

II.

Having shown how unreliable is the method of obtaining saturated solutions by keeping a stock of crystals always in contact with the solvent, we would say that for any exact purpose the idea of saturated solutions should be entirely abandoned in practice, unless for some special object the maximum amount possible of a certain chemical is required to be dissolved. What we recommend is a solution containing a definite proportion of the required substance, closely approaching saturation if wished for, but the term "saturated" to be abolished entirely. As employed in nineteen cases out of twenty it is simply a lazy man's excuse, and almost meaningless under ordinary conditions of manipulation.

There is now to be considered the class containing the alums, "hypo," sulphite of soda, bichromate of potash, citric acid, and, in many studios, bichloride of mercury. If they are required in store solution the simplest way of proceeding is to make use of the gravity method before alluded to. A large jar or other vessel is marked plainly, with asphalt varnish, or in any other similar manner—in quarts, gallons, &c.—and the crystals are suspended in the vessel in a grating of some sort, or, as this is most easily obtainable, they can be tied up in a piece of coarse muslin with a piece of twine, and the bag so formed hung over the inside of the jar, which is then to be almost filled up to the mark indicating the required quantity. The whole may be put aside until required, when, if sufficient time have elapsed, it will be found that complete solution has taken place; but it is most important to bear in mind that it will be necessary to stir the liquid well before using, as otherwise the first quantity taken out of store will be less strong than the next, and so on, owing to the solution forming strata of increasing density as they near the bottom of the vessel.

The solution, however, may be required for immediate use, when such a plan as we have described is quite inapplicable. The best way in this case will be to dissolve by the aid of heat, adding successive small quantities of boiling water to the crystals, continually pouring off the strong solution formed before each addition. The crystals will soon give way to this treatment, and then the liquid obtained can be made up to the required bulk by the addition of a suitable quantity of water.

There is, however, a further mode of facilitating solution, and that is by first powdering the chemical to be dissolved, it will then be much more quickly acted upon by cold water, and when boiling water is used the action is almost instantaneous. Crystals, such as "hypo" and sulphite of soda, are used in such large quantities that powdering is a needless waste of time, and in fact "hypo" does not lend itself readily to the operation.

But the alums, bichromate of potash, citric acid, and bichloride of mercury are easily reduced to a fine powder, and our recommendation to photographers generally is to purchase them in the state of powder from the dealer. The addition to the cost is insignificant, and the convenience great, especially where such articles as mortar and pestle do not form part of the fittings. These crystals are kept so powdered by most dealers who lay themselves out for photographic trade. Bichromate of potash is reduced to fine powder for a few coppers per pound, and the poisonous mercury compound for very little more; common potash alum is used so largely for other purposes that a halfpenny per pound for powdering would be looked upon as most exorbitant if the salt were bought, say, by the half hundredweight. It would not be rash to say that the ease and saving of time in the making of solutions that follows the employment of powders instead of crystals is so great, that no one who has once purchased his chemicals in that form would care again to have them as crystals. The only objection that can be raised is the facility offered for sophisticating the powder; but when dealing with a respectable house little need be feared on this score.

We have left nitrate of silver out of this class, as its costliness prevents any very copious store of solution being kept, except in large establishments; it will be well, however, for one peculiarity in connexion with solutions of this salt to be remembered, for to our knowledge serious trouble has followed ignorance of or inattention to it. We refer to the extreme density of aqueous solutions of nitrate of silver. We have had before us a case of trouble with the nitrate bath which we were able to trace to this cause, as follows:—Half a pound of silver had been put in a Winchester quart bottle at the conclusion of the day's work, and the next morning it was seen to be all dissolved. The bottle was turned upside down to mix the solution, and during the day, after a portion of it was used, everything went wrong. The bottle of solution was examined at our suggestion, and, as we anticipated, the chief part of the dissolved nitrate still lay at the bottom of the bottle, notwithstanding the preliminary shaking and mixing it was subjected to. The truth is, the solution at the bottom was almost saturated and was so heavy, that when the bottle was reversed, as described, a portion only was mixed, and the rest fell, like water mixed with oil, to the bottom of the vessel. This has sometimes been looked upon as incredible when narrated to practical men, but we would simply ask any unbeliever

to try for himself, and he would soon learn something new about solutions.

The few further remarks we have to make on these minor points of practice may be deferred to a future number.

PANORAMIC PHOTOGRAPHY.

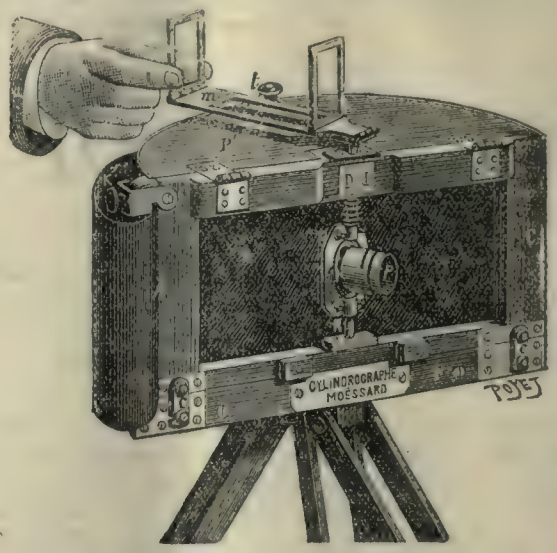
Even in the Daguerreotype days photographers sighed for the means of increasing the field of delineation in order to obtain panoramic views of nature, and in the first panoramic camera of which we have any record the picture was received upon a Daguerreotype plate. History is continually repeating itself, and the camera of Martens of France has been re-invented several times, although in forms differing from the original, which consisted of a long Daguerreotype plate bent cylindrically, a lens pivoted at top and bottom being placed in the centre, of which the curved plate formed the radius. The lens rotated and carried with it a narrow chamber the height of the plate, and in the back of which was a slot through which the light passed to the plate. All of the plate but the portion opposite the slot was in obscurity, and the exposure was made by rotating the lens from one side of the cylindrical plate to the other.

Anterior to the invention of his panoramic camera and lens, Sutton invented a camera in which the picture was received on a flat plate which always stood at a right angle to the narrow lens-chamber. Details of this, with a drawing, are given on page 314 of the first edition of his *Dictionary of Photography*, published by Sampson Low & Co. in 1858. He subsequently invented his cylindrical panoramic camera with spherical lens, by which the exposure was given to every part of the plate simultaneously.

The Pantascopic camera of Johnson & Harrison—one of the most ingenious and perfect examples of photographic engineering yet produced—came into existence in 1862. In their specification these inventors, in addition to the flat-plate system, foresaw and provided for flexible films when bent in a semicircle, as Martens had done with his Daguerreotype plates, and by so doing anticipated other independently invented cameras, in which talc and similar flexible films were employed, in particular one by Winstanley, which he described in The British Journal of Photography of July 7, 1865, mica plates forming the collodion support. And it was, we believe, during the year subsequent to that last mentioned that we constructed, on the Johnson & Harrison lines, a quarter-plate pocket panoramic camera, the lens of which was capable of being whisked across the surface of the curved mica quarter-plate and including an angle of view of 100°, the extreme margins of the negative being so sharp as to bear examination under a microscope. *Apropos:* some allusion is made to this in an article in the last Scovill & Adams *American Annual*, by the editor of this Journal, on *Unrecognised Properties of Celluloid Films.*

A still further development of the panoramic camera has recently been made by M. Moessard, whose invention consists in perfecting several details by which negatives may be obtained on celluloid films.

We have seen in the establishment of Messrs George Houghton & Son, High Holborn, the agents for the instrument, quite a number of admirable prints of the French Exhibition from panoramic negatives taken in the "Cylindrograph," the name of this camera. These are of large dimensions, and are perfect up to the edge; indeed, they could scarcely be otherwise, seeing that the extreme margin is impressed under precisely the same conditions as the centre. A lens of six inches focus covers or, to speak more correctly, impresses a film $17\frac{1}{2} \times 5$ inches. The cut shows the cylindrograph as in the act of taking a picture.



By moving the finder *m* from side to side, the lens is rotated over the whole field. The dark slide is quite flexible, and when the lid P′ is opened the slide is bent and inserted into curves which receive it. The shutter is then drawn, and being flexible is bent back, as shown at K, to be out of the way. The front of the camera is of course formed of opaque flexible fabric to permit of the lens P being rotated on the axis R, which must coincide with the optical centre of the lens to ensure the image remaining motionless while the lens rotates.

The projection is strictly panoramic; but into the subject of plane *versus* panoramic perspective we do not here feel called upon to speak. Both have their special uses.

A fortnight back we referred to the, at that time, increasing price of metallic silver; since then the market has been in a very unsteady condition. After falling twopence per ounce the metal has recovered one penny or more per ounce. Retailers and consumers of the nitrate are to be congratulated on the fact that the price of the salt does not vary like that of the metal. This would have been a necessity in the early days of photography, for then the refiners, who are in reality the manufacturers of the nitrate of silver, and with whom it is a by-product, sold it for little, if any, more than the value of the silver it contained.

The reason why nitrate of silver used to be sold so cheaply was, that till photography was introduced there was no use for it, except to a limited extent in surgery as a caustic. Hence the silver in the nitrate produced in "parting" had to be obtained from it in the metallic form, and this was a more costly process than crystallising the salt. At the present time, however, the consumption of nitrate of silver is so large that the quantity obtained in refining is no longer equal to the demand. Therefore it has been made specially, and consequently is now sold at a profit. This being the case, its price has proportionately increased on that of the metal, consequently the manufacturers do not find it necessary to vary the price with every fluctuation of the metal market.

Yet another photographic venture under the Limited Liability Act. This time it is "a penny in the slot" affair. A Company, under the title of the Automatic Photograph Company (Limited), is being promoted to take portraits automatically. A penny is to be dropped in a slot while the model stands before the machine, and in "forty-five

seconds" the portrait is finished and delivered. For an extra halfpenny in another slot, a suitable frame for it is supplied. The capital of the Company is 100,000*l.* of which the patentee of the apparatus, Mr. Isaac Joel, who is also the promoter of the Company, is to take 60,000*l.* for the patent rights of the United Kingdom. In addition to the patent rights the Company are to acquire "the secret of preparing the chemicals." It is stated in the prospectus that an additional profit is anticipated from the sale of these secretly prepared chemicals "for ordinary photographic purposes."

The prospectus, like most others, is a glowing one, and sets forth the profits as being enormous. The cost of the "*plaques* and other materials" is said to be less than a halfpenny, and that of the halfpenny frame, one shilling and twopence per gross. Added to the profits on these, there is to be a large profit derived from advertisements on the back of the portraits, as well as on the sides of the machines themselves. The figures represent that a yearly net profit of something over 31,000*l.* is to be anticipated, "equal to thirty-one per cent. on the capital of the Company," and in time it is anticipated that this will be largely increased.

Thirty-one per cent. would be a magnificent dividend, and is infinitely better than has hitherto been paid by any limited photographic company, as all the shareholders in them will admit. In a photographic company numbering an earl, a lord, an admiral, K.C.B., K.C.S., and a captain amongst its directors, investors *ought* to have some sort of a guarantee. The prospectus and the opinions of the press accompanying it are certainly interesting reading to practical photographers, and it really does credit to its compilers.

It is gratifying to see that, notwithstanding the enhanced price of platinum, engraving-like tones on matt-surface paper for the highest class of work amongst both professionals and amateurs are still increasing in favour. Therefore it is satisfactory to know, where price is an object, that similar results can be more cheaply produced than by the platinotype process, although they may not be so theoretically permanent. These tones and surface, which we were the first to advocate for the highest class of work, have taken such firm root in the public favour that they will be in no way checked by a trifling additional cost in production. The warm tones and garish surface of silver prints will still be maintained by third-rate photographers and a certain class of amateurs. Mediocre negatives are better suited to silver printing than for high-class matt-surface prints.

Last week we published a letter from the Rev. Mr. Healy, in which he gave an unusual experience of the keeping qualities of some gelatine plates, just ten years old, which had been subjected to the most adverse conditions. This experience is unfortunately very exceptional, for with the generality of plates, after but a few years' keeping, a marked deterioration is almost universally apparent. It is generally assumed that when the emulsion is prepared by the ammonia method the plates do not keep so well as when it is made on the boiling system. It is also a tolerably well-recognised fact that the most rapid plates do not retain their properties so well as slow ones. It would be exceedingly interesting to know, if possible, to what the plates tried by Mr. Healy owed their lasting quality under such abnormally trying conditions.

On more than one occasion we have directed attention to the fact that the deterioration of many plates is largely due to emanations from the paper in which they are packed. During the past few weeks we have experimented with a number of brands of plates which have been made for several years. We have no means of knowing the conditions under which they have been kept, as they have only recently come into our possession. In every case but one the plates on development show the well-known iridescent metallic appearance round the margins. This in some instances is but slight, though in others it extended nearly to the centre of the plates; but for this defect most of the plates were otherwise good, and showed no other sign of injury. In one parcel the plates were packed between tissue paper; these had no iridescent markings, and, on the whole, were the best plates of the lot. All those plates which had been separated with strips of paper at the edges showed a dark imprint of them; in some instances with a nearly sharp outline, but more generally with it blurred. This would indicate that some deleterious matter had exhaled from the material and spread its evil influence beyond the points of contact—in some cases as much as a quarter of an inch. When plates are packed with an air space between them the quality of the paper used is an important consideration, for it is pretty clear that some papers, with variations of temperature, do give off fumes that may act injuriously upon the films.

COLONEL STUART-WORTLEY.

We are sorry to announce that, at the age of fifty-eight, the death of Colonel Archibald Henry Plantagenet Stuart-Wortley took place on the 30th ult., at his residence, Rosslyn House, St. John's Wood.

Although of late years the name of the deceased gentleman has been but little associated with photography, yet has the time not very long gone by since it was one of the best known in all that partook of progress. A good artist, a clever chemist, an expert manipulator, an active experimentalist, and a fluent writer, Colonel Wortley for a long course of years occupied a foremost place in all that pertained to the advancement of photography. Its literature was enriched by his contributions, and its exhibitions by his artistic productions. In its polemics he very frequently occupied a leading position, and when he met a "foeman worthy of his steel" he never shirked a conflict. During the Crimean War one of his arms was injured by the fragment of a shell which burst near to him, but it did not greatly incapacitate him for the subsequent practice of photography. He was the founder of the once famous United Association of Photography which twenty-five years ago flourished in Regent-street, and in which the now almost-forgotten Wothlytype process of uranium printing was the leading feature.

About ten years ago he was most severely injured in a railway accident, and never afterwards altogether recovered. For the benefit of his health he, in December, 1879, took a trip around the world and brought home with him many photographic reminiscences of that journey, which embraced Australia, Tahiti, many nameless South Sea Islands, California, Yosemite, Sierra Nevada Rocky Mountains, many of the leading cities in the United States, including New York, where, in the September of 1880, he gave us a most graphic account of his varied adventures, especially in Tahiti, which he considered the most lovely and glorious place in the whole world.

From this time he gradually retired from photographic public life, and an article written for our Almanac for 1889 formed the last of his innumerable contributions to literature.

Colonel Wortley was a man of varied and high attainments. Referring to his political career, he once told us that although he was a conservative in politics he was an out and out radical in photography.

He was, if not the first, at least among the first, to obtain bold effects by working in the face of the sun, and his artistic conceptions of sea and clouds have never been surpassed. As Colonel Wortley was in early life one of the Queen's pages, Her Majesty always felt interested in him, and one of his last photographic efforts was made for her at Osborne. It is known that the Queen possesses three large and similar albums, filled with carbon photographs of her "household gods," and things specially beloved by her, one of which is kept at Osborne, a second at Windsor, and the third of which invariably accompanies her wherever she goes. It was to add to the contents of these albums that Colonel Wortley was requisitioned to attend at Osborne, in which house he was a guest during the time of his doing so. This was the last of his photographic work.

The sea and sky pictures of the departed Colonel are still so popular that the Autotype Company are almost constantly printing from these and others of his selected negatives to supply the demands made for them.

Old photographers are familiar with amber varnish, a solution of amber in chloroform much in request a score of years ago, and a varnish of real value, as it was used cold, dried almost instantaneously, and gave a bright, hard, resistant film; but we are inclined to imagine that none of them, either for negatives or coloured photographs, will be inclined to use a new amber varnish which, it is stated, has been discovered, and may be used for preventing the pigments used by artists from fading. This inventor has made an amber varnish out of sulphate of copper which, after drying, remains colourless.

PHOTOGRAPHY IN LITERATURE.—"ROMANCE OF TWO CAMERAS."

It is a sign of the times, and tends to show how thoroughly photography is weaving itself into the daily lives of a large section of society, to find in the current number of *The Century Magazine*—a high-class illustrated monthly—a short story in which photography supplies the basis of the plot. Some months ago two or three articles appeared in these columns under something like the title that heads this, in which attention was called to instances in which photography had been utilised in this country in the construction of plots, and it may not be uninteresting to see how the fair American writer has now gone more thoroughly and deeply into the mysteries of detective cameras, dry plates, films, instantaneous studies, and what not, for the purpose of building up the details of a romance, which of course culminates in love.

"A Romance of Two Cameras" is written by Elizabeth W. Champney, who, from the familiar manner in which she discourses of hand cameras, roll holders, films, plates, developers, and quasi science generally, is either herself an amateur photographer or intimately acquainted with some one who is. Her story is ingeniously constructed, and, as already stated, photography forms the pivot on which it turns; but, whether from deliberate romancists' license or from imperfect acquaintance with photographic possibilities we cannot say, the chief interest to technical readers will be found in the series of comically improbable accidents and incidents that form the framework on which the fictional drapery is arranged.

We are introduced to the heroine, Eleanor Thurston, a young American lady, in the Spanish town of Toledo, where, in the course of their tour through "Yurrup," she has arrived with her father, her detective camera, and "two rolls of sensitised paper instead of the ordinary glass plates." The change from glass to paper is important, not only because it forms a point in the story, but also because it shows the wisdom of the fair young artist, who, we are told, had recognised not only the saving of weight, but also "the further convenience of not being obliged to develop her own negatives," which could be "developed and printed at some future day by a *professional* photographer," and yet in America—as here—the professional declares that the amateur injures his business!

We need not follow our heroine through the narration of her troubles with customs officers and other minor matters, suffice it that before we make her acquaintance she has already lost one of her rolls of a hundred exposures through taking a shot at the picturesque figure of a Moorish peddler who objected to having his portrait taken, and, after attempted explanations, "angrily snatched the plate holder from her hand and deliberately unrolled the contents." Clever peddler! Must have met a roller slide before in his travels.

At the time we meet them they are consulting with their courier Antonio on the balcony of the inn, and by a strange coincidence we are told that "Thomas Winter" (the hero), "a young American journalist and magazinist, who was also an amateur photographer," is stopping at the same hotel, and of course overhears all their conversation, and equally of course makes use of it afterwards, as "journalists and magazinists" will. A portion of the conversation, of which Miss Eleanor has the monopoly, consists in light banter on the subject of the Magian's Tower—one of the sights the courier proposes they should visit. From a discussion of the antecedents of this place, which was said to be a relic of the School of Magic, for which Toledo was famed in the tenth century, Miss Thurston, with a view no doubt of exhibiting her general knowledge of science, works round *vid* the old astronomer magicians to Geber and algebra, thence to the alchemists, and finally, by an easy step, to "the black art" of photography, and ends by painting an imaginary picture of a secret chamber in the ancient tower fitted as a dark room and "hung with black velvet, a faint spark glimmering in a ruby glass suspended in one of those beautiful Oriental lamps." Surely rather a luxurious dark room for any but an American heiress.

But it happens by another curious coincidence that Mr. Thomas Winter has rented a story in the very tower which he actually uses as a dark room, and he is naturally moved to mirth at Eleanor's imaginative description of his fit-out, including as it does the "red lantern rigged from a penny candle and a broken Bohemian glass Cologne bottle." However, Antonio is enabled to assure her that she has hit the mark in her imaginings, since "the little Candida, daughter of the muleteer," who had penetrated into Winter's sanctum one day during his absence, had accurately described just such an apartment, and actually offers to show it to her. So much for our hero's case as an amateur photographer.

Eventually the Thurstons decide to accompany Antonio to the Old Cloister of San Juan de los Reyes, of course taking the detective; and thither also, of course, Mr. Winter innocently follows them with *his* detective. Admiring the interior architecture of the chapel, he hears voices, and through an *ivy-screened* window sees Eleanor flitting about, gracefully exposing film after film on the gems of beauty surrounding her. The photographer's instinct was too "strong," and despite the ivy—which the fair authoress appears to deem an advantage rather than otherwise—"soon has his plate carriers filled with different views of the same lovely subject." After this he feels a little ashamed to meet Eleanor face to face, so as her party are passing out he "dodges" them, leaving his camera and stand in the chapel. Eleanor presently makes a discovery—rather unusual with enthusiastic photographers—that she has forgotten her camera. We heard Captain Abney the other evening allude to having on one occasion left his lens behind, but it has remained for the imaginary Miss Thurston to do the thing properly, and leave what the showman termed the "whole bag of tricks." Of course, Antonio is sent back for it, and he naturally does what in real life we should have deemed an accident—but being fiction we know it to have been intentional, on the author's part at least—takes up Winter's apparatus, which is "very similar outside," and departs with it. Presently the latter reappears, and contentedly picks up Eleanor's "traps" and returns to his hotel.

This is really the gem of the romance. Could any ordinary person imagine two "enthusiastic," and presumably intelligent amateurs not knowing their own cameras? It is only justice to American manhood, however, to say that the authoress, who not improbably is acquainted with the kind, makes Winter discover the error first; but that is only when he finds a roll of a hundred pictures in place of a dozen glass plates in carriers. It is too late, however, to put matters right, for the Thurstons have gone and he cannot trace them.

Next the scene changes to New York, and we meet Miss Josie Winter, our hero's sister, in the boudoir of her bosom friend and school companion, Eleanor Thurston, our heroine—another singular coincidence; singular, in fact, in the deliberateness of its planning. Josie, imbued with the American notion of their own vastness, is surprised that Nelly "had not run across Tom in Europe;" but Nelly, who has seen some of it, sagely replies that "Spain is a large country." Speaking of Spain, Josie asks, "Have you seen his last story, *The Magian's Tower; or, Geber the Enchanter?* The critics say it is the most original thing," &c. Eleanor, *not* having seen it, was not aware that the mean fellow had made use of her for "copy."

Josie's object in life, it seems, has been to bring her only brother and her bosom friend together, in the full hope that something would come of it; but so far has not succeeded, owing to Tom's frequent absence from home and other reasons. Now she takes the opportunity of inviting her friend to come next Tuesday to witness the military parade from her windows, and before leaving discovers a frame of portraits of Nelly which are "too sweet for anything," and which are really the portraits Winter took in the Cloister at Toledo, which Nelly has had developed and printed with a view of endeavouring to find the real owner of the camera.

A day or two later Winter happens to be one of the party invited

to go on board "the steamer *Philadelphia*, chartered by the New York Society of Amateur Photographers," to witness the "naval display," and while manipulating his, or rather Miss Thurston's, camera, is annoyed by a female figure planting itself right in front of him, and presently recognises it as that of the "little photographer of the Cloister of Toledo," whose roll of photographs, by the way, he has developed and printed from. These pictures, not only in choice of subject, but also in artistic treatment, have already given him a deep insight into the character of the unknown artist whose acquaintance he has been anxious to make, and now the opportunity offers—and he is not slow to take it—of offering her back her camera, and arranging to call at her hotel, the Fifth Avenue, for his own. After her departure, however, it strikes him he even yet does not know her name, and the Fifth Avenue is a big place.

Next comes the day of the military parade, but the visitor does not arrive, and poor Josie records one more failure in her attempt to bring the two young people together. Winter, however, performs a feat with the camera; making a drop-shutter exposure on the crowd at the moment that it is opening to make way for an hospital ambulance with an accident case to pass, he recognises in the face of the victim—when the picture has been made into a lantern slide and thrown on the screen—that of the unknown lady of the Cloister, so next day he rushes off to the Fifth Avenue Hotel and all the hospitals, with the result that the only discovery he could make was that a young lady who had been brought from the Fifth Avenue Hotel had died in one of the hospitals the previous evening.

Returning home "stunned and inexpressibly shocked," he retires to his own sanctum, hearing merry voices, which did not suit his mood, in the parlour. Here his sister seeks him out and learns his sorrow; and he darkens the room and shows the portrait of his lost one, which she, of course, recognises, explains that Eleanor only fainted in the crowd, soon recovered, and was not even taken to the hospital, and is now downstairs anxious to see him. And so it all came right.

The story is cleverly written, and, so far as we recollect, we have never known photography to be so thoroughly, and in such a matter-of-fact way, exploited in fiction of any sort. The style in fact, if anything, errs on the side of being too matter-of-fact, as for instance when, in a description of the scene on the steamboat, the writer enumerates the cameras represented as "Kodaks, Scovills, Lilliputs, Blairs, and Clarks," and throughout goes generally into details that savour more of "shop" than "romance." Innumerable are the stories in which the painter's art occupies the position that photography does in this, and the doings and manners and customs of artists have been familiarised to us by many a score of writers, but never do we recollect to have been treated to an inventory of the names of the principal colourmen and dealers in artists' materials.

Of the improbabilities of the story we, of course, say nothing beyond this, that if they had been omitted and facts substituted the story would not have been told.

SILVER PRINTING BY SUBSTITUTION.

III.

THE method of printing in silver that is the subject of patent No. 5374, the specification of which is printed on page 170 of this volume, is a substitution process. It may be remembered that the inventor, Dr. Nicol, detailed the formula at a meeting of the Birmingham Society earlier in the year, and submitted specimen prints which elicited remarks of approval. I was not aware when penning the two preceding articles that the process had been patented.

In common no doubt with others I have perused the specification with a great deal of interest. The claims therein set forth are comprehensive enough to prohibit, in the existing state of our chemical knowledge, the possibility of any one but the patentee or his assignees from engaging in the commercial exploitation of a process of silver printing that depends for its practical working upon the action of light on numerous iron compounds, and the deposition of silver from its solution. I cannot boast an expert knowledge of patent law, which to all but a few is a profound puzzle (like several other laws), but I have to some extent gained a familiarity with the outlines of most of the researches and experiments in positive printing since the earliest days thereof, and as there are one or two features of the specification under review which seem to call for some explanation, I propose to take a short notice of them, but, of course, not in the least spirit of hostility or objection to the patent.

The inventor says: "Hitherto no means have been known by which when using ferric salts as sensitisers, and developing solutions containing silver salts, a print could be obtained the tone of which was such that toning with gold or other metals, followed by use of sodium thiosulphate, could be dispensed [with]. I therefore greatly simplify the operations involved, and add to the permanency of the finished prints."

I should take the foregoing to premise that a mixture of ferric chloride, alone or in combination, had been employed as a "sensitiser," and that the effect of applying aqueous silver nitrate to the picture was the formation of chloride which required to be fixed. I cannot find, however, that such a plan of silver printing was ever publicly experimented with. If that is the case—I am of course open to be corrected should my conclusion be ill-founded—the toning and fixing difficulties complained of never had any existence in fact; and the "means," &c., were not only unknown, but not sought after.

Mr. Willis has claimed for his platinum processes the use of many of the ferric compounds scheduled by Dr. Nicol in his specification. The latter gentleman applies to paper "a solution of normal ferric sodium citrate and normal potassium oxalate," but "sometimes uses ferric ammonium citrate or ferric potassium citrate; or the corresponding salts of tartaric acid, also ferric tartrate and ferric citrate," &c. &c. He has also used a mixture of ferric oxalate and ferric tartrate. Mr. Willis's patent, No. 2011, June 5, 1873, is based upon the fact that in order to convert an image obtained by the action of light on ferric oxalate paper into one of platinum it is necessary to have present, besides the salts of platinum, substances which, like the soluble oxalates, tartrates, and citrates, will increase the action of the ferrous salts. In patent No. 1117, March 15, 1880, he also speaks of improved developing solutions which may contain the citrate or tartrate of sodium, potassium, ammonium, or mixtures of these salts, which Dr. Nicol claims for "clearing solutions" in his silver process. Is it in accordance with the intention of the patent laws that the use of a number of ferric compounds may be claimed by two persons who employ them in producing platinum and silver pictures respectively? Thus, if Mr. Willis patents the coating of paper with a mixture of ferric oxalate and ferric tartrate, and the application to the image of a "developing" solution of potassium oxalate and a salt of platinum, can Dr. Nicol subsequently acquire a valid patent for a process which differs from that just outlined only in the replacement of the salt of platinum by a salt of silver?

The published experiments of Hunt, Herschel, Draper, Emerson-Reynolds, Phipson, Eder, and others, who between them have investigated the entire class of ferric compounds that appear to have any primary use in photography, and in particular those claimed by Mr. Willis and Dr. Nicol as sensitisers, while some of the chemists named took advantage of their discoveries and experiences to base thereon several printing processes which they described, these circumstances compel me to doubt if *anybody* now living can claim as his "invention" the use of surfaces coated with ferric salts for the production of photographic images. If I am wrong, then the number of printing patents that may derive existence from a common source is remarkable. Thus, starting from the sensitiveness of certain well-known iron persalts to light, claims for the use of paper coated with such compounds may be made for the production of, besides pictures in platinum and silver, others in gold, uranium, gallic acid (black image), potassium ferricyanide (blue), potassium permanganate (brown), and possibly, after a little experiment, of palladium (lately suggested as a toning agent), osmium, ruthenium, iridium, rhodium, and so on. Such claims might sustain attack, or might not; but the following quotation from the brief extracts which the editor gave us (page 49, *ante*) from a work on *Patent Cases* may help the reader to form his own judgment in the matter. "An application of an old or known article to an analogous purpose is not subject matter for a valid patent." Now ferric oxalate is certainly an "old" and "known" article, and there is an "analogy of purpose" between Mr. Willis's cold-bath platinum process and Dr. Nicol's silver process—namely, the production of positive pictures. I remarked previously

that Herschel is stated in 1842 to have coated paper with ammonio-citrate of iron, and to have deposited silver on the image formed; I remark now that Dr. Nicol, forty-seven years later, claims, among other compounds, ferric ammonium citrate as his "invention to be used for the production of photographic images in silver."

I had intended describing some experiments in printing on lines similar to those laid down by Dr. Nicol in his specification, but inasmuch as that gentleman has rather fully anticipated me, and has acquired patent rights over the results of his researches, it would not, perhaps, become me to persevere. Apart from the possible vulnerability of his patent, I hope to see Dr. Nicol's kallitype process submitted to an exhaustive trial, as I am convinced from my own attempts that very excellent pictures are to be had by the substitution method.

THOMAS BEDDING.

THE ART OF RETOUCHING.

CHAPTER VII.—THE STUDY OF THE FACE (*continued*).

BEFORE we leave the study and treatment of the eye, a few more remarks upon this important feature may not only prove opportune, but they may add considerably to the store of knowledge necessary to ensure the success of the beginner who seriously wishes to master the many little delicacies of the art of retouching. One should never desire to pass too hurriedly over a subject which is of such vital importance, and which, if but perfectly mastered, will lead the student into many grave errors, which will, in turn, more or less mar the chances of his ultimate success.

Beginners are very often disposed to either accentuate too strongly the indications of the eyelashes, thinking thereby to flatter the vanity of a weak-minded sitter, or else to obliterate them completely, producing as nearly as possible the effect as though they had been singed, and of course by so doing thus ruin the expression of the eye. Such an *unthinking* treatment (for no one who reflects for a moment upon the subject would do so) is of course fatal; no portrait subjected to such manipulation could ever prove satisfactory or successful. As for the upper edge of the lash, it should be very carefully softened into the lid, and the lower edge should graduate imperceptibly into the shadows which it throws upon the orb beneath it. In this treatment the drawing, as it were, of the lid must be seen through the outer portion of the lash, and must be quite distinct from it, although of course in a subdued and tender *tone*.

The form or shape of the pupil of the eye is altogether governed by the relative position of the head; in full-face portraits it is *round*, in profile it is *oval*, and can have all the intermediate degrees of form, as the face may be turned in half profile, three-quarter face, &c. These various changes in the position of the head will of course control the lighting of the eye, and great care should be exercised in this regard, or we will surely spoil the effect we are so anxious to secure.

As before stated, where not absolutely necessary, the retoucher should leave this feature as little worked upon as possible; but certainly he should know thoroughly how to treat it satisfactorily if obliged to take it in hand. We will therefore see what is best to be done in the case of our being obliged, from one reason or another, to at all touch the eye. We should start by placing a light upon the top light side of the iris, but not in such a manner as would attract too much attention or become too prominent. This light will be but a speck as it were, and somewhat of the shape of a wedge; and opposite this, in a direct line with the source of light, must be a longer light much lower in tone, and about the third of a circle in form, and taking the same curved direction as the iris; this will represent the luminous effect produced by the light striking on and passing through the convex form of the eye. A light, too, may be placed on the light side of the white fibrous membrane, but having a care not to block up the necessary shadow formed by the upper eyelid. A small light, proportionately subdued in tone, may be placed in the extreme corner on the shadow side where the lids intersect; a few judicious touches on the edges of the lids where the lashes begin may be placed with advantage in many cases, but he must not in the least interfere with the dark spaces between and formed by the lashes. In this manner, if successfully carried out, the life and expression of the negative may be greatly enhanced.

A word of warning may be offered to the student here, to exhort him to avoid falling into an error often made, not only by beginners, but very often persisted in by many retouchers of long experience—that is, of destroying the extremely delicate transparency of the skin immediately under the eye; every particle of half tone should be most carefully preserved, as it is really invaluable in imparting expression and softness to the eye. For men of *experience* in the art of retouching to be guilty of spoiling this portion of the face it may seem difficult to find an excuse, but really I feel sure in most cases it is the result of *thoughtlessness* more than any want of knowledge. This fact will furnish another proof of the necessity which I have tried to emphasise in the early part of this work for the student to be ever *thoughtful*, and always give full consideration as to the proper treatment of each and every head he may have to retouch. It is a certainty, if he consider for a moment, he will *never* obliterate those delicate effects of half tone, which not only mark the difference between a skilfully and *un*-skilfully lighted portrait, but which are also so potent in giving a lifelike expression to the feature under notice.

The lower lid, in the majority of cases, will be found to have two or three sharp and distinct lines under or upon it, and sometimes also a *furrow* under it. This latter will, of course, be greatly influenced by the lighting of the picture. If a strong top light prevail, it will become exaggerated to a most unnatural extent, and must consequently be considerably modified by the retouching, so as to assume a more natural and pleasant appearance. Care must be taken, however, not to reduce it too much, for by so doing, much of, if not all, the likeness may be completely destroyed. In many faces it is a positive mark of individuality, and must be preserved as such. Even when the light has been *carefully* arranged, and so diffused as not to unduly accentuate this furrow, there are other causes which may make it so strongly marked as to demand the retoucher's skill to rectify its defects. Sorrow age, pain, or excessive pleasure, will all cause this furrow to appear strongly marked, and in such cases *judicious modification* will greatly improve the picture.

Thus this furrow must always be subdued somewhat, but never totally removed, as an indication of it must always remain to help the expression of the eye. Those markings above it will require but little modification; should they by any means become too much diminished they impart a *dead* appearance to the eye. This should suffice for the treatment of the confessedly most difficult organ the retoucher can be called upon to exhibit his skill. I trust these remarks will be found comprehensive, as they are intended to be, for the full manipulation of the eye, although, once more let it be clearly understood, the less done to this feature the better. We can now pass on to another organ, one which seldom meets with due consideration from retouchers, and seems to be totally neglected by most photographers, yet still deserves as much attention as any other portion of the head.

This neglected feature is the *ear*. I cannot see any reason why it should be such a matter of indifference, not only to retouchers and photographers, but even to many artists. A close inspection of the productions of some of our most eminent photographers will, however, convince one that the *ear* has been to them a subject of the most accurate study. The argument of those who neglect this organ is simply that being without expression, and not an intellectual feature, it does not contribute to resemblance. Against the former portion of this argument there is little, if anything, to advance, but the latter, on close examination, can scarcely be considered accurate. The judicious posing of a head, whereby the ears are kept in their proper places, may not show them as at all aiding the likeness; but let us fancy the reverse of this. How many otherwise good pictures have we not seen totally spoiled by the thoughtless posing of the head, which brings the ears into prominence, and really imparts to the head an appearance that the oldest friend would fail to recognise? Is not this practically injuring the likeness?

Neither are all ears alike; and this fact alone should be sufficient to ensure for them some small measure of attention, as it must also prove to an extent that they must frequently contribute somewhat to resemblance. This feature when represented in full light—as, for example, in profile portraits, and to a somewhat less extent in three-quarter faces—demands great nicety and precision in its treatment, whereby the exaggerations of photography usually apparent in the ear may be modified. Attention should be given to preserve the natural softness

of the lobe, and the upper cartilaginous surfaces should be very tenderly treated.

In three-quarter and full-face views of the head, the retouching of the ear may contribute much to the perspective, while in profile it may be so handled as to give breadth and rotundity. It is not a very unusual thing to see the ear of a grown-up person, through thoughtless treatment, so badly distorted as to appear quite round and plump, like that of a child. Now, as the ear elongates as we progress in years, this effect should be modified in harmony with the rest of the face; and this is to be accomplished by increasing all the perpendicular cartilaginous lights, and thus give less breadth and better form to the ear. Of course, all these details should be carried out in such a delicate and skilful manner as not to result in giving undue prominence to this feature, for such would interfere largely with the excellence of our picture. There is not much more we can say upon this feature, save and except, perhaps, that the utmost care and thought should be used when treating it, also to leave it in as much half tone as possible, and so not attract the attention away from the other features, which to a greater extent hold the individuality of the face. This is a very essential point.

In working up a head, the preservation of half tone should ever be a primary consideration to the artistic retoucher, for without it his skill will never be properly appreciated. Half tone in a monotint (I presume we may class a photograph as such?) is what colour is in a painting. Besides, it is in the half tones and shadows that our work will show to the greatest advantage. Even when a negative does not possess much half tone we should try to create it by the skilful working up of the lights, and thus gain by *contrast* what we had not before we started work. Of course, all this is legitimately part of the retoucher's work, for I hold it, after all said and done, the object to be gained by the united efforts of the photographer and retoucher) is a satisfactory and artistic picture. And where, through one cause or another, the operator in his negative may have failed to secure variety of light and shade—in most cases not his own fault—we must, as I before said, struggle to perfect them by securing as much half tone as is possible, and which is often only practical by forcing up the lights and so procuring contrast.

The most casual observer will not fail to appreciate what an advantage it is when a certain degree of half tone pervades a photograph. It is this half tone distributed down the side of the head that gives not only the form to the cheek and shows up the ear to the greatest advantage, but also gives shape and intellect to the forehead, which without it would be a white unseemly patch from one side to the other. Besides, without half tone where will be the roundness of nature in your picture? What an advantage, too, will not a delicate shade be on the light side of the nose. Indeed, when we have it not, we should force a light on the cheek and also on the bridge of the nose in order to procure a little half tone. Since that is so, how careful should we be to preserve it when the skilful operator gives us a negative full of such useful detail! Notwithstanding all this, there are numbers of thoughtless people who dash off retouching, and at each stroke of the pencil obliterate what to the skilful retoucher, possessed of artistic feeling, would be an object of the greatest value.

REDMOND BARRETT.

MOUNTING PHOTOGRAPHS.

II.

In a previous article on this subject I referred to a few of the numerous mounting mediums in common use, and instanced cases where, if the best results were desired, certain of these mountants should be used in preference to the others.

To those workers who only now and again have a few prints to mount, and who do not care to be always begging favours of their landlady or cook in the shape of getting her to brew some starch or other mountant at most unearthly times (for when does it happen that the kettle is boiling at such times? very seldom, I fear), I can strongly recommend the following:—Procure from your grocer a supply of "flour of rice" (I don't mean rice starch), take two tablespoonsful, and with a little water work it up into a nice thick cream in a common bowl. When this is done, and it is seen that there are no lumps, go on adding water to the extent of about twenty ounces. Keep well stirred, and add a teaspoonful of powdered alum when quite dissolved. Take a suitable enamelled pot or other clean one, such as in Scotland we make our porridge in, stretch over the top of it a piece of coarse muslin, and pour through the same into the pot the rice-flour and water. While these operations have been going on a little gelatine, about twenty grains or so, is to be softened in clean cold water. When quite soft place this also in the pot and add thirty drops of oil of cloves. Place over a gas stove or bright fire free from dust, and bring gently to the boil, stirring well all the time. When the boil is reached the result will be a nice thin paste; if too thick it must be thinned down by the addition of water at this stage and gently boiled a little longer. I may just describe that when the paste assumes a thickness of the consistency of thin treacle, or when it will of its own accord permit its being poured from the pot direct into a wide-mouthed bottle, it will at the end of the operation be about right.

If it is seen that at this stage the paste is of the right thickness, add one ounce of alcohol, and when the same is well stirred and incorporated with the paste, pour the whole into a wide-mouthed pickle bottle, or I find a pyro bottle very useful, set aside to cool, and when quite cold you have a permanent mountant that will delight the heart of the most fastidious operator. Let me add, then, when cold and going to use it, the same should be taken out of the bottle with a spoon and placed in a saucer or cup and beaten up with the hog's-hair mounting brush, the bottle being carefully corked again till future use. A dirty or used brush should not be allowed to go into the bottle or remain there, as we so often see done with common gum bottles; if such little precautions as these are attended to the stock bottle will keep good indefinitely, and the amateur or professional, wherever he may be, will have on hand always a stock of as good a mounting medium as the world has ever seen. Quite recently a similar paste to this has been put into the market at a very high price—I think a six-ounce bottle costs a shilling. I have tried the two alongside each other, and for the life of me I cannot detect a difference, unless it be in the price. I can make a nice pot of stuff for a mere bagatelle. The flour of rice I purchase at twopence per pound, and I need not tell my readers the cost of the other ingredients. I find no difficulty in getting a supply of flour of rice. I mention this because a friend of mine to whom I gave this receipt told me he could not get a supply when his wife asked her grocer for it. Any good establishment ought to have it, but should any of the readers of the JOURNAL find a difficulty in this respect, just let them drop me a line and I will tell them where to procure it.

The colour of this paste is one of its great points, while it has very excellent adhesive properties. A print, if carefully brushed over round the edges, will never lift, provided the mount is what it ought to be.

So much for the mountant. Having in my last article described an effective method of mounting prints in quantity on to cardboard, I now proceed to give a few hints, which I believe are not generally known to the great bulk of amateurs, or professionals either for that matter, on the mounting of prints in optical contact on glass. "Of course every one knows how to mount in optical contact," I fancy I hear some of my readers exclaim; but just wait a bit, kind reader, what I am going to describe is not the oft-told tale of placing a sheet of glass in a solution of gelatine, and then, after soaking your print in a similar manner, squeegeeing them into contact.

This no doubt is a very excellent way, and when a large batch of prints have to be mounted is as good as any; but how frequently does it happen that just one print or so is required? and then to have to provide one's self with a hot solution of gelatine means just a trifle of labour and loss of time, which is always voted a nuisance, and sometimes leads to the decision, "I won't mount it in optical contact." Whereas, were it generally known that a print can be mounted in optical contact quite as well with the aid of cold starch or any other good mountant, and that there would be no bother in the operation at all, doubtless many more would be found who would utilise their spoiled negatives in place of using expensive cardboard mounts.

It is not my intention to enter into any discussion as to the merits of pictures mounted in optical contact as against other more artistic styles. I take it that there are always a number of workers who do admire a little of the "patent leather," as it has been sarcastically termed, and when I tell such that every spoiled dry plate may be washed off, and the glasses used to mount their prints upon in optical contact with an ordinary medium, such as starch, or the formulæ I have given, I have no doubt some of these may be interested when I briefly describe how to go about it.

First of all get your glasses thoroughly clean and dry, and be sure they are free from dust. When quite dry, brush over the surface of them a quantity of mounting medium: work this well on to the face of the glasses, and set aside for a few moments while you give a

similar treatment to the "*face*" of the print, which ought to be damp. When the face of the print has been well brushed over with the medium, it is placed face down on the prepared side of the glass. I feel it is at this stage that many have gone wrong in their attempts to mount their prints in optical contact with cold starch. Were a squeegee to be applied to the back of the print in this state, it is just about ten to one it would result in the tearing of the print by the friction of the rough surface of the back of the paper with the rubber of the squeegee; but once this difficulty is recognised, and a simple means adopted whereby some efficient lubricator is brought to bear on the back of the print that will permit of the squeegee slipping nicely along its surface without any fear of tearing, even when a fair amount of pressure is applied, the difficulty will be at once solved. I remember once when giving a demonstration to a photographic society how pleased a gentleman was to find what a little matter stood between him and success in his endeavours to put his prints on to glass by this means. Now the secret of success lies in not only brushing the cold mountant over the face of the print, but the *back* also. When the print is placed face down on the glass, take the brush and apply a good dose of mountant to the back also. This done, the squeegee will slide most beautifully, and no tearing of the prints results.

For many years I have mounted all my prints in optical contact in this manner, and have often smiled when being told that I used hot gelatine for it. I find my prints keep quite as well as those mounted with gelatine, and no one can tell the difference. If the face of glasses and prints are free from grit or grease there will be no slug markings. I can confidently recommend those who have a supply of old negatives or spoiled glasses to utilise them in this manner.

So much for placing the prints on the glasses. When dry, a neat appearance may be given to the pictures by binding round the edges of them a suitable coloured paper. Most artists' colourmen keep a supply of gold and other coloured papers, and a few pence will acquire a sufficiency of such to bind a lot of pictures. Having made up your mind as to the colour of the paper, cut even strips of same about one inch broad, and having provided some cardboards the same size as the pictures as a backing, (or another spoiled glass the same size as the picture will do equally well), bind them together just like a lantern slide. When dry, a small ring or piece of ribbon may be attached to the backs to hang the picture by.

Such is an effective and economical way of mounting many photographs that otherwise would be discarded or consigned to the waste-paper basket for want of framing. I have seen such when presented to some little message boy afford the utmost delight possible, and after all costs almost nothing but a little labour. T. N. Armstrong.

PHOTOGRAPHIC LENSES.*

The various applications of lenses to different purposes will indicate the most appropriate directions in which to work to accomplish this. For very rapid lenses, such as are used in portraiture, it is necessary to pay strict attention to the aplanatism of the central pencil, and choosing such forms as are best suited to eliminate curvature of field, astigmatism, and distortion, but these latter are made subservient, in the main, to those of rapidity. When, however, aperture may be sacrificed, we are enabled to lay greater stress on the three latter considerations, but in every case the skill of the optician consists in the best compromise among the effects of aberration.

We have seen that a single glass lens can neither be achromatic nor aplanatic for parallel rays, but we have found that a single lens can be made achromatic by combining it with another lens of different dispersive power, the condition for axial achromatism being merely one of the correct relation between the focal length of the lenses or their powers. Let us now examine the condition for aplanatism by combination with another lens.

In the first approximation combining two lenses we have

$$\frac{1}{v_1}=\frac{1}{f_1}-\frac{1}{u},$$

$$\frac{1}{v_2}=\frac{1}{f_2}+\frac{1}{v_1}=\frac{1}{f_1}+\frac{1}{f_2}-\frac{1}{u},$$

so that if the lenses are in contact, the effect is the same as one lens equal to the *algebraical sum* of the *powers* of each. If the second lens was negative, for example, we should get

$$\frac{1}{v_2}=\frac{1}{f_1}-\frac{1}{f_2}-\frac{1}{u};$$

and with any number of lenses—

$$\frac{1}{v_n}=\frac{1}{f_1}+\frac{1}{f_2}+\ldots\ldots+\frac{1}{f_n}-\frac{1}{u}.$$

* Concluded from page 293.

We have found a second approximation for a single lens showing the aberration, and for our purposes here this may be put under a more convenient form.

Since $$\frac{1}{u}+\frac{1}{v}=\frac{1}{f},$$

let $$\frac{1}{u}=\frac{1}{2f}(1+a), \qquad \frac{1}{v}=\frac{1}{2f}(1-a),$$

and $$\frac{1}{r}+\frac{1}{s}=\frac{1}{\mu-1}\frac{1}{f};$$

$$\frac{1}{r}=\frac{1}{2(\mu-1)f}(1+x), \qquad \frac{1}{s}=\frac{1}{2(\mu-1)f}(1-x$$

If we then find the values of

$$\left\{\left(\frac{1}{r}+\frac{1}{u}\right)\right\}^2 \quad \text{and} \quad \left\{\left(\frac{1}{s}+\frac{1}{v}\right)\right\}^2$$

we obtain the second approximation in a more convenient form after the necessary reductions, viz.:—

We have at the first lens,

$$\frac{1}{v_1}=\frac{1}{f}-\frac{1}{u}+\frac{1}{\mu(\mu-1)}\left\{\left(\frac{\mu+2}{\mu-1}\right)x^2+4(\mu+1)\,x+(3\mu+2)(\mu-1)\,a^2+\frac{\mu^3}{\mu-1}\right\}\frac{y^2}{8f^3}.$$

This may be written

$$\frac{1}{v^1}=\frac{1}{f_1}-\frac{1}{u}+\omega_1 y_2,$$

and, on passing to the second lens,

$$\frac{1}{v_2}=\frac{1}{f}-\frac{1}{u}+\omega_2 y^2=\frac{1}{f_1}+\frac{1}{f_2}-\frac{1}{u}+(\omega_1+\omega_2)\,y^2,$$

and, in general,

$$\frac{1}{v_2}=\frac{1}{f_1}+\frac{1}{f_2}+\frac{1}{f_3}+\ldots\ldots\frac{1}{f_n}-\frac{1}{u}+(\omega_1+\omega_2+\ldots\ldots\omega n)\,y^2.$$

The object, then, for aplanatism is to make

$$\Sigma\omega=0.$$

Now, this can always be done by assuming a definite ratio between the radii of one lens and finding the ratio between the radii of the second that shall destroy the first aberration.

Now, if we call r_1 s_1 the radii of the first lens, and r_2 s_2 the radii of the second lens, and take a form of aplanatic combination, such as the rapid rectilinear, in which both front and back combinations are identical with cemented and identical contracts.

Here s_1 and r_2 are identical except in sign, and if the glasses chosen are suited, there is only one form for the best correction for spherical aberration. The ratio of the powers is a constant, and therefore by a proper substitution in the above equations this construction becomes a simple matter. The question evolves itself into a simple quadratic, one root of which is usually imaginary. Should both be imaginary, the glasses are unsuited to the purpose, and a symmetrical system cannot obtain.

The front combination alone, with its convexity towards the object for the oblique pencils, has a powerful coma-*in*, and the back combination alone, with its concavity outward, a powerful coma-*out*. The two in the combination have the effect of counterbalancing one another, more or less according to the selection of suitable material. The residuum effect of aberration for the oblique pencils being visible as astigmatism or curvature of field, but distortion is destroyed. A proper selection of the new glasses certainly enables improvements in both these respects with larger apertures than was formerly possible.

For the elucidation of the possibilities of producing combinations of large aperture suited to portrait work, at a period, too, when rapidity was of the utmost importance, we owe a great debt of gratitude to the prince of mathematical opticians, Professor Petzval. His portrait combination, known to you all, was a triumph, and the result of pure analytical investigation. He proved to working opticians the possibilities of vast improvements in the instruments then made, and also confirmed them in many of their geometrical and practical deductions.

I have made a drawing (which is seen on the screen), tracing the course of the rays through a Petzval combination for the oblique as well as the central pencil, and it serves to show how perfectly the mathematical elegance—perhaps I should say labour—brought to bear on this subject corresponds with the general principles then known and worked upon for the best relation to exist between the incidence and emergence of the various pencils to form a distinct image.

I think I may be allowed to mention here, with pardonable pride, my late father's improvements in lenses generally since that period, and particularly with respect to his portrait combination. It was a great advance on that of Petzval, not only for greater covering power, but for

strict mathematical capabilities. You are well aware that a lens that is free from spherical aberration for parallel rays is not so for nearer objects, but becomes what is called over-corrected for spherical aberration. Now, in addition to better optical perfection, the form of the back combination, by a mechanical contrivance of separating the back flint from the crown, will correct or counterbalance the over-correction for nearer objects if necessary, or may, on the other hand, be so far removed as to introduce, according to taste, a considerable amount of positive spherical aberration that was first asked for by the late Mr. T. R. Williams to soften the biting sharpness of lenses when required to produce more artistic results.

In slower lenses, where rapidity is sacrificed, a judicious selection of the powers of the elements in the combination or combinations, and arranging their curvature so that, as in the case of achromatism, the pencils at incidence and emergence are similarly treated for every part of the lens, so do we arrive at better perfection of the image, until the maintenance is so perfect that it becomes a parallel with an imaginary pinhole (without diffraction), the aperture or intensity being as great as possible consistent with this perfection.

To conclude, as photography for utilitarian purposes in the sciences and commerce require our lenses to attain the highest mathematical precision, no less does art—and photography is rapidly gaining ground as an art—require the optician to handle the subject in an equally intelligent manner to give to those instruments wider capabilities.

T. R. Dallmeyer.

AN EASY PRACTICAL METHOD OF FINDING THE FOCUS OF AN OBJECTIVE.

The practical photographer is naturally no friend of complicated calculations; he prefers a purely practical method of ascertaining the focal length of his objective. Unfortunately, these purely practical methods are not always so simple, and this is particularly the case with the well-known rule of focussing the camera first for a distant object, and then focussing a measure in such a way that the image appears exactly of its natural size on the focussing screen, when the difference of the two positions gives the focal length. Theoretically, this is as correct as it is simple. Any one, however, who has attempted to focus an object exactly its natural size knows what kind of job it is. If it appear too small on the screen one must go nearer with the camera, and then focus again. The image is now, however, just as likely to be too large as it was too small before. The process must then be repeated, and one may congratulate oneself on extraordinary good fortune if one succeed in obtaining a satisfactory result after half an hour's trouble and annoyance. Really accurate it will not be even then. Belitsky's method consists of comparing the objective whose focal length it is desired to measure with another, by focussing both for the same distant object, in which case the two focal lengths bear the same relationship to one another as do the two resulting images. But for this is required an objective the focal length of which is accurately known. Few professional photographers, however, know exactly the length of any of their objectives, and amateurs are usually masters of one, and desire a means of ascertaining the focal length of this one. I will therefore proceed to give a method by which the exact focal length can be ascertained without fail, and which involves only two focussings and a single multiplication.

The camera is first focussed for infinity, *i.e.*, on a very distant object, and the position marked on the slide. It is then pointed at a near rectangular object of easily measurable dimensions—preferably a measure—in such a way that the image falls on the middle of the screen, accurately focussed, and the position again marked on the slide. In this position the object—the measure—is photographed, and this photograph enables the operator to estimate how much smaller are the dimensions of the image than those of the object itself. Multiplying the distance between the positions of the two different focussings by this factor will then give the focal length. A few examples, in which a meter rod is supposed to be the object photographed, will make the matter clear.

Example 1.—100 mm. of the meter rod measure on the photograph 73 mm., and the distance between the two focussings is 19 cm. The focal length will be:—

$$f = 19 \times \frac{100}{73}\text{ cm.} = 26{\cdot}03\text{ cm.}$$

Example 2.—100 mm. of the meter-rod measure on the photograph 21 mm., and the distance between the two focussings is 5·5 cm. The ocal length will be:—

$$f = 5{\cdot}5 \times \frac{100}{21}\text{ cm.} = 26{\cdot}14\text{ cm.}$$

Example 3.—100 mm. of the meter-rod measure on the photograph 10·2 mm., and the distance between the two focussings is 2·7 cm. The focal length will be:—

$$f = 2{\cdot}7 \times \frac{100}{10{\cdot}2}\text{cm.} = 26{\cdot}47\text{ cm.}$$

In all three cases the real focal length was actually 26 cm. As will be observed, the accuracy attained in the second case is quite sufficient—the error not amounting to more than $\frac{1}{13}$; in the third case the difference amounts to $\frac{1}{9}$; while the first instance will satisfy the most excessive demands. It follows that the measure ought to be photographed as large (*i.e.*, as near the natural size) as the camera admits; but even where the camera cannot be lengthened above a quarter of that distance practically sufficient accuracy may be reached. F. Stolle.

—*Photographische Nachrichten.*

Foreign Notes and News.

The Veresez controversy is still in progress in Germany, and the longer it continues the more does it become evident, as we and some of our French contemporaries suggested at the time, that nothing new has been discovered. Herr H. W. Vogel now comes forward from the Charlottenburg Laboratory, where he has been comparing Herr Veresez's results with the originals of which they were purported to be copies, and has found that the colours reproduced only bear a distant resemblance to their prototypes. Herr Veresez's results thus appear to be not only not new, but, in respect of correctness, scarcely as good as the results obtained by earlier workers.

The general interest awakened by the publication of Herr Veresez's results have, however, had the effect of inducing several other workers to take the subject up—notably Herr Gadicke and Dr. Miethe.

Herr Gädicke appears to have made some progress in fixing the results, twenty minutes' exposure to sunlight being mentioned as having been successfully withstood by the colours without alteration. Even this improvement in fixing would appear, however, to be not altogether new, as some similar results appear from *Poggendorff's Annalen* to have been obtained by Rose many years ago.

Dr. Miether employed a method differing somewhat from those hitherto employed. He exposed an ordinary chloride of silver collodion emulsion containing excess of silver to the light. After some hours' exposure a brown precipitate settled to the bottom, from which the collodion was poured off. This collodion he employed to sensitise paper, and found that he obtained very brilliant colours, which were, however, not permanent.

The Brunswick Photographic Society, the formation of which we mentioned some time back, appears to be in a flourishing condition, numbering already some forty members. The first meeting was held on April 16, when Professor Müller delivered an address dealing with the value of photography in forensic practice, and also with recent improvements in micro-photography. A number of Hartz landscapes and various kinds of apparatus formed the exhibits.

A photographic tour through the "Giant Mountains" has been arranged by Herr F. Pietschmann in conjunction with several professional colleagues for the middle of June. We do not know if English brethren are permitted to join the expedition, but if they are, a pleasanter way of spending a holiday for the professional or amateur photographer could scarcely be devised, for in Germany they know how to make these sort of tours agreeable.

The editors of the Vienna *Photographische Rundschau* and the Berlin *Photographische Mittheilungen* do not appear to cherish feelings of very strong affection for one another, and there is something quite American in the way in which they are occasionally pleased to exchange amenities. The former journal appears to have criticised the Berlin Exhibition unfavourably, and is now carring on an "agitation" which we may presume is disagreeable to the *Mittheilungen*, for this publication points out to its readers that the editor of the *Rundschau* was expelled from the Berlin Society for the Promotion of Photography, and accuses him further of having falsified the election returns for the Committee of the Vienna Society! "*C'est magnifique, messieurs, mais ce n'est pas la guerre.*"

Chicandard gives a useful practical method of testing the purity of commercial sulphite of sodu. Add excess of barium chloride to the solution;

if the resulting precipitate does not dissolve completely in hydrochloric acid the sulphite of soda contains sulphate. We give this as useful, not as new.

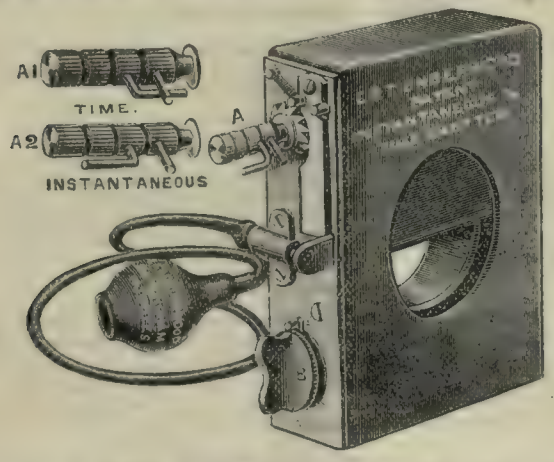
The New York Society has introduced what appears to be a very practical method of dark-room illumination. An incandescent electric light is arranged inside a glass globe which is filled with an aqueous solution of red colouring matter. The light is said to be very bright and non-actinic.

The current number of the *Photographische Mittheilungen* contains a short but highly interesting paper, by Professor H. Cohn, on the employment of photography in the diagnosis of diseases of the eye. Herr Cohn's method of diagnosis depends on the measurement of the radius of curvature of the cornea, which varies with different conditions of the eye. The impressions were taken with magnesium flash light, and appear to have been fully as satisfactory as those obtained by Helmholtz's costly and tedious method.

Our Editorial Table.

Underwood's Patent Shutter.

We are now in a position to give a detailed description of the new shutter of Messrs. E. & T. Underwood, to which we have already made reference a few weeks since. As will be seen from the cut, it acts on the principle of the roller blind. When the milled handle, A,



is wound up to the top the shutter is then set, and is ready to be discharged by pressure upon the pneumatic ball by which the catch is thrown out from the ratchet wheel. The rapidity of the descent of the shutter (in which there is an aperture the full width of the lens) is determined by the degree to which the propelling spring is wound up by the thumbscrew shown at B. The arrangement for time *versus* instantaneous exposures is very ingenious, and also very simple. For *time* exposures it suffices that a rectangular bent wire projecting from the handle A be turned as at A1, when upon pressing the ball the shutter in descending is arrested at full opening, where it remains until liberated by a second touch upon the ball by which the exposure is terminated. For "instantaneous" exposures it is only requisite that the angle wire be turned as at A 2, when the descent of the shutter is made without a break. The shutter consists of a riband of flexible material impervious to light, and is attached by each end to two rollers working inside the case. We have had the shutter in use, and find it fulfils everything claimed by the makers.

Photographic Annual and Catalogue.

By Jonathan Fallowfield.

This thirty-fourth *Annual and Catalogue* of Mr. Fallowfield is unmistakably the largest that has ever been issued, not only by himself, but any one else, as it contains no fewer than 432 pages, thus exceeding by a good deal anything in this line yet achieved, even by the American dealers, and they, we know, issue catalogues which are acknowledged to be "immense." This one has been compiled with much labour, and in doing so Mr. Fallowfield has laid under contribution almost all the leading manufacturers of apparatus and appliances in general. We find here the lenses of nearly every maker, both at home and abroad; cameras of all classes and for every purpose, including photo-micrography; shutters with every variety of name, descriptive and otherwise; tents, dry plates, and lanterns. There are numerous attractive designs for *carte* and cabinet mounts; descriptions of sensitive papers, and directions how to use them; chemicals, and many other things. The *Annual* is copiously illustrated with cuts of cameras and apparatus, and it contains many useful hints on practice, together with a well-arranged index.

A Platinotype Actinometer.

For printing platinotypes or other pictures of which the platinotype is a type, Mr. A. Spurge, of Milsom-street, Bath, has introduced a convenient little actinometer which serves the purpose in an excellent manner. Its nature will be ascertained from the following extract from the directions for use:—"Lay a small piece of platinotype paper —about three inches square—under the principal object in the negative; place a piece of silver sensitised paper in the actinometer, and put it to print by the side of the frame containing the negative; when the platinotype paper has been sufficiently exposed, which must be judged by examining it in the usual manner, develop and wash it; if, when dried—which may be done before a fire or in the sun to save time—the exposure is found to have been correct, note the last letter just visible on the paper in the actinometer; other prints can then be taken of exactly the same depth as the trial one, if care is taken to expose until the same letter as before is equally visible each time." The actinometer is in the form of a miniature printing frame.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 6984.—"Improvements in Apparatus for Developing and Fixing Photographic Negatives." H. Silbergleit.—*Dated May* 6, 1890.

No. 7010.—"Improvements in Photographic Cameras." Communicated by L. Lumière. Complete specification. B. J. B. Mills.—*Dated May* 6, 1890.

No. 7066.—"An Improved Method of Actuating Photographic Shutters." W. G. Tweedy.—*Dated May* 7, 1890.

No. 7159.—"Certain Improvements in Hand or Detective Photographic Cameras." R. Mercer and A. J. Mercer.—*Dated May* 8, 1890.

No. 7236.—"A Method of Changing Plates in Changing Photographic Cameras." E. S. Miller and E. C. Hawkins.—*Dated May* 9, 1890.

No. 7248.—"An Improvement in Photographic Shutters." H. R. Hume.—*Dated May* 9, 1890.

PATENTS COMPLETED.

Improvements relating to Photographic Cameras and to Apparatus for use in connexion therewith.

No. 5337. William Henry Smith, Upton-villa, Beckenham-road, Kent, and William Willis, Bromley, Kent.—*March* 8, 1890.

Our invention relates to photographic apparatus, and one of its objects is to provide improved means whereby sensitised plates or films may be conveniently transported, and may at any time be inserted in and removed from the camera without liability to exposure of the said plates or films to light.

Our said invention, moreover, comprises an improved shutter, hereinafter described, for facilitating exposures of short duration.

For holding the sensitised plates and transferring them as required to and from the camera we employ a holder or dark slide, which comprises a metal sheath or case, one end of which is open and is firmly attached to one side of a tube having slots therein, through which the plates may be inserted in and removed from the said sheath. In the said tube is fitted a plug or shutter of any suitable material. This plug is so formed that the portion thereof which corresponds with the slots in the tube is semicircular or of other convenient shape in transverse section, so that it will, in one position, close the opening or mouth of the sheath or case, and thus exclude light; but by turning the said plug about its axis through a greater or less angle a clear way through the slots and the open end of the sheath may be made, through which the photographic plate can be inserted or removed.

Our improved dark slide is very compact and can be cheaply manufactured. Moreover, the said dark slides can be very closely packed, so that a large number of them may be contained in a comparatively small space.

To provide for the use of our improved dark slide on a camera, we attach to the said camera a tube or portion of a tube with a slot in it through which a plate may pass into or from the camera; this tube is of such internal diameter that the tube on the aforesaid sheath or case will accurately fit and slide in it. The tube or socket on the camera is, moreover, provided with a slot throughout or nearly throughout its length to admit the sheath or case, so that the dark slide can be readily applied to or removed from the camera. When the dark slide containing the plate is slid into position in the aforesaid tube or socket, and the plug is turned by a key or otherwise through the required angle, the plate will fall through the slot in the said tube or socket into the camera; grooves or other suitable means are provided in the camera to hold the plate in a proper position therein. To remove the plate from the camera, the latter is inverted, and the operations above described are performed in the reverse order.

In some instances we provide a key or other device in one end of the tube or socket on the camera, so that by turning the dark slide through the required angle after it has been inserted in the said tube or socket, the said dark slide may be opened and closed.

In other instances we arrange within the tube or socket on the camera another slotted tube capable of revolving therein, and adapted to receive the tube on the sheath. Then, by arranging in a proper position the key or other device for opening and closing the dark slide, we are enabled to insert the sheath in the tubes on the top or side of the camera in a plane parallel thereto, and then by turning the said sheath about the axis of its tube the opening of the sheath will be effected, and the slots in the tubes brought into line with each other, thus permitting the plate to fall into the camera. When the plate has been thus transferred to the camera the sheath may be turned back so as to be parallel with the top, and therefore out of the way, or when in this position, it may be altogether withdrawn, the slot in the camera, when the inner tube is in this position, being closed by the said inner tube.

We sometimes provide the camera with means for attaching a dark slide to the top thereof, and another dark slide to the bottom thereof, one for the insertion of the unexposed plates into the camera, and the other for the reception of the exposed plates from the camera. We can employ with a camera any desired number of interchangeable dark slides constructed as above described.

If desired, we provide means whereby the sliding of the tube on the sheath into the tube or socket on the camera will effect the opening of the dark slide.

We sometimes employ a slotted tube or socket similar to that above described in combination with a dark slide of ordinary construction (or with a receptacle similarly used), so that plates or films may be inserted therein and removed therefrom by means of our improved dark slide without risk of exposure of the said plates to light.

Our improved dark slide is constructed to contain a single plate, or is adapted to contain and consecutively deliver more than one plate. In the latter case the dark slide is provided with grooves or other devices for keeping the plates apart, and is made reversible in the tube or socket on the camera.

We sometimes provide for facilitating the removal of the camera from a tripod for the purpose of inverting the camera to change plates by means of our improved dark slide, and for permitting the removal and replacement of the camera without risk of altering a position already secured by the tripod. For this purpose we provide on the under side of the camera a projection, or block of wood or metal having parallel sides. This projection fits into a suitable groove or opening in the tripod-head, or preferably in a turntable which is attached to the tripod-head, capable of being partially closed so as to tightly clamp the said projection. The closing of the sides of the groove against the said projection may be accomplished by means of a spring, screw, cam, or eccentric, or otherwise.

Our improved shutter for effecting exposures of short duration comprises two plates or pieces of metal or other suitable material, each having the inner end V-shaped, and its outer end provided with a projecting pin or stud. These pins or studs slide in cam grooves formed in a bar of ebonite, or other suitable material, acted upon by a spring, whereby it is partially rotated, to open and close the shutter.

If the shutter is applied to a lens of the doublet or rectilinear type, the slides are preferably arranged to operate between the lenses, the mount of the lens being cut or divided for the purpose of admitting them. When the shutter is closed the V-shaped ends overlap each other, and when the shutter is opened so far as just to admit light through the lens, the aperture thus formed should be central in respect to the lens. These V-shaped shutters slide easily over one another in grooves, and on being operated they first of all recede from one another until the maximum aperture is given to the lens, and afterwards approach each other until the aperture is closed. The aforesaid grooved bar is preferably fitted to turn on the mount of the lens. A catch with a trigger forms a convenient means for releasing the spring for operating the shutter. A suitable device is provided for winding up the said spring. We prefer to use for this purpose a ring or annular piece fitted to turn in a box or case enclosing the said lens. The duration of the exposure may be regulated by winding up the spring more or less as may be required.

Improvements in the Production of Developers for Photographic Use.

No. 9265. Henry Williams Jones, 17, White-street, Coventry.—*March 8, 1890.*

The nature of the said invention, described as "Improvements in the production of developers for photographic use," is to produce a portable and permanent photographic developer, consisting of a specially prepared compound of hydroquinone in a compressed state.

To accomplish this, I take crystallised sulphite of sodium or similar alkaline sulphite, but I prefer to use the ordinary sulphite, and I heat this until it fuses, and until all water of crystallisation has been driven off. The dry mass is then ground with an equal weight of hydroquinone, or other similar proportion, but I prefer an equal weight, and one-tenth part of the whole of bromide of sodium added. The mixture, after being thus made, is wetted with aqueous sulphurous acid, and then partially dried, and whilst still damp forced through a sieve of forty meshes to the inch, and dried at a gentle heat, by which means the compound is obtained in small dry granules. The compound thus formed is made into tablets, or circular discs, or pellets, by a powerful press.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The production of a compound, formed from alkaline sulphite, as sodium sulphite, which I employ, hydroquinone and alkaline bromide, as sodium bromide, which I employ, the same compound being produced in the dry granular form, as and after the manner described. 2. The formation of the compound hydroquinone produced after the manner described, into pellets, or tablets, or discs, by pressure exerted by a steam or other form of press.

Improvements in Apparatus for Copying by Photography.

No. 9403. Archibald Barr and William Stroud, Yorkshire College, Leeds, Yorkshire.—*April 12, 1890.*

Our invention has reference to the copying, by means of photography, of pictures, drawings, book illustrations, and the like, more especially for cases in which it is desirable to have the reproductions or negatives all of one size, or restricted to a very few definite sizes. Now, the object of our invention is to provide an apparatus by means of which such copying may be effected with ease, rapidity, and accuracy.

Such an apparatus should provide or consist of means, 1°, for properly supporting the book or picture; and 2°, for supporting the camera and adjusting the same at the proper height and distance and in the proper position with reference to the picture, and also for focussing the same. One of the most useful cases to which our invention may be applied is the production for lecture use of lantern slides of illustrations from books, and we shall describe our invention with reference to such use, as this, perhaps, best illustrates and ascertains the nature of our invention.

An apparatus constructed in accordance with our invention consists, in the first place, of a holder or support for the book. Such holder may conveniently consist of a box-shaped frame, open at the front and provided at the back with two sliding boards, arranged so that they can be simultaneously and to an equal extent moved towards or from a central vertical line. The upper edges of the boards may be arranged to move in a narrow groove in the under side of the top board of the frame, close to the back edge thereof. The lower edges of the sliding boards may be similarly fitted to slide in grooves in the bottom of the frame, or provided with lugs or bosses fitting on a tubular or plain slide or guide bar. The two sliding boards are so connected together that they are constrained to move simultaneously, and to an equal extent, towards or from the centre vertical line (in which their inner edges would meet if closed up). This may be effected by suitable link mechanism, but is, perhaps, most conveniently carried out by providing each sliding board at its lower end with a tapped or screwed boss or socket, fitting respectively on opposite (i.e., the right and left hand) side portions of a quick pitched right and left-handed screw. In this case a guide for the lower edges of the sliding boards, as above mentioned, is unnecessary. The book, opened to the page containing the illustration to be copied, is placed with this page against the back sliding boards, which have been opened the necessary distance so as to expose the illustration to be copied. The opposite page of the book is laid on the top board of the frame at the back thereof, and a pointer or index attached to one or other of the sliding boards facilitates the adjustment of the boards to give the proper opening, the size of which may have been previously ascertained by measurement from the illustration. A couple of Argand gas burners or other source of light, placed one towards each side and towards the front of the frame, supply the necessary illumination for the picture, the front of the frame being, of course, covered in so much at each side as to exclude the direct light from the lens of the camera. Instead of using artificial light, the frame may be arranged and placed so as to expose the illustration to be copied to daylight.

The second part of our invention relates to the means for supporting, adjusting, and focussing the camera. The camera is supported by mechanism for adjusting it to the proper height (to be afterwards described), from a frame or carriage capable of being moved on a railway or longitudinal guide, so that the centre line of the camera may be moved to and fro in a direction at right angles to the back of the frame or book holder (i.e., to the illustration to be copied). An index or pointer attached to the carriage or frame, and a scale of equal parts fixed on the side of the railway or longitudinal guide, enables the camera to be at once adjusted at the proper distance from the book holder to produce a negative of the desired size.

The scale is most conveniently graduated and marked according to the longest dimension of the picture to be copied, so that when the camera is placed with the index opposite this division the image of the picture in the camera will be of the desired size.

The camera is supported from the carriage or frame by means of a parallel motion, so constructed as to keep the camera in a perfectly horizontal position, both longitudinally and transversely, and preferably so as to constrain the camera to move in a vertical line, so that its up-and-down motion may not affect its distance from the book holder. Such a parallel motion may consist of two pairs of hinged boards (or equivalent link connexions), the angular or radial movement of the one pair being at right angles to the angular or radial movement of the other pair. Or the two pairs may be arranged with their angular or radial movements in the same sense or direction, in which case a vertical guide and a connecting board or rods joining the middle hinge are required, in order to keep the camera perfectly horizontal in a longitudinal direction. The lower boards hinged to the carriage or frame may further be prolonged below the point or axes at which they are hinged to the frame or carriage, and carry a balance weight or weights to facilitate the raising and lowering of the camera. Or a spring may be introduced so as to balance or partially balance the weight of the camera. Such spring may be conveniently introduced at the hinge connecting a pair of radial boards or frames. A pointer attached to the camera and a vertical scale of equal parts fixed to the carriage or frame facilitates the adjustment of the camera to the proper height, a scale of equal parts being also attached to the inner edge of one or both of the sliding boards of the book holder, for reading off the requisite height of the camera. The moveable or negative end of the camera is provided with a pointer or index, and the base of the camera with a scale of reciprocals for facilitating the focussing of the camera; the graduations and markings of this scale being made to correspond with those of the scale indicating the distance of the camera from the book holder. By the arrangement of scales described, if a picture, for example, having twelve inches as its longest dimension is to be reproduced, the camera is to be moved to the mark 12 on the railway, and the back end of the camera to the mark 12 on the baseboard of the camera.

Provision may be made for securing the camera in any position in which it may have been adjusted.

In order to facilitate the use of the apparatus for the production of positives from negatives, provision may be made for supporting the negative in the same position as that described for the book holder; or provision may be made to

alter the position, and a second pointer or index attached to the camera carriage at a distance from the other equal to the distance between the front and back of the book holder.

To support loose drawings, photographs, pictures, we may provide a board to which they may be fixed, such board being furnished with a ledge, or brackets at right angles thereto, so as to rest upon the top board of the frame.

Improvements in Photographic Cameras.

No 7347.—Richard Williams Thomas, 121, Cheapside, London.—*April* 19, 1890.

My invention is principally designed for cameras for taking instantaneous photographs.

I construct my improved camera with two lenses, and preferably in the shape of an ordinary field or opera glass, one side being fitted with a lens and focussing glass, and the other side being provided with a lens and also suitable arrangements for the dark slide and shutter. The two sides are joined together and worked backwards and forwards by means of a screw, as in an ordinary field glass, and the lenses in each side are so arranged that by movement of the screw both are focussed at the same time. The shutter is connected with a catch or spring fixed or projecting to or near the wheel or thumbscrew by which the screw is worked.

To bring my invention into use, the operator places in the side of the camera arranged for the purpose a dark slide containing the plate, which he arranges ready for use. He then looks on the focussing glass in the other side of the camera, and regulates the screw until he secures the required representation on the focussing glass, and then releases or touches the catch or spring connected with the shutter, which causes the shutter to open and close.

By means of my invention the operator is able to see the object at the time he takes the photograph, and the risk of failure is thereby minimised.

[In what respect does this differ from the *Jumelle* or "opera-glass camera" of Geymet & Alker, described, with an engraving, in our Journal of April 9, 1869?—Ed.]

Improvements in Cameras for Making Lantern Slides or Copying Photographic Pictures.

No. 7983.—Walter Griffiths, Highgate-square, Mosely-road, Birmingham.—*April* 19, 1890.

My invention consists in a new and more convenient arrangement for holding photographic negatives or positives—lenses and sensitive plates for the production of lantern slides, transparencies, or other copies of the aforesaid photographic negatives or positives—in such a way that the instrument is always ready fixed as regards the required size, the required position, and the required focus of the said photographic picture, and without the necessity of any preparing whatever, as distinguished from the ordinary methods and necessities in producing lantern slides and transparencies.

I carry out my invention as follows:—

The focus of the lens to be used having been discovered or determined, I prepare a tube, preferably square, and of the length to suit the said focus.

This tube may be of any suitable material, such as wood, metal, millboard, or strawboard, &c., or a combination of these materials; as an instance, I use wood, strawboard, and cloth combined.

Into one end of this tube, which I will call the "front," I fix a grooved frame, into which to slide the photographic negative or other plate, and which is thereby held in the required position.

These grooves are made to fit any one size of plate, such as the standard photographic sizes—$6\frac{1}{2} \times 4\frac{1}{4}$, $8\frac{1}{2} \times 6\frac{1}{2}$ inches, &c.

Immediately in front of this groove I place, if required, a second groove, into which may be inserted a ground glass, for the better diffusion of the light passing through the negative or photographic plate—this being often desirable.

At the opposite end of the tube, or at any required distance up it, I fix a frame with an aperture in the centre, in which aperture is to be placed the sensitive plate before mentioned, and which may be held in position by a spring, or any of the usual devices.

Between these arrangements at each end I insert a third frame in the aforesaid tube, this third frame carrying the lens, which is to project the picture upon the sensitive plate mentioned and placed in the aperture mentioned.

I provide a double cap or lid, which fits over what I call the back end of the tube, its function being to protect the aforesaid sensitive plate from all light except that passing through the lens mentioned, and which light contains the image from the negative or photographic plate situated in the grooves at the front end of the tube.

Small handles or suchlike may be placed on the lid, or cap, or other parts for convenience in handling.

I complete the apparatus ready for use by setting the aforementioned frames in such relative positions that an image of the negative or photographic plate is projected upon any sensitive plate in the back end of the tube, with all the requisite sharpness of focus and correct size and position; that once being fixed, all further setting may be dispensed with, and the instrument rendered always ready for immediate use.

[Cameras of the rigid class indicated are very handy for making transparencies. The French have used them extensively over two decades for stereoscopic work. In these there were a pair of lenses, and a longitudinal partition dividing the right-hand side from the left.—Ed.]

London and Provincial Photographic Association.—Thursday, May 22, Mr. J. Traill Taylor will give a paper on *The Ethics of Photography*.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 20	North London	Myddelton Hall, Islington, N.
,, 20	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 21	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 21	Bury	
,, 21	Manchester Camera Club	Victoria Hotel.
,, 21	Edinburgh Photo. Club	5, St. Andrew-square.
,, 21	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 22	Burton-on-Trent	The Institute, Union-street.
,, 22	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

May 13.—Mr. J. Glaisher, F.R.S. (President), in the chair.

Mr. T. R. Dallmeyer read a paper on *Reflected Images in Optical Combinations, and their Effect on the Brilliancy of the Final Image*. He opened by saying that the first practical demonstration of the effect of reflected images on the brilliancy of the photographic picture was given by the late Mr. J. H. Dallmeyer, in conjunction with the late Sir John Herschel, in 1867. The flare spot was then particularly dealt with, and it was shown to be due to the formation of a real image of the diaphragm. There were other points in connexion with brilliancy which might now be considered. The general deductions made were, that the fewer the number of reflecting surfaces the greater the brilliancy of the image; that the smaller the area of the surfaces of glass the greater was the brilliancy of the image; that the fewer of these surfaces were concave to the plate the greater was the brilliancy. The absence of any such concave surface behind the diaphragm was also effective in the same way. The brilliancy of the image was affected in various ways—in one, by the formation of the flare spot which had been mentioned; again, by the formation of what was called a ghost; and in another way, and one that had, he thought, not been treated previously, namely, by reflection from the illuminated surface of the plate on to the lens surfaces, and the reflection of such rays back again on to the plate. To illustrate this source of loss of brilliancy a camera was shown fitted with a concave reflector in the place of the plate. The front of the camera was pierced with holes in one corner, and images of these holes were thrown by the reflector on to the opposite corner of the inside of the camera front. It was stated that in absolute darkness illumination of the front could be detected when the concave reflector was replaced by a plain white surface. If the plate were absolutely black this source of want of brilliancy would not exist, but as a fact it reflected a good deal of light. Drawings were made on the blackboard to illustrate reflections from various lenses, including the rapid doublet, the Petzval portrait lens, Dallmeyer's variation on this lens, and the rapid rectilinear single lens. He had introduced the drawing of this last because Mr. Burton, of Japan, had made some statements concerning it which he (Mr. Dallmeyer) had controverted. Mr. Burton had since, however, in a communication to the *Amateur Photographer*, admitted the accuracy of his (Mr. Dallmeyer's) contention. With this lens, if the utmost brilliancy, irrespective of other considerations, was required, it would be better to place the stop behind the lens.

In the discussion, Captain W. de W. Abney said that one source of loss of brilliancy arose from the fact that lenses are not perfectly transparent, but act as sources of illumination themselves, and this to the extent of four per cent. of the light falling upon them. Mr. Dallmeyer was to be congratulated on bringing forward a new phase of the question.

Mr. W. England wondered why so little care was generally taken to shade the camera. He never went out to photograph without a shade. All cameras ought to be furnished with a hood. He used it in such a way as to all but cut off the image.

Mr. L. Warnerke agreed with Mr. England that camera makers ought to furnish a hood, and that the hood should be large.

Mr. V. Blanchard said that he believed the mode of shading the lens by a hood was originally suggested by Mr. England and the late Mr. Dallmeyer.

Mr. W. E. Debenham said that two kinds of shades for lenses had been mentioned by the speakers—one attached as hood close to the lens, and the other, as mentioned by Mr. England, in the form of an attachment to the camera, where it could project considerably farther from the lens itself. This attachment, which he remembered to have seen as long since as 1857, when it was called a front camera, was much more effective than a shade close to the lens could be.

Mr. T. Samuel corroborated this statement by saying that he had remarked the greater brilliancy which he had obtained with Johnson's pantascopic camera than with others; and this he attributed to the shade with which it was furnished.

Dr. G. Lindsay Johnson did not think that there was any advantage in a large hood. He used simply a tube or brass sliding over the lens tube itself, and drew it forward just sufficiently to cut off any light which he did not wish to include. He further remarked that he thought that one of the causes of the superior brilliancy of the images yielded by single lenses was that the tube served as a hood.

Captain Abney did not see the advantage of using a large hood distant from the lens. He drew a diagram on the blackboard to illustrate a lens and the sun, and considered that it did not matter at what point the hood cut off the rays of light from the sun, whether it was close to the lens or at some little distance.

Mr. Debenham then, using Captain Abney's diagram, pointed out that with a hood close to the lens, if the hood were lowered sufficiently to shade the whole of the lens from the sun, the upper part of the lens would also be prevented from doing its work in reproducing the upper part of the picture. There might also be a considerable action from the brightness of that part of the sky which was in the immediate neighbourhood of the sun. He thought

that Captain Abney would see that whilst his proposition would be correct if applied to a point, say a pinhole opening, it was not so for a lens of appreciable magnitude.

Mr. DALLMEYER then replied. With regard to the contention that a hood should be large, he said that an optician was required to place a shade where light from a given point should not be able to reach the optical centre of the lens, and it made no difference whether such hood were small or large. He drew a cone and figures of two hoods, one of which projected about the third part of the diameter of the lens and the other about two diameters, and maintained that so long as the edge of the hood was in the line of the cones, its size and distance were not important.

Mr. WARNERKE said that it had often been observed that the edges of the gelatine emulsion plate became, on keeping, covered with a certain amount of fog, and no sufficient explanation had been given of this circumstance. He now showed some pieces of plain gelatine without emulsion which had darkened at the edges; this perhaps might throw some light on the subject.

Dr. LINDSAY JOHNSON showed a photograph of the ferrotype kind, measuring about two inches by one and a half, which, he said, was the first taken by the new automatic machine.

Mr. J. W. Beaufort was elected a member.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 8.—Mr. J. S. Teape in the chair.

A circular from the Photographic Convention, inviting delegates from the Association to the gathering at Chester, was considered, and Messrs. A. Haddon, H. M. Smith, and T. E. Freshwater were appointed.

The HON. SECRETARY read a recent resolution of the Committee, inviting members to write out the names of subjects which might form topics of future discussions, and the following were proposed:—1. Treatment of focus in relation to photographic art. 2. How to strip silver prints that have been squeegeed to glass. 3. The best form of hand camera. 4. Hand cameras *versus* cameras on stands. 5. Restrainers, physical and chemical. 6. Best means of printing in clouds on bromide paper and for lantern slides. 7. Pictorial treatment of landscape in regard to composition. 8. Cloud negatives. 9. Moral effects of Conventions on the photographic public. 10. Portrait photography and the use of retouching. 11. Preparation of dry plates. 12. Silver printing, toning, and fixing. 13. The carbon process. 14. The use and abuse of hand cameras. 15. Copyright law in relation to photography. 16. Focus *versus* fuzziness. 17. Development of quick shutter pictures. 18. Platinotype possibilities. 19. Rival developers. In addition to the above the following subjects had been suggested at the Committee meeting when the plan of asking for suggestions for subjects had been proposed:—Photography in natural colours. (a) Lenses of chemical combination. (b) Gold toning and the influence of the various soluble salts used. (c) The action of various fixing agents. (d) Various means of ascertaining the duration and effective value of instantaneous shutters. (e) The point from which the focal length of a compound lens is to be measured. (f) What is the advantage of large aspect glasses with the optical lantern? (g) What printing process but registers the gradations of the negative? (h) Prints produced by salts other than silver and iron.

The HON. SECRETARY also mentioned that his avocations would prevent him from continuing to occupy the post after the end of the present Association's year, and it was suggested that it would be well to procure the assent of a suitable successor before the annual meeting.

Mr. H. M. HASTINGS showed some prints on a matt surface paper said to be prepared with chloride of iridium. The printing took about half the time required for silver paper. They had been toned in a gold bath. The paper was of French preparation; and upon the circular and paper of instructions accompanying it being read, Mr. W. E. DEBENHAM remarked that the facts of the paper being amenable to gold toning, of its requiring a hyposulphite bath to fix it, and the direction to lighten over-printed proofs by leaving for a longer time in the hypo bath, suggested that it was really a silver paper, although there might possibly be a little chloride of iridium used in the preparation of it as well.

Mr. F. A. BRIDGE said that at the last meeting it had been stated that a coating of gelatine over ready-sensitised paper rendered it insensitive to light. He now showed two proofs made on paper thus treated which were fully printed out and had not taken longer than the ordinary time in the printing press.

It was announced that on the last Thursday in May Mr. J. Traill Taylor would read a paper, and that in June Mr. A. Haddon would give a demonstration of electroplating with galvanic batteries.

CAMERA CLUB.

MAY 8.—There was a special lantern-slide exhibition at the above Club, photographs taken on recent tours in Egypt being shown by Messrs. Rodgers and Collins and Major Nott. Amongst the transparencies were many of excellent quality, and the collection contained a great variety of interesting illustrations of present life and manners in Egypt, with original views of the Pyramids and other remains and public buildings.

Mr. Elder exhibited a large number of photographs recently taken in Madeira and Tenerife; Mr. Andrews, some views of volcanoes in action and other subjects; Mr. Ferrero, landscapes taken on Club excursions; and Mr. Crookes, some pictures of Ightham Moat House. Other slides, by Messrs. Fitz-Payne, Carnell, and Sands, were exhibited.

On Thursday, MAY 22, Mr. Shipton will read a paper on *Cycle-photography—Some Recent Developments, including an Ideal Cycle.*

NORTH LONDON PHOTOGRAPHIC SOCIETY.

MAY 6.—Mr. Groundwater in the chair.

This being a business evening, Mr. H. W. HART exhibited his new portable stand for flash lamps, photographic backgrounds, magic-lantern screens, &c. This stand is constructed of bamboo canes, screw-jointed, so as to enable the operator to arrange the stand for any desired height or width. The standards are supported on tripod bases; these are made specially firm and rigid by braces, so firm that it seems almost impossible to overturn the structure. Between the uprights there are double rail supports when employed for lamps. At the top there is a rail or batten to support a photographic background or lantern screen with rail or roller at bottom, or the top and bottom rail can be adjusted at any intermediate space between floor and ceiling. There is also an arrangement at the top of the standards by which the background or screen can be arranged at any angle, so that it may be brought parallel with the lantern or camera when these latter have to be tilted. There are other attachments to the stand by which a top shade or side screens can be easily arranged as may be required for taking portraits, &c., out of doors. In fact the stand seems to have been thoroughly well thought out, so that nothing is wanting to make it a useful adjunct to any studio and a necessary piece of apparatus for any lantern exhibitionist, besides its primary use, viz., for a flash-lamp stand. The whole of the framework and fittings when packed can be easily carried by a lad with one hand. Mr. Hart placed a few lamps on the stand to illustrate the various motions, and stated that such a stand as shown would accommodate from thirty to forty lamps.

A discussion afterwards took place, in which many members joined, and it was generally agreed that the stand was a novel invention and likely to prove most useful both in flash-light and ordinary photography, and for many other educational purposes.

Mr. PARFITT then exhibited a new hand camera which he had patented, and described its various parts and actions, the principle being the economising of space and the simple mechanism by which the plates, in sheaths, are brought from a horizontal into the perpendicular. One motion of a lever at the bottom of the camera from right to left changes the plates, and whilst bringing each in its turn into position registers the number of the exposure upon a small tablet.

The members unanimously congratulated Mr. Parfitt, as a member of the Society, upon the invention of so simple a hand camera, and wished him every success when he was ready to issue it for sale.

Mr. Danlo, an old member of the Society, who has been residing for some time in Paris, then exhibited some splendid negatives of views in Paris, including the Eiffel Tower, both half-plate and stereoscopic, and also some beautifully printed platinotype pictures with cloud effects from the negatives.

The members were of opinion that no more beautiful negatives had ever been exhibited before the Society.

Mr. DANLO stated that they were taken with a Wray's rapid rectilinear half-plate lens upon a French make of plate, and most of them developed with pyro and soda. He said that, of course, the beautiful clearness of the atmosphere in Paris had something to do with the brilliancy of the negatives, the distinctness of the minute detail, and the absolute clearness in the shadows. He had developed some of them with hydroquinone, but preferred with these plates the pyro and soda developer, and they would not stand ammonia.

Mr. Fuller exhibited some prints from negatives taken at Burnham Beeches on the Good Friday outing.

The SECRETARY announced that the next meeting, on May 20, would be the last lantern night of the season, when members were requested to bring as many new slides as possible. Mr. Parfitt in the chair.

Any gentleman wishing to join this Society and all business correspondents are requested to note the change of Secretary, and to address all communications to Mr. G. J. Clarke, 52, Queen's-road, Finsbury-park, N.

HOLBORN CAMERA CLUB.

MAY 9.—Mr. Chang in the chair.

The PRESIDENT (Mr. T. C. Hepworth) delivered a lecture, illustrated by lantern slides, on *Photography as Applied to the Illustrated Journalism of the Day, as Exemplified by the "Daily Graphic."* He first showed a copy of a portrait published in a newspaper in 1679, and said that it was rather an advantage not to have an exact likeness, as in the event of doubt upon the subject the same block could be used again later on for somebody else. He then followed the rags from the ragshop to the paper mills, where they are sorted, cleansed, and mixed with esparto grass, converted into pulp, and finally paper, which is delivered at the office of the *Daily Graphic* in rolls of three and a quarter miles in length. He then saw the way type and illustrations were set up on a flat surface, a paper mould made from the same, from which a curved casting was made in type metal, these curved castings being fixed on to a large roller in the printing machine. Mr. Hepworth had timed one roll of three and a quarter miles in length, and found that it was printed both sides and delivered at the other end of the machine in fourteen minutes, or at the rate of 10,000 copies per hour. After touching on the way in which the most crude and indistinct sketches or photographs were elaborated by a special staff of artists, who copied them on to very white card with a particularly black ink, they were then photographed, and a zincographic etching was made from the negative so obtained, the whole process being completed in a few hours, by which means we are enabled to get prints of the doings of to-day in to-morrow's paper.

On Saturday ten members proceeded to Carshalton and Beddington, and, after exposing about fifty plates, adjourned to the Greyhound for tea.

On Friday next (this evening) Mr. Cobb will give instruction to beginners on *Silver Printing, Toning, and Mounting.* Beginners in photography are specially invited to come.

HACKNEY PHOTOGRAPHIC SOCIETY.

MAY 8.—Annual meeting.—Dr. Roland Smith presiding.

The annual report and balance-sheet was read by the Secretary, and unanimously carried. It is satisfactory to note that the Society has during the last year, the first of its existence, had ninety-six members.

The following officers for the year 1890–91 were elected:—*President:* Dr. Gerard Smith.—*Vice-Presidents:* Dr. Kibbler, Dr. Roland Smith, and Mr.

J. Hubert.—*Council:* Messrs. H. Burton, W. L. Barker, H. J. Beasley, J. O. Grant, F. Houghton, and Dr. J. B. White.—*Treasurer:* Mr. Frank Jolly.—*Curator:* Mr. A. Dean.—*Secretary:* Mr. W. Fenton Jones, 12, King Edward-road, N.E.

WEST SURREY AMATEUR PHOTOGRAPHIC SOCIETY.

MAY 7,—Mr. W. Winsford in the chair.

Several new members were nominated. The attendance was large.

Mr. G. DAVISON gave an address on *Platinotype Printing Processes*, accompanied by a demonstration. Mr. Davison, having recited the advantages of the processes and given briefly the theory of the formation of the platinum image, explained the distinction between the hot-bath, cold-bath, and printing-out methods respectively, and proceeded to develop a large number of proofs, showing the ordinary details of practice as well as the variations in colour obtainable by the use of the Sepia papers and by the addition of mercuric chloride (half a drachm to one drachm per ounce of hot oxalate solution) to the developer. Cold bath prints were also developed, specimens of all the variations being handed round upon glass plates, as also mounted examples of platinum prints on fabrics, rough papers, &c.

It was decided that the next outdoor meeting of the Society should be to Carshalton and district, and that the subject for the first Wednesday in May (evening meeting) be *Gelatino-chloride Emulsion Papers*. Mr. James agreed to treat this subject.

LEWES PHOTOGRAPHIC SOCIETY.

MAY 6,—The President in the chair.

A paper on *Cloud Photography* was read by Mr. J. J. HOLLWAY. He described the many beauties of cloud form and sky effects, and gave examples from the works of Constable and Gainsborough, showing the proper relation cloud forms should bear to the other part of the pictures. While recommending photographers to use cloud negatives to complete their pictures, for he considered nothing so offensive to the artistic eye as a broad patch of white for the sky, which was generally to be seen in photographs, he, at the same time, cautioned them about using them in an inartistic manner, as it was quite probable that unless clouds were inserted with taste and after careful consideration of their appropriateness to the general effect of light and shade and general composition of the picture, they would rather detract from what beauty there might have existed before their introduction than bring about the desired improvement.

MANCHESTER PHOTOGRAPHIC SOCIETY.

MAY 8.—Special general meeting.—Mr bel Heywood, jun., in the chair.

The CHAIRMAN announced the resignation by Mr. W. I. Chadwick of the office of Hon. Secretary, which he had held for about fifteen years, and that Mr. H. M. Whitefield, Ashville, Mayfield-road, Manchester, had undertaken the duties until the next annual meeting of the Society.

A letter was read from the Hon. Secretary of the Manchester Survey in connexion with the Manchester Amateur Photographic Society, inviting the assistance of the members of this Society by the loan of negatives of places of interest and of buildings recently demolished in Manchester and Salford. The Hon. Secretary was requested to respond.

The remainder of the evening was devoted to a vigorous discussion and amendment of certain rules, and the advisability of the Society forming itself into a Club, with the object of promoting more social intercourse among the members, and providing facilities for a dark room, smoke room, and place for a daily meeting of members in a central position in Manchester. A recommendation to the Council was adopted to ascertain if the scheme is practicable, and report to the Society at an early date.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

MAY 6.—After the routine business of the meeting and the election of Mr. W. V. Davy as a member, Mr. J. W. CHARLESWORTH gave a subject, *Hand Camera Work*. He began by describing one made by himself, and showing the most minute details of the same. There were also laid on the table hand cameras by various makers.

It was announced that Mr. Chadwick, of Manchester, had promised to give a subject at an early date; also that the Britannia Company, Ilford, would give a demonstration—*How to work Alpha Paper*—at the September meeting.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

MAY 8,—Alderman J. B. Stone, J.P., F.L.S., F.G.S., in the chair. There was a large attendance.

Eight new members were elected.

A letter was read from the Hon. Secretary of the Camera Club, enclosing a copy of their new rules for exhibitions.

The Curator of the Municipal Art Gallery (Mr. Whitworth Wallis) sent a communication acknowledging the receipt of the National Challenge Cup (won by the Birmingham Society at the Crystal Palace Exhibition in March last), and asking for examples of the pictures which won the cup to be exhibited with it in the Art Gallery.

THE PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.—At the close of the ordinary business Mr. STONE announced that the present meeting had been called specially to discuss the proposed photographic survey of Warwickshire. He said:—

We are assembled here this evening upon a matter of very considerable interest, which has now reached a point when it is important to ask your very serious consideration as to what course is to be pursued. I take it for granted that every member of this Society is deeply interested in the proposed Photographic County Survey. Every one, I suppose, desires its success; every one, also, I apprehend, is fully alive to the fact that there are difficulties to be overcome. If every one is prepared to render assistance to get rid of these difficulties, depend upon it they will easily melt away. If we were to give way to the difficulties of the world we should never accomplish anything. Reverting to my first observation, as to its being a critical moment in the proceedings, you are called upon to-night to decide whether this survey shall be a success or otherwise. There are two distinct ways in which you can deal with the matter; one is by taking it in hand yourselves and settling to work out the whole problem, taking credit for the result of your labours, keeping the control of the whole undertaking, and carrying it out within your own limits; that you are perfectly justified in doing if you so desire. If you take this view it will be your duty to set about a scheme within your own means and within your own numbers. This, of course, is simply within the range of any Society; in other words, any Society has a perfect right—indeed, you may go further and say that any single individual has a perfect right who can command means of doing within his own scope something towards obtaining the same object that you have in view. As a Society you may succeed more or less, but such proceeding within yourselves would not be sufficiently large, I apprehend, to correspond with the scale you have already contemplated. You have at this moment an opportunity to distinguish yourselves as a Society, because you have hit upon a brilliant idea which all the world is prepared to give you credit for, and that idea worked out will be not only for your good reputation, but will be a beneficial example to the whole country. If you take a good lead, you will be followed by others, and if you take a narrow view, and you permit jealousies to exist amongst yourselves, or in respect to other people, you will damage the whole thing, you will earn a bad reputation, and, in point of fact, you might makes yourselves ridiculous. If you can decide upon broader lines, which I recommend, you will at once offer to the whole world a good idea and appeal to the co-operation of every one interested in it to contribute towards its success. For this you must go outside your own Society. It appears to me if you do (and I hope you will) you will obtain considerable support—pecuniary and otherwise—from the county generally. You must present to the public a broader scheme, that will invite confidence and that will attract support. You cannot propose any kind of Council or Committee limited to yourselves, you must begin by proposing a Representative Council for the Photographic Survey, and must state frankly that you are prepared to send representative members and render every assistance. There would be, of course, elected representatives from other districts and other Societies, and I suggest, also, co-optative members useful to you in many ways, and men sufficiently known to ensure the confidence of the city of Birmingham and the county generally. Then, depend upon it, your prospect will succeed, and you may almost believe that your scheme is an accomplished fact.

Mr. JEROME HARRISON, F.G.S. (Vice-President), said he had listened with great pleasure to the very able speech of Mr. Alderman Stone, with which he was, in the main, agreed. Their President advocated the establishment of a County Council or Committee, by which the photographic survey of Warwickshire should be directed; and considering that there were several photographic, as well as many scientific, artistic, and literary Societies in the county, he agreed that such a guiding body was desirable. Such a Council should consist of representatives of all the Societies willing to promote the work of the photographic survey. It was not less the duty than the right act of such Society to aid in carrying out and completing so desirable a task. But he (Mr. Harrison) did not think it was necessary that their own Birmingham Society should sink their own identity with the task which they had resolved (at a previous meeting on December 11, 1889) to undertake. The Council of the Birmingham Photographic Society had been carefully considering the question, and they had unanimously passed the following resolution:—"That it is desirable to form a Photographic Survey Section of the Birmingham Photographic Society, with separate officers and separate subscription, to commence and carry out a photographic survey of Warwickshire." He trusted that the meeting would endorse that resolution, and that every one in the room would join the survey section which it was proposed to form. The section could then invite the co-operation of other workers in the county and form the "County Council" to which Mr. Stone had alluded, by which the work done by each Society should be pointed out. As their would necessarily be certain expenses incurred, it would be needful to charge a small extra subscription to the section. He hoped they would also invite gentlemen to join the survey section who, although not photographers, felt an interest in the work; and for them the subscription should be somewhat higher. Such gentlemen could thus join the survey and assist in its work without becoming members of the Photographic Society. He trusted the meeting would first discuss the resolution from the Council, which had just been read, recommending the establishment of a Photographic Survey Section of the Birmingham Photographic Society, after which the consideration of the County Council, as urged by Mr. Stone, would naturally follow.

The resolution referred to by Mr. Harrison was carried unanimously amid much applause.

It was then resolved, "That the subscription to the Photographic Survey Section shall be half-a-crown per annum for members of the Birmingham Photographic Society, and half-a-guinea per anuum for all others."

Thirty-eight gentlemen then gave in their names as members of the new section.

The officers of the section were elected as follows:—*Chairman:* [Mr. J. B. Stone.—*Vice-Chairman:* Mr. Jethro A. Cossins.—*Curator:* Mr. B. Karleese.—*Treasurer:* Mr. S. G. Mason.—*Hon. Secretaries:* Messrs. J. H. Pickard and W. J. Harrison.

The question of a governing body to direct the general work of the survey was next considered. The following resolutions were then passed:—1. "That the Council should consist of representatives elected by the various photographic and scientific Societies of Warwickshire, with co-optative members who may be of service in developing or aiding the work of the survey." 2. "That the photographic, artistic, and literary societies of Warwickshire be invited to send representatives to a general meeting on May 22 at St. Edmund's College, Edmund-street, Birmingham, for the purpose of electing a Council to direct the photographic survey of Warwickshire.

It was decided that the members of the Birmingham Photographic Section should meet on Tuesday evenings at the Club Rooms to discuss the work of the survey.

A hearty vote of thanks was passed to Mr. Stone for his able conduct in the chair, and the proceedings terminated.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

APRIL 9,—Vice-President John G. Bullock in the chair.

Owing to the removal of the Society of Amateur Photographers of New York to new quarters, it was agreed to postpone the exhibition until the spring of 1891.

The Committee on Lantern Slides presented a full report in regard to the public exhibition of slides illustrative of the work of members, which had been

held at Association Hall on the evening of March 12. The exhibit was one of the best ever made by the Society, and furnished unmistakable evidence of a general improvement in technical and artistic photography on the part of the members.

Mr. John G. Bullock was unanimously elected President of the Society *vice* Mr. Frederick Graff deceased.

Dr. MITCHELL, of the Executive Committee, read a communication which had been handed to him by the author, Mr. Frank H. Rosengarten, entitled, *Working Department of the Photographic Society of Philadelphia*. The paper was a lengthy plea for enlarging the scope and usefulness of the Society. It was referred to a Special Committee.

Mr. CARBUTT, alluding to a letter he had read at a previous meeting, from Mr. Pansoust, in regard to keeping qualities of plates, showed a negative sent him by the same gentleman, made recently on a Carbutt A plate, which had been coated about 1884 or 1885. The negative showed no signs of deterioration on account of the age of the plate.

Mr. BROWNE, referring to the appointment of a Committee to ascertain the cause of certain deterioration in lantern slides, said that within the last two weeks he had examined a large number of slides with a table microscope having a two-inch objective. With a glass of this power, he noticed that in a good many cases the crystallization or cloudiness is formed on the cover glass, but not invariably so. It has been said that a great deal of this difficulty arises from the quality or composition of the glass—that from the thin glass now used, both for picture and cover, emanates some chemical injurious to the slide. This might be so, but in his experience, which had been almost entirely with the quality known as "B. P. C.," he could not lay this fault to the glass. In examining the slides he found a great deal of matter evidently deposited from impure washing water, which seemed to consist of particles of vegetable matter,—mud and sediment of various kind—which had not been perfectly washed off. He also thought that the central spots from which the crystallization started were sometimes due to hyposulphite of soda in the gelatine film. Years ago, having trouble of this kind, he had commenced using diluted cyanide of potassium instead of hypo for fixing slides. Slides so fixed did not show any of the faults in question. A great deal of the trouble, he thought, arose from intensification. The purchasers of commercially prepared slides desired very dense positives, which makes it desirable to use some form of intensification. Among the chemicals used for this purpose is sublimate of potassium, which to his mind is most objectionable. He had found the treatment with bichloride of mercury, followed by a bath of chloride of platinum, to make a permanent and safe intensifier.

Mr. FASSETT had found the treatment with mercury invariably fatal to a gelatine slide.

Dr. WALLACE thought the question of fading depended not so much on the use of mercury as upon what the mercury was followed by. If ammonia was used the result would be disastrous; but with cyanide of silver the picture would not fade.

Mr. CARBUTT, referring to the use of cyanide of potassium for fixing gelatine slides, said it could be used if a perfectly pure article was obtained. The ordinary commercial cyanide contained caustic potash, which had a deleterious effect on the film. He recommended a solution of eight or ten grains to the ounce as suitable for fixing an ordinary gelatine plate with safety.

Mr. BELL endorsed the remarks of Dr. Wallace relative to the use of mercury. It was not the mercury itself, but what followed it. If followed with cyanide of potassium, it was perfectly permanent; if with sulphide of soda, the same as ammonia; if with cyanide of silver, it is perfectly permanent.

Mr. CARBUTT claimed that there was no need of intensifying lantern slides. He had been making some positives requiring great density; it was simply done with pyro, soda, and bromide. The action of the alkali should be well restrained, and the exposure as full as subject and conditions will allow. In the instance referred to, it was nearly a minute before the image began to show. It was a positive made by contact. For the purposes of those using dry process plates, the developer consisted of—Water, sixty ounces; carbonate of soda crystals, two ounces; sulphite of soda crystals, four ounces; bromide of soda or potash, sixty grains. To each ounce of the above, two and a half to three grains of dry pyro is added. By this means perfectly clear glass in the transparent parts of the negative and very dense blacks can readily be obtained.

Dr. Mitchell showed an 8×10 Irving camera, recently introduced by the Scovill & Adams Company. The weight of camera alone is but six pounds, and with plate holder and carrying case, but nine pounds. It has no sliding front, but when pointing the camera above or below the horizontal line, the swinging front as well as the swingback are brought to a perpendicular, thus doing away with any necessity for a sliding front of the usual form. The focussing is effected by a rack-work, operated by a pinion set horizontally on base-board of camera. By this arrangement, when camera is closed, all projecting screws, brasswork, &c., are avoided. The 8×10 size extends about eighteen inches.

The meeting closed with the exhibition of one of Moessard's panoramic cameras.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

PROPOSED SOCIETY IN HARLESDEN.

To the EDITOR.

SIR,—I am desirous of forming a Photographic Society for Harlesden and district, and shall be glad to know of any gentleman willing to assist me in doing so. I shall be pleased if you will give this publicity in your next issue. Any suggestions you may offer will be thankfully received by—Yours, &c.,

ISAAC COHEN.

26, Wendover-road, Harlesden, N.W., May 12, 1890.

PHOTOGRAPHING IN EPPING FOREST.

To the EDITOR.

SIR,—The letter from Mr. Smith and the enclosure from Mr. McKenzie, printed in your last issue, do not altogether agree with the statement in my letter printed beneath Mr. Smith's. I shall, therefore, be glad if you can find space for the enclosed from Sir John Monckton, which speaks for itself, and with regard to which I would only add that it bears a more recent date than that sent you by Mr. Smith, and, I take it, is from a superior authority.—I am, yours, &c.,

125, *St. Paul's-road, Bow, E., May* 13, 1890. HENRY EVERETT.

(COPY.)

"TOWN CLERK'S OFFICE,
"GUILDHALL, E.C.
"*7th May*, 1887.

"SIR,—In reply to your letter of the 18th ultimo, asking permission to take photographs *in the camera* in Epping Forest and Wanstead Park, I beg to say that if you produce this letter to the keepers it will be a sufficient authority for you to do so.

"I regret the delay in answering your letter, but it arrived on the day following the meeting of the Committee.—I am, Sir, your obedient servant,

"Mr. Henry Everett. JOHN B. MONCKTON."

PETROLEUM ETHER.

To the EDITOR.

SIR,—Mr. Scott makes one mistake in his communication on page 270. The petroleum ether originally recommended by me does *not* produce an explosive mixture with the oxygen in the cold saturator. There are heavier petroleum ethers in the market which might do so before the light had been run very long, or would at least necessitate the drying out of the porous filling occasionally, as with sulphuric ether, but such I have neither used nor recommended.—I am, yours, &c.,

Philadelphia, May 5, 1890. FRED. E. IVES.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, "Facile" camera: can offer many things in exchange.—Address, DAY, Photographer, Monmouth.

Will exchange C. D. V. portrait lens, about six-inch focus, for modern landscape half plate camera with three double slides.—Address, WILLIAM MILLER, Ballyshannon.

Condenser, eight or nine inches, wanted in exchange for whole-plate portrait lens or three gold lockets.—Address, W. HUDSON, River-street, Balsall Heath, Birmingham.

Will exchange fifty-two inch silver plated bicycle, ball bearings, for half-plate landscape, or wide-angle lens.—Address, C. J. YOUNG, Bleak House, Low Fell, Gateshead.

Wanted, THE BRITISH JOURNAL OF PHOTOGRAPHY for years 1860 to 1863, 1868, 1870 to 1884, 1886 to 1889; will pay cash or exchange scientific books. Address, M. EVANS, 8, Remington-street, City-road, N.

To exchange, ship's deck background, boat with water foreground and oar, for studio chair with three backs; differences adjusted or for interior and exterior background. Address, HOLMES, 60, Mount Pleasant-terrace, Mountain Ash.

Will exchange whole-plate mahogany camera, long extension, folding tailboard, single dark slide, the whole in perfect order, for a whole-plate wide-angle rectilinear lens by good maker.—Address, G. R. NEWMAN, 5, Clifton-street, Wigan.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

R. DAVIS, Lancaster.—*Photographs of the first and second teams, Lancaster Football Club.*

LANDSCAPE.—Robinson's work is as good as any.

RETOUCHER.—It is not yet manufactured for sale.

1, 2, 3.—Consult the advertisement columns. Such things are advertised almost every week.

DARKEE.—Better have a consultation with your local patent agent. He will give you every information with regard to trade marks.

BERKSHIRE.—If the paper was discoloured at the time you received it you should have sent it back at once. There is no method of making it useable.

S. S. D.—The plates sent are about as pretty specimens of pitting as we have ever seen. It is the fault of the gelatine used. There is no remedy for the plates made. With regard to the emulsion, the most profitable plan will be to put it amongst the wastes and start afresh with a suitable gelatine.

LUX.—A lens of the "rapid" type, of from fifteen to eighteen inches focus, will be the best for copying the size you require. It will give straight lines and work quickly.

W. CHARLES.—You would certainly bring yourself within the pale of the law by copying the portrait, even if you combined it with a number of other portraits. See reply to "A. A."

W. D. H. (Paris.)—Eikonogen will not keep in solution without the addition of sulphite of soda or an equivalent. We, from your note, presume you made a plain solution in water. If this is correct it quite accounts for its behaviour.

JOHN WILSON.—The system of blocking a large number of lenses ready for grinding is given in Tomlinson's *Encyclopedia* under the heading "Lens." The powers of convex spectacle glasses are usually determined by their focal length in inches.

"BOZ."—We regret we are not in the secrets of the Company in question, therefore we cannot give you the desired information. Like yourself, there are many others who would be glad to know a practical method of making "half-tone blocks to machine with type and give as good results as silver printing." We should ourselves like to know such a process.

WEEKLY SUBSCRIBER.—1. If the paper behaves in the way stated, after the precautions you have taken, we should advise you to employ a different sample, discarding what you have. Yours is not the only case of a similar nature we have heard of lately.—2. A lens of the "rapid" type is best for groups, buildings, and other purposes generally, when limited to one lens.

W. P. ADAMS.—Several so-called exposure tables are published (see the ALMANAC), but they are only intended as rough guides. Tentative experiments with a dozen or two of plates will teach more with reference to correct exposures than any tables that have been or probably ever will be compiled. The best criterion for correct exposure is the appearance of the image on the focussing screen.

WALTER.—Your communication is not quite clear; but eight feet wide is very narrow for a studio. In reply to the queries: 1. Fluted glass will obstruct but little light, and sitters cannot be recognised through it.—2. Plain glass will answer for the roof, but we cannot understand the dimensions as written.—3. Green or dark-blue blinds will answer for the roof, and, if it faces the north, white will do for the sides.

D. GORDON says: "I have a positive on glass which I have been handed to copy from; unfortunately, it has got cracked right through the middle; I copied it and tried to erase the mark on the negative, but it does not please my client. Can you suggest any other method of having it copied without showing the crack?"—Make a good print and send it to a competent retoucher or artist to have the crack mark worked out, then from this make another negative.

ECONOMIST asks: "Do used pyro-ammonia developing solutions contain enough (or any) silver to make them worth saving?"—Answer: Alkaline developers act by reducing the bromide in the film to the metallic state, and may, therefore, be thrown away when done with. But not so would it be in the case of pyro and acid as employed in the wet collodion process. In the modern dry plate process you must look to the fixing solution in order to recover silver.

W. H. writes as follows: "I am engaged to photograph the interior of a church at Whitsuntide with all its decorations for the occasion. I have had but little experience in this class of work, therefore can you give me any idea of what exposure I should give? The lens I am going to use is a wide-angle one with a stop equal to *f*-32."—Without seeing the subject we cannot give the slightest idea. Our correspondent's best plan is to take a couple of plates the day before and expose them, giving different times. From these he will be able to judge with accuracy the exposure necessary.

C. WALLIS inquires for a varnish for negatives which will dry without artificial heat during the summer months, as then he has no fires and abominates spirit lamps. He says the negatives can always be warmed by the sun, but the heat so acquired is not sufficient to prevent ordinary varnish from drying with a matt surface.—Dammar resin dissolved in benzole makes a very good varnish that does not require heat to make it dry transparent. This varnish is not quite so durable under rough treatment as some spirit varnishes having lac as a base; still, if made with the best materials, it is excellent.

A. A. says: "A person has set up in business in our neighbourhood and has taken a number of really very good local views, *printing them in silver*, and selling them at a much lower price than Mr. ——'s, though they are really better pictures. Now, what I want to ask you is this:—If I take some of the best of this man's pictures and get them copied by a *mechanical process* (he only prints in silver), can he stop me from selling them? I do not want to make a profit out of them, so I should sell them at a very low price. The man had no business to come here to cut up the trade in this way."—In reply: If the pictures are copyright our correspondent would certainly lay himself open to a prosecution for piracy. The copyright is vested in the picture, and not in the process by which it is produced. Printing it larger or smaller, with or without alteration, or by a totally different process, makes no difference; the infringement is the same.

W.—Thanks for information, which you will see we have utilised. In reply to queries: 1. Twenty-seven inches seems to be a focus unnecessarily long for a lens that is to be employed in copying to fifteen inches, because its working focus when reproducing a picture of that dimension will be fifty-four inches, while if the object is to be enlarged the camera will have to be expanded much more than this. For instance, if the copy was required to be only twice the linear dimensions of the original, you would have to extend the ground glass to a distance of eighty-one inches from the lens. For this reason, other things being equal, the lens of eighteen inches focus should be preferable.—2. We know of one studio, devoted exclusively to copying, in which the light falls upon the drawings from a window in the roof just over where the camera is placed, and the proprietor would not wish it altered on any account.—3. We should advise you to keep the lens you have in preference to exchanging it for any other.

G. H. A. says: "I am using daylight for enlargements, and have been using a 5×4 camera fitted with a rapid rectilinear lens; I have been able to enlarge from 5×6 up to 12½×15½. I am wanting to use a whole-plate camera with a rapid rectilinear lens, as the focussing screw is in the front instead of behind, as it is in my whole-plate. Can I get the same sized enlargements with the whole-plate as I did with the 5×4 camera?"—Yes, if the focus of the whole-plate lens and the length of the camera are in the same proportion as those in present use. Why not try a simple experiment with the apparatus you propose to use?

BATH writes as follows: "I would be greatly obliged if you would tell me in your next issue what you consider to be the best way to preserve sensitised paper for a week during the warm weather, and if you recommend acid what should I do to the toning bath to prevent it from going wrong? I have always sensitised my own paper, but it sometimes is not convenient for me to tone the prints until a week after they are printed, and it would be a great convenience to me if I could make the paper so that it would keep for a week. Could you recommend either putting citric acid in the silver bath or floating the paper after it comes off the silver bath upon a solution of citric acid; and, if so, what is the smallest quantity of acid I could use to answer my purpose, as I would prefer having as little of the acid as possible? I get along with my toning without the least trouble at present (I use an acetate and borax toning bath), and would rather go on as I am doing than try anything new that would be likely to make the toning bath unworkable; but if you can recommend anything that you know would answer my purpose I would be extremely obliged. Some persons recommend keeping the paper rolled up in paper that has been soaked in a solution of carbonate of soda. This is no doubt good in its way, and may answer well for sheets of sensitised paper, but I think would be very awkward after the paper is cut up into *cartes* and cabinets."—As it is only desired to keep the paper for a week or so, and as it is desirable to retain, as far as possible, the ordinary working conditions, the carbonate of soda treatment is about the best and most convenient. After the prints are removed from the frames it is an easy matter to make them in a pile, with a piece of blotting paper which has been treated with the carbonate of soda between each, and keeping the whole together under pressure.

SWINDLED, who sends us full names of the parties involved, which for the present we suppress, writes: "About a month ago I sent some testimonials and photographs as specimens to a firm. Not receiving any answer from them within two weeks, I wrote to them; the reply was, that they were not aware they had received anything from me. I went directly to the post office here, and inquiries were made. Then I received another letter from the firm, in which they said they had received the parcel, but had sent it to a man at Rochester in a mistake. The postmaster received a letter from the General Post Office, London, and they say the firm will not take any trouble to recover them. They said the mistake was made through my answering their advertisement under an assumed name; but when I sent the specimens, &c., I enclosed a letter with full explanation, and giving my right name, which was also on the photographs. I obtained the name and address of the man at —— where they had been sent; so I wrote to him for them, and enclosed a stamp for reply, but have not yet received any answer from him, therefore it seems a case of dishonesty. I sent forty-eight cabinets and twelve imperial photographs, a letter from Sir James Whitehead (late Lord Mayor of London), and two testimonials from first-class firms, therefore I should not like to lose them. They were all done up in a cardboard box, so it is not like a small parcel—gets put on one side and forgotten. I should think it a great favour if you will let me know through your columns what steps I can take to recover them?"—Yours is a very hard case indeed. The proceedings of the firm implicated are disreputable. So far as we understand the law, you have two courses open. One to proceed by civil action in the County Court, for the value of the pictures and damages. The other, criminally before the magistrates. You must proceed against the firm to whom you sent the pictures. It is no business of yours at present how they disposed of them.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 21, *Photo-mechanical Processes;* May 28, *Photographic Fog.*

WE have received specimens of direct printing platinum paper from Mr. C. A. Rudowsky, Guildhall Chambers, E.C., and also from Mr. Otto Schölzig, Binfield Road, S.W. These are prepared on the Pizzighelli system by rival foreign makers, for whom the gentlemen above named are agents. It is enough here to say that both samples have produced excellent results. A specimen picture which accompanied Mr. Schölzig's packet is exceedingly fine.

PHOTOGRAPHY AT ETON COLLEGE.—Photography is evidently interesting the Volunteer Corps of Eton College. Under their auspices, Mr. Andrew Pringle gave a lecture in that College on Saturday last to a large audience, taking as his subject *The Pleasures, Advantages, and Various Branches of Photography*, dwelling largely, as might naturally be expected, on its application to military purposes. Numerous lantern slides were projected upon the wall, which is finely prepared for such illustrations. It is gratifying to observe that as an outcome of Mr. Pringle's lecture, and in response to his plea for organization, a Photographic Society is being formed among the collegians.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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THE PROTECTION OF FILM NEGATIVES.

There is undoubtedly a great future for film photography, by which term, in the present instance, is meant a thin flexible material made to take the place of glass as a support for the image. Now, seeing that these negatives are not varnished, like those on glass, it becomes a point to consider how they can best be protected from atmospheric and other influences to which they must be subjected while being printed from; also the best method of storing them when not in use.

The first flexible film negatives were those of Scott Archer. They were taken on glass, and afterwards transferred therefrom on a film of guttapercha. The only advantages then recognised from this proceeding was portability in storage, freedom from breakage, and the fact that the glass might be used over and over again. It may be mentioned that at that period the cost of glass was an item of consideration, as that used was generally patent plate, and it was very much more costly than it is now. Archer's stripping process did not become popular. It involved extra trouble, and it was found that guttapercha, in time, became resinised and brittle, so that the negatives could not then be handled without their falling to pieces. Only a few months back we happened to turn out some old negatives on guttapercha, and they were so rotten that they could be powdered between the fingers. Theoretically these films required no protection, as both the collodion and the guttapercha are impervious materials so far as moisture is concerned. Yet, as we have said, they quickly decayed.

Collodion negatives transferred from glass on to gelatine are now very old, though their use has, for the most part, been confined to collotype, or other purposes where a reversal of the image is necessary. They are always printed from without protection; but then it must be remembered they are rarely, if ever, used for silver printing, and that seldom more than a limited number of impressions are required from them, so it will be seen that they are not subjected to the usual vicissitudes of ordinary negatives. Still, however, they require care in keeping, owing to the tendency of the gelatine to absorb moisture when the atmosphere is damp, this tendency being enhanced by the glycerine added to the gelatine to prevent brittleness. However, when these negatives are preserved with ordinary precautions in a dry place, and between the leaves of a book, they seldom suffer injury.

With regard to gelatino-bromide negatives transferred from glass—say by Pleuer's method—on to a sheet of gelatine, the case is somewhat different from the above. Here the whole of the material is gelatine, a portion of which contains glycerine, and it is not in any way protected; hence it is free to absorb moisture from both sides, which it certainly does when exposed to the air in damp weather. In proof of this we, by way of experiment, kept one of these negatives for some time in a damp cellar, and it not only became very limp and flabby, but it expanded in size. Of all film negatives, those of the class referred to require the greatest care, both in use and in storage.

The next type of film negative to be referred to is the Eastman "stripping film." This, from a theoretical point of view, should be the most stable of all yet referred to. In this the image is covered with a layer of collodion, and in practice this has proved to be quite as good a protective as most of the varnishes now in the market. Added to this, the back of the gelatine skin, before it is stripped from the glass, can also be coated with a layer of collodion. When that is done, the gelatine—that forming the negative as well as the backing skin—is, as it were, "sandwiched" between two layers of impervious collodion, so that it is practically sealed from the atmosphere.

We now come to the consideration of celluloid negatives—the latest introduction. The celluloid, though flexible, is an impervious material, hence negatives on it are analogous to those on glass, except that they cannot be varnished in the ordinary way. The solvents used in most negative varnishes are, more or less, solvents of celluloid. So also are those used in collodion. Furthermore, collodion and spirit varnishes, when heat is necessary, would be more difficult to apply to a flexible than a rigid material like glass.

At a recent meeting of one of the London societies, gold size, diluted with turpentine and applied with a brush, was recommended as a varnish for negatives on celluloid. There is little doubt that a varnish of this character would prove a very effective protecting medium for film negatives. Unfortunately, however, "gold size" is a very indefinite article, as its composition varies with almost every maker. Some samples, when thinned with turpentine, dry in a few hours, while others require a long time to become hard, and so long as the surface remains in a tacky condition it is very attractive to flies, dust, &c. Negatives on celluloid are, of course, quite as durable as those on glass when neither are varnished, and a great number of the latter are being constantly printed from, both by professionals and amateurs, without varnishing; therefore, there is no greater risk incurred in the one case than in the other.

With the thin rollable celluloid films it has been recommended to treat the negatives with very dilute glycerine to prevent their tendency to curl while drying. In our experience we have not found this necessary, because, when the negatives are dry, the curl can generally be taken out by keeping them rolled the reverse way for a short time, and then retaining them

flat under pressure when out of use. For our own part we prefer the slight—for it is but slight—inconvenience of the curling to the introduction of a hygroscopic material as a preventative.

CLEARNESS IN GELATINE TRANSPARENCIES.

In a discussion that took place at the last meeting of the Photographic Society of Philadelphia on the subject of the deterioration of lantern slides, several causes of veiling and fading were mentioned, though from the report we judge that the fault originally in view consisted of the alleged corrosion of the cover-glasses already mentioned more than once in our pages. As, however, the possible causes of deterioration lying in the gelatine film itself, or arising from variations or errors in its mode of treatment, are sufficiently numerous, we may here draw attention to a few of them.

In previous articles on the subject of gelatine transparencies the necessity has been pointed out for the strictest care in avoiding any treatment of the plate during its preparation or development that may tend to the formation of insoluble lime-salts in the body of the gelatine, so that we need not here go over that ground again, especially as the want of clearness thus caused would be visible from the first, and therefore scarcely comes under the title of deterioration.

The same might almost be said of the first form of trouble mentioned by Mr. Browne at the meeting in question—namely, a film or veil formed, whether on the cover-glass or the film is not clear, by matter from impure water used in the preparation of the slide. It is probable that any defect arising from this cause would be more or less palpable from the outset, though not necessarily, for such a deposit might be transparent and invisible, or nearly so, when newly formed, and yet, under the action of time, develop into an objectionable veil. This may, therefore, be treated as a possible source of deterioration.

That ordinary tap water is not free from solid impurities, either dissolved or mechanically suspended, is a fact we need not call to our readers' attention, though probably some of them are unaware to what an extent the apparently clean water will sully the crystal brightness of clean glass film when the latter is critically examined after the water has been dried off. If this occurs on bare glass it will also take place in an intensified degree where a gelatine film is concerned; for there not only is the surface subject to contamination, but the absorbent nature of the gelatine itself causes it to absorb a considerable quantity of water, and necessarily to retain within itself, as well as on its surface, the solid contents of that water.

Without going minutely into the possible composition of these impurities, it may be said that those most likely to be encountered are absorbed into the film in minute quantities of soluble lime salts, sulphates, and other salts, while on the surface will remain adherent any insoluble matter, such as chalk-dust, organic matter, or mechanical impurities of one sort and another. How best to get rid of these, and to avoid any chance of deterioration that may arise from their presence, is the question.

With regard to the absorption of dissolved matter, we can say nothing more than we have already said in previous articles—namely, avoid, as far as possible, any conditions that are likely to lead to the conversion of soluble into insoluble salts, and, further, to give a final wash in distilled, or, at any rate, rain water previously boiled and allowed to cool. If these directions be followed, all has been done that can reasonably be expected to guard against a danger that is, perhaps, not great from the outset.

The mechanical impurities of the water are more likely to cause trouble than the soluble or chemical, but are quite as easily dealt with if their presence is recognised. Few ordinary workers take the trouble to perform a simple operation that we have frequently insisted on—namely, to finish off the washing of a negative or transparency by carefully rubbing its surface with a pledget of thoroughly wetted cotton wool, allowing the tap to run gently on it the while. Many will be no doubt surprised on trying the experiment for the first time of passing the finger over the surface of a gelatine negative just before rearing it up to dry, especially if it should have been *lying* in a dish during washing. Upon seeing the result of this, if wise, the operator will in future adopt the advice we have given.

Turning to the questions of deterioration from faulty methods of intensification, we must confess that we are not in agreement with several of the speakers at the meeting referred to. These object variously to intensification with mercury, or to the chemical employed after bleaching with chloride of mercury; but we would submit that if any deterioration take place—that is to say, if any change occur in the course of time, such as *fading* in the strict sense of the term—it is not a matter at all connected with what we have in hand. If a veiled or dull appearance creep over the originally clear lights of the transparency—an entirely different thing—it is the fault of the operator rather than of the method; it is, in fact, carelessness rather than failure in the chemical sense, and it is more likely to be palpable at the outset than to occur afterwards. The remedy is to apply more care in washing, and to observe the conditions already laid down.

Where a tendency exists to any abnormal veil, the aqueous shellac varnish, as a remedy in negative work, has proved invaluable, but we have no experience as to how it will stand the heat of the lantern. We have known it crack and reticulate when exposed to a very considerable heat, but probably it will bear all that it is likely to encounter for a short time in the lantern. It is made by boiling bleached lac with one-fifth its weight of borax, and diluting the solution to a sufficient strength. Allow this to stand until perfectly *bright* (filtration is useless), then decant it, and apply by pouring it on to the wet transparency on a levelling stand and allowing it to soak for a minute or two. Never use the same quantity a second time without allowing it again to clear itself. Drain the transparency, and allow to dry spontaneously.

Of streakiness in photographs we have heard beforetime, but the first time we have heard of the cause of the streaks being attributable to traces of hyposulphite of soda in the mount was at a three days' trial which took place in Liverpool and terminated on Saturday last, when a local photographer, Mr. Aaron Vandyke, sued a London firm of manufacturers, Messrs. Marion & Co., for damages for alleged loss through the cause mentioned. We thought every one knew that the presence of incipient traces of hyposulphite in a mount manifested itself otherwise than in streaks, which might perhaps be the case if in the course of manufacture the antichlor were applied to the large sheets of board by means of a small brush. But the streaks—how came they there? Fortunately, we are left in no doubt as to their cause, whatever the jury may have been. A witness for the plaintiff who mounted the streaky photographs said that after laying down the starched prints upon the mounts she invariably *licked the faces of the prints with her tongue.* Probably neither this lady nor her employer realised that by this proceeding she introduced the seeds of disease and decay into the print. The saliva of a *healthy* individual—which we

assume the lady print-mounter in this case to be—consists of not only water, but also of mucilage, albumen, chloride of sodium, phosphate of sodium, phosphate of calcium, and phosphate of ammonium. In an individual other than strictly healthy the number and varieties of soluble matters in the saliva have never been estimated. Who after this could wonder that prints, the faces of which were treated to such a dose, even from the tongue of a young lady, would eventually show indications of streakiness? The wonder would be were it otherwise. But as the jury could not come to any decision the case remains *in statu quo*.

The Vienna Club of Amateur Photographers in Vienna intends holding a so-called "Photographic Salon" in the Imperial Royal Museum for Art and Industry in April next year. The main idea of the exhibition is to invite photographers of high reputation to send the best work. A jury of artists and photographers will decide as to the admission of the pictures. Further particulars are promised shortly.

Platinotype workers will have already learnt through the rise in price of the prepared paper that metallic platinum is now at a very high price, and from all appearance is likely to remain so; indeed, every indication points to still greater cost of this "raw material," which already is closely approaching that of gold, as it is now more than three-quarters the price of the latter. This being the case, we would urge upon our readers the need of increased care in collecting the waste developing solution and not allowing it to be thrown away, as is too often the case. Already we see advertisements in the technical journals asking for old platinum crucibles, and offering a high price; possibly the advertisers hope to catch some chemist napping and ignorant of the great and comparatively sudden rise.

Silver, too, after such a long stagnation, is, in the language of the markets, lively. Its present market price is close upon four shillings an ounce, an increase of fifteen per cent. upon what it was a few months ago. As those interested in the study of bi-metallism are aware, we have to thank the American Senators in their action upon the silver currency question for this increment, which does not appear to have reached its limit yet. As a matter of course, nitrate of silver closely follows the fluctuations of the market in metallic silver, its price not affording much margin. We are not aware that the price of sensitised paper has gone up, though photographers must be prepared for it. Albumenised paper itself is dearer in price in some quarters, and indeed we may anticipate that other continental productions besides albumenised paper will have an upward tendency before long—mounts and mounting cards for example.

American photographers are much exercised in their minds at present by a proposed alteration in the duty on albumenised paper. This, which formerly was twenty-five per cent., has for some time been fifteen per cent., but in the new Tariff Bill it was placed at thirty-five. The opposition this alteration met with led to its being reduced to the original twenty-five, but the photographers are agitating for the duty either to be left as it has been of late or taken entirely off on the grounds that possibly the amount of duty laid upon albumenised paper for the purpose of protecting native manufacture would stop importation, the foreign make being superior to any that could be made in the States.

Old collodion workers are familiar with the change undergone by ether after keeping, and especially if exposed to light, in regard to the property thus imparted to it of liberating iodine from salts of that haloid dissolved in it. For some time the theoretical change has been attributed to the formation of hydrogen peroxide under the action of light; but at a recent meeting of the Chemical Society, Professor Wyndham R. Dunstan and Mr. T. S. Dymond read a paper describing the result of their investigations on this subject, and they state that, contrary to the usual belief, pure ether, either wet or dry, does not form hydrogen peroxide when exposed to light (daylight or electric light). When, however, the ether has been prepared from methylated spirit the peroxide does form after some time, though not if the ether has been treated with chromic acid. In the discussion which followed, Professor Ramsay made the interesting statement that he, working in conjunction with Professor Young, had found that in order to eliminate all the alcohol from the ether, they had found it necessary to wash about fifty times with water before the iodoform test ceased to afford evidence of the presence of alcohol.

In a well-known continental technical journal this subject was being treated about the same time. It states that the so-called pure commercial article always contains various impurities, which, on spontaneous evaporation, remain behind as an ill-smelling residue. Sulphur is detected by shaking up the sample in question in a test-tube with a drop of pure, bright mercury. If the quantity of sulphur is very small, the surface of the mercury is merely rendered dull and grey; if there is much sulphur the entire liquid turns grey or black.

Mr. C. V. Boys has recently been making some photographs of drops of water in their various stages of formation, and in a paper entitled "Photographs of Rapidly Moving Objects," read before the Physical Society early this month, he describes his apparatus and the results obtained by its aid. It consisted of a lantern and lenses, by means of which a trough wherein the drops were formed could be strongly illuminated, combined with a camera and revolving disc, with one perforation. The exposures taken have, perhaps, for combination of rapidity of production and of sequence, not before been equalled, were one six-hundredth part of a second in duration, and were made at the rate of twenty in a second. The dark slide was about three feet long.

Dr. Thomas Taylor, of the United States Department of Agriculture, has designed an entirely new kind of flash light, intended to displace a number of the dangerous flash compounds at present in use in America. It is stated to consist largely of charcoal made from the silky down of the milk-weed—a form of carbon almost free from ash. Dr. Taylor exhibited the results of some of his powder and a sample of an interior flash light, burnt side by side, on a piece of white paper. In the new powder the flash was so instantaneous that it did not even scorch the paper, while the other kind used not merely scorched but set fire to the paper.

Dry Point.—This comparatively new style of picture, of which we have only heard within the last fifteen months, bids fair to become more or less a leading feature in photographic portraiture; but we think it unfortunate that they are so costly in their getting up, and that this will prevent the demand for them becoming general. The results of "dry point" finishing are decidedly in advance of the smooth, boneless sets of features that the public is often required to accept as portraits. Novelty is not claimed for this method of working up enlargements—which, by the way, is open to all, not being protected by patent, and which, we are told, is not a mere artist's trick or dodge; those examples that have come under our view resemble fine engravings, to our mind, more than photographs. The effect is certainly very refined and artistic, their only objection at present being the cost. Mr. Flather, the producer, has left a charming specimen with us, charging ninepence per square inch for the smaller sizes; but, no doubt, time and a little competition will bring this to its proper level.

EIKONOGEN.

It may seem rather late in the day to attempt to say anything fresh about what has now ceased to be the "new" developer, but as my experience with eikonogen has varied in some slight degree from that of others who have written on the subject, it may, perhaps, be worth recording.

I may premise that my experiments have all been made with the original form of eikonogen, a package of which was kindly placed at my disposal by Messrs. Marion & Co. soon after its introduction. When first opened it consisted of a nearly white crystalline powder; what now remains of it resembles at first glance ground coffee,

although it has been kept in a stoppered bottle, to which it was at once transferred from its original tin. When dissolved, the solution has about as uninviting an appearance as can well be imagined, being as dark and muddy looking as alkaline pyro that has been standing for an hour or two. What I am able to say in favour of eikonogen can scarcely, therefore, be set down to the conditions having been too favourable.

The dark crystals may be purified by solution in boiling water, from which, on cooling, the excess will crystallise in a nearly colourless condition, and the drying may be effected with alcohol. If a weighed quantity be dissolved in the smallest possible quantity of water, the loss on recrystallisation is not great, and what remains in solution may be used for negative purposes, though, possibly, it might stain a paper print.

With regard to the claims made in favour of eikonogen by its introducers, I do not intend to deal, as that portion of the subject has been thoroughly treated by Burton and others, while I have not attempted any definite series of trials. I may say, however, that on first trial I was not favourably impressed with eikonogen, from which it happened that it was some months before I put it to any real test. My objections to it were, first of all, too great rapidity of action, want of density, and general inferiority in the quality of image as compared with either hydroquinone or pyro, and this although I varied the formula in several ways, besides using that given by the makers. It would be manifestly unjust to condemn any new agent, however, on a first trial, as I have since found in this particular instance.

Before proceeding further, I should like to define the position I take in connexion with the different developing agents. I am not going to say that eikonogen is superior to pyro or hydroquinone any more than that either of the latter takes the lead of the other. I quite agree with those who remain satisfied with pyro because it is capable of producing any desired type of result; the same may, perhaps, be said of hydroquinone and eikonogen, though in a somewhat restricted degree, owing to our being less familiar with them. I don't agree with those, however, who allege that pyro produces *better* results than can be obtained by other means; it may, perhaps, in their hands, though others may take precisely the same ground with regard to the other agents. It remains greatly a matter of taste, of convenience, or of circumstances, and in comparing the three substances in general use, it is my wish to do so impartially, and with the special purposes to which they are to be applied kept in full view.

Pyro, "our old friend," is naturally the one with which we are best acquainted, and it is, perhaps, not very surprising to find the "old hands" cling firmly to it in preference to its newer rivals. It may be the proverbial conservatism on their part, but I think it is just as likely to be that the newer hands find it just as easy to learn to use eikonogen or hydroquinone as pyro, and to produce equally good results. It is a difficult matter to gain twenty years' experience in a week or month; but I do not think that any friend of pyro will claim for it the same freedom from liability to stain the gelatine film that can be urged in favour of hydroquinone, and still more for eikonogen; and this, I take it, to be the main, if not the only point on which the relative differences in value turn when the subject is worked out to a practical issue.

Pyro employed without sulphite will inevitably, unless a very full exposure be given and a large proportion of bromide be employed, produce a more or less yellow tint in the transparent portions of the film, as well as a yellow cast of image. The printing quality of the negatives is not necessarily lowered thereby—some, indeed, go so far as to say the quality is improved—but the time occupied in printing is of course increased, while the colouration totally unfits pyro for positive work. But pyro possesses the advantage over its rivals of being apparantly equally available for use with any kind of alkali.

Hydroquinone has less tendency to stain than pyro, but images forced with carbonate of soda as the alkali do frequently exhibit a very strong yellow stain. I have never met with it when using potash or ammonia. But though this agent under ordinary circumstances gives images of great beauty, and is, indeed, capable of producing the highest quality of result, it labours under a series of disadvantages. It is slow in action, is occasionally liable to freaks of irregularity in development, and in some hands tends to the production of hard results; it is, also, not well adapted for use with ammonia. These defects are not insurmountable, but they render care necessary.

Eikonogen is still less liable to stain than either of the foregoing, though in cases of prolonged development following short exposure a stain does often occur. But as I have already seen pointed out in the JOURNAL, the stain so produced is perfectly soluble in plain water, and will soak out of the film completely without any clearing solution if a little time be allowed. The stain produced by hydroquinone is, in my experience at least, indelible; that is to say, the ordinary clearing solutions produce little, if any, impression on it. Pyro stain is not *completely* removed by such clearing solutions, as is easily proved by scratching the clear edge of a negative, when the contrast with clean glass will render the veil very palpable. Besides this, the yellow stain peculiar to the combination of pyro with carbonate of soda, though discharged by the acid alum bath, reappears when the film is washed. The difference in behaviour of eikonogen therefore recommends that agent wherever absolute clearness is a necessity.

The last-named agent is also free from the faults of hydroquinone; it is rapid in its action, more so, indeed, than pyro, exhibits none of the tendency to irregularity or patchiness of development, nor inclination to hardness or over-density. On the contrary, it is remarkable for the delicacy and fine gradation of the images produced, and has been objected to on the score of the difficulty there is in getting density. This was a fault I found with it at first, but recent experience has proved that it is not at all a necessary one, as I can get any required depth of deposit, even with plates that under pyro development give very thin images. The way out of the difficulty I shall endeavour to explain.

The restraining or retarding action of bromides, sulphite of soda, and other additions to the pyro developer has formed the topic of many a discussion in past years, but whatever the action may be decided to be, it is an undoubted fact that it is proportionately far stronger in conjunction with hydroquinone, and, as I think, stronger still when eikonogen is used. Hydroquinone employed without either sulphite or bromide—as it may be without producing stains—is by no means the slowly acting developer many find it under ordinary circumstances. But it is somewhat unmanageable under those conditions, and does not readily give density. It is only when the restrainers are applied, but especially bromide, that patchiness of development and over-density come in.

Similarly with eikonogen when employed alone (*i.e.*, without bromide or sulphite) it acts with excessive rapidity, and gives very thin, but well-detailed images, and these have led some observers to claim for it the capability of shortening exposure. But if the same exposure be given, and a developer containing restraining bromide, with or without sulphite, be employed, it will be found that the same detail, with much greater intensity and "pluck," will be obtained, but a longer time will be required for the action to take place. The bromide is the agent that is most active in effecting density, and this it does in proportion to the quantity employed, the time of development being correspondingly increased. But in this matter eikonogen differs from hydroquinone in that, though the density is increased by the addition of bromide, there is no advent of the accompanying evils of patchiness of development or inconvenient hardness. I have used abnormally large proportions of bromide, protracting the development over several hours, with the result that, though the density was extremely great, it was proportionate or well-graduated throughout the image, whereas with hydroquinone the lights would have become opaque long before the faint details of an under-exposed image had been touched.

It must be borne in mind, however, in employing bromide for this purpose that it must be added more sparingly than in the case of either pyro or hydroquinone. A little produces a great effect at first, and then for a time *small* increments make comparatively little difference. For instance, a plain solution of eikonogen and alkali applied to a properly exposed plate will give a feeble, useless image; a second plate developed in the same solution will give a better, and a third a still better result, after which little variation is noticeable for some time. Here, again, eikonogen differs from hydroquinone, for with the latter the special action of the bromide in setting up the irregularity and patchiness of development renders it impossible to successfully apply the same solution to a succession of films.

In conclusion, I may state a recent experience for the double purpose of giving a formula, and also showing what may be done with eikonogen under apparently trying conditions. I had made a number of "drop-shutter" exposures, and was compelled to develop at least one just to "see how they were going to turn out." I had no stock pyro dissolved, and no reliable sulphite at hand; I dare not use hydroquinone for such short exposures—at any rate, not from the solution in stock—so I was compelled to fall back upon some of the coffee-coloured eikonogen already mentioned. This was dissolved in the proportion of ten grains to the ounce of water, and for use was mixed with an equal quantity of a forty-grain solution of washing soda, and to each ounce of the mixed solution one drop of a sixty-grain solution of bromide of potassium was added. The formula for an ounce of developer would therefore stand:—

Eikonogen	5 grains.
Carbonate of soda	20 „
Bromide of potassium (sat.)	½ grain.

The solution when poured on to the film was so dark and "muddy" as to entirely hide it, and rendered it necessary to pick up the plate in order to watch development. This proceeded rapidly, and was complete in less than five minutes, the result being a vigorous, well-detailed negative, with just the faintest suspicion of yellow in the shadows. After soaking for half an hour in water the least one can fairly give for the removal of the hypo—the stain was entirely gone, and the finished negative was as clean and perfect as if sulphite and half a dozen clearing solutions had been employed. I may add that I finished off the remainder of the negatives in the same way, and have adopted that as a useful standard formula, varying only the quantity of bromide to suit circumstances.

From more recent trials I have come to the conclusion that, except for keeping purposes, sulphite is better omitted, as it cannot be relied upon to work with the same uniformity in its retarding action as bromide.

W. B. Bolton.

THE ART OF RETOUCHING.

Chapter VIII.—The Lower Portion of the Face.

To the most casual of observers the nose will always appear a leading, if not absolutely *the* most prominent feature of the face; and, indeed, the success of a portrait will depend very materially upon the degree of success with which we treat it. This remark applies from first to last, as it is a matter which exercises the ability of the *operator* quite as much as that of the *retoucher*. The feature which must guide a skilful and thoughtful operator, and the one to which he would give his first attention, is the nose. In most cases, upon this feature will depend which side of the face he will select for his portrait, and still further will this feature be his guide as to whether he will *pose* his subject *full face*, *profile*, or any of the intermediate grades. To secure repose as well as beauty (when possible) to this feature is, therefore, the artistic operator's first care.

It must be only natural to suppose that a feature which is of such great consideration to the operator must be of no small importance when placed in the hands of the retoucher. Many times a kind of compromise will be found advisable, if not altogether necessary, in order to produce a good picture and striking likeness. The operator, in studying his pose, may find it impossible to so turn the head as to secure the greatest degree of likeness or individuality, and at the same time secure beauty and repose to the nose. In such cases he shares his troubles with the retoucher, and so arranges his subject that a few skilful touches judiciously placed by the latter will put matters satisfactory for both. In all such cases the combined efforts of the operator and retoucher, and their mutual endeavour to help and work with each other, can alone succeed in producing successful and artistic pictures.

Many times the retoucher will be called upon to give absolute form to the nose, and this, it is needless to say, will often tax his ability to the fullest. A nose, for example, may have a very sudden rise at that point usually known as *the bridge*, and should the head be so posed as to show this fact too plainly, either through an oversight on the part of the operator, or the fixed desire of the sitter to be taken in a certain position, or any other cause whatsoever, the retoucher must judiciously fill in this hollow. Although filled in, in such a manner as not to attract or rivet the attention of an observer, the most modified indication of same must be retained, so that those who know the sitter may *think* they see it, but under most favourable conditions. The ordinary observer will, of course, fail to discover the assistance rendered by the retoucher, and, consequently, have no fault to find. All this, however, would not be so if we, as retouchers, were to remove *all* trace of this hollow. Were we to remove it completely it is more than likely that every one would observe the sweeping change, and be as likely as not to declare the portrait not a bit like the original; in fact, that it has been deprived of all likeness and character by the process of retouching. One touch, more or less, of the pencil may mean the difference between success or failure in such a case, therefore the greatest care must be employed.

These remarks will also refer to all cases where the retoucher may be obliged to depart from or alter the drawing or outline furnished by the negative. The more skilful the hand that directs these alterations, the more successful the results must necessarily be. Many times the outline on the shadow side of a face may give, in parts, a certain squareness of formation to the cheek which is anything but pleasing. The least touch of the pencil may suffice to cure this defect, and that, too, without in the least altering the likeness; on the contrary, the expression and intellectuality of the head may be enhanced very considerably. The "*heavy jaw*" may also be similarly treated, even on the *light* side when required; but generally it is not so often or so strikingly observable as on the *shadow* side. This alteration or, may we say, rectification of outline must always be carried out with the greatest care and judgment, as the *least* modification may produce very considerable effect, and which must show to the improvement or detriment of the picture. All these points demand a large amount of attention from the student; and, as a primary advice, *always err on the side of moderation in making these alterations*, as you can always add to, but seldom advantageously reduce the work when once it is fixed.

To return more strictly to the nose and its treatment, we will for the moment put all other considerations on one side. The first thing to strike an observer is the light running along or down the ridge of the nose. The treatment of this must be very carefully and delicately carried out, otherwise the rest of the work upon the face, however nicely done, will be very considerably deteriorated. Thousands of negatives are hopelessly ruined yearly, although in other respects fairly well retouched, by having the likeness spoiled by the introduction of a strong line of light running down the nose, altogether out of character with the feature itself, and almost always altering the shape of it. There are many who think that they have mastered the most essential points in the retoucher's art when they fancy themselves capable to put a patch of light upon the forehead and run a straight line of the same down the nose. At the end of this latter they put a spot or bulb of extreme light, and shake hands with themselves on having, if not absolutely *made* the feature under treatment a success, at least produced an original work of art. People so easily pleased with their own work should be very happy, and no doubt they are, if they have 500*l.* a-year to back them up. But such a self-satisfied manipulator will have unlimited difficulty to find any good class photographer who will allow him to amuse himself with his negatives.

The line of light running along the ridge of the nose requires but little, and I never advise that little to be in the form of a continuous line of light. In the ordinary run of negatives fairly well lighted, this line of light is generally sufficiently indicated to thoroughly determine the exact shape of the nose. Now, if we alter this we must necessarily alter the feature, and thus lose the likeness. I have always held that by starting the light at the upper or top part of the nose, and carrying it down half way, that is, nearly to the centre, then making a slight break, and finishing by placing the high light on the end or lobe, all the effect of a continuous light is gained, without the many defects that would necessarily accompany such a treatment. The eye, if I may so express myself, is carried over the break, and can fancy an unbroken line of light to exist. This treatment has many points to recommend it. Properly done it will ensure regularity of formation to the feature, but not really alter the shape or expression of it. By such a treatment many noses, in themselves

irregular, possessing peculiar distinctiveness, and even holding the greatest amount of likeness as a result thereof, may be benefited and made presentable in a picture; while the continuous line of light may make a *better nose*, but all resemblance may at the same time be completely lost.

The apparent length of the nose is greatly influenced by this line of light. By its judicious adjustment the idea of *length* may be imparted, which will in some faces produce dignity or importance, whereas, left to itself, the nose may be a very insignificant item, and fail to produce a balance with the other features. Of course, this idea of breaking the line of light must only be accepted in a general sense, as must the *position* of the break be determined by the judgment of the retoucher. Sometimes, by making this light more intense and broader at the middle, a better shape will be imparted; in fact, fineness or breadth may be given to the nose by the skilful placing of this light. Sometimes the end of the nose may show signs of a double formation, seldom very apparent, and in such cases the light will have to be sharper, or, perhaps it would be better to say, more angular.

The delicate cartilage forming the wings of the nose should not go without their proper share of attention. A round, soft, and diffused light should be placed upon them, just a shade above half tone, and when the inner portion of the nostrils may appear too dark the retoucher will do well to touch lightly over it, in order to relieve the intensity of the shadow. In the plain photograph or the negative before it is retouched the correct balance of light and shade is not always secured, the shadow in this case being greatly intensified; how much more noticeably, therefore, must this balance be lost when all the surroundings have been worked upon, if we neglect to touch the nostrils? I have seen the nostrils in such photographs print so black they might as well have been two blots of ink, and, of course, thoroughly ruined the effect of the pictures. And a little thought would have remedied all this!

Having so far treated the feature itself, we must now treat the surrounding parts connecting it with the rest of the face. This high light on the nose must necessarily be soft and never too strongly defined; therefore care must be taken, in softening it into the half tones, not to lose too much of the latter. The delicate shade or half tone down the nose—between it and the cheek in light—is of great value to the picture, and the more it can be preserved the better for the portrait. This half tone will be invaluable, not only in helping to make the nose stand out in relief, but also to enable the retoucher to produce rotundity in the cheek. Rotundity should always be sought after—flatness avoided. In nature, faces may sometimes appear flat, but they are really round. I dare say you have many friends who have the reputation of possessing "square" heads, but examine them closely—they will not be very far off the round.

In many faces the shape of the nose may almost be said to depend upon the careful treatment of the surrounding parts; this will be most observable in such faces as have a very slight, if any, indication of the labial furrow. It is a peculiarity among Americans that they seldom possess this trait. Such subjects are necessarily rather difficult to treat successfully, for the absence of this furrow will make the nose appear much larger, and to add to the trouble this defect is very likely to be exaggerated by photography. The Americans are not the only people who are generally wanting in this formation; as a rule, the Swedes and Indians in a large majority possess the same peculiarity. To those who are not used to negative retouching the presence or absence of this distinctive furrow may seem of but slight importance, but to the regular retoucher it is an invaluable adjunct.

The upper lip, coming immediately under the nose, necessarily has much to do with the well-being of the nasal organ, and must be retouched with considerable care. There is a great deal of distinctive character about this upper lip; indeed, much more than people are likely to think at first. Of course, if covered by a heavy moustache we are at once set free from all trouble; but in men's faces shaven—and in ladies' faces—the matter is different. This portion of the face has not only to aid in showing off the nose to advantage, but the shape and expression of the mouth will depend very largely upon our treatment of it. In the centre of the upper lip is what we may best describe as a *groove*, and which terminates in the septum of the nose. After generally clearing the entire surface, we must brighten to a consistent degree the projecting edges of this groove, increasing gradually the light on same as it approaches the end at the edge of the lip. Done carefully and tastefully this will help very much towards imparting expression to the lip proper, and which will in turn tend towards the vivifying of the mouth and its surroundings. The light on the light side of this groove must be brighter and somewhat longer than the one on the shadow side; this is important, not only with an idea of helping the perspective, but because there is a natural shade thrown by the nose over the light on the shadow side, and which must on no account be disturbed at this point. It is marvellously easy in these small details to almost ruin a correct likeness.

In cases where there are distinct indications of a strong beard or moustache, the same must be carefully preserved, or else much character and likeness will be lost, and the portrait generally lack what may be termed *colour*. This remark will also include the working towards the corners of the mouth. If the delicate little half tones be not preserved about the mouth, expression must be weak, and the lips appear by contrast much too dark and heavy to be natural or pleasant to the eye. It is only by careful attention to all these details that one can cultivate a thorough knowledge of the necessities of a negative and the various means to obviate their defects. One may take up a number of negatives and not find *one* to which *all* these remarks will apply, but they will be sure to find them all demanding some different portion thereof. In all cases it is best to know a little more than is required, than be forced to work in uncertainty for want of sufficient knowledge of the subject under treatment.

REDMOND BARRETT.

PHOTOGRAPHING MARINE MODELS.

THE extraordinary advances that have been made within recent years in the building of marine models are most marked to those observers who can look back upon the productions of later times in the shape of half models in close contact upon their upright supports. Recently all this is changed, and now the custom is to spare no pains or money in building up full-rigged models that embrace every rope, spar, and rail, down to the most minute detail of the builder's plan. Examples of these modern types are now to be found in the exhibits under the shipbuilding sections in all our international exhibitions, the cost of which is certainly great. The extraordinary perfection to which this building of models has now attained has led to a common practice on the part of most owners and shipbuilders to have these photographed, therefore a few practical notes may be of interest to the readers of the JOURNAL. For some time back I have had to do a fair amount of commissions in this class of work, and quite recently have been doing models of a size over ten feet long, which is perhaps about the largest, if, indeed, not really the largest, model that has ever been built.

When an operator has to undertake this branch of photography there are a good many minor circumstances to be taken into consideration that do not, as a rule, apply to work done in an ordinary studio. First and foremost comes the objection on the part of the builders to have their models removed to a studio for the purpose of being photographed, for, be it remembered, a model of such large dimensions as I have mentioned, with all the fine work in rigging, guns, compasses, and fine deck work, is not improved much by being shaken about in transit from one point to another, therefore, whenever it is practicable, the work of photographing such is generally performed on the spot where the same is being built. During the course of a somewhat pretty extensive experience, I have found that, in this respect, this work resembles much that one finds when working on paintings, viz., that it frequently happens the light is quite suitable where the model is built, just like where a picture has been painted. And if length of floor space can be had, then the work of photographing is quite well done without any moving about of the model being necessary.

In undertaking this class of work, perhaps the item of first importance is the background, and where the model is of such dimensions as over ten feet long this is a matter that necessitates some little outlay. Such, however, is never misplaced, as on this will depend much in the way of ultimate success. The selection of a suitable background will of course depend a good deal upon the colour of hull and tint of the deck plan and rigging.

In cases where the former is of light colour tints—such as flesh colour under the water line, and, as is frequently met with, light colour from the water line to top of bulwarks, or deck line—it will be found that a background, graduated from a dark to a medium slate-coloured tint upwards, will come in very well to relieve the light tints

of the hull and the more sombre tint of the standing rigging, &c., and when it is decided to treat the photograph as a mere representation, pure and simple, of the model, such will be found as good as any. It frequently happens, however, that builders and their *confrères* take high flights of fancy and express a desire to have these models so photographed as to represent them in their native element. In the writer's opinion such is always a mistake; nevertheless, when such a desire is expressed, there is often no help for it but just to yield to the wishes of these, and do the best to fake up an imaginary foreground of sea with a corresponding suitable seascape background.

Not very long ago an old salt that the writer came in contact with was quite bent on having his model portrayed in this manner, and the following is how we went about the job:—Having provided a good marine background, the model was so placed as to bring the sky line in proper position with the hull of the model, so as to yield a fairly good perspective. This done, we had to build up the foreground, so as to cover up the pedestals upon which the model rested upon its base. After a good many trials we hit upon a plan which far exceeded my hopes at starting; in this I must own that my old friend "Ship aboy" showed the proverbial tack for ingenuity which one so often meets with in sailors. We tried several expedients, but all proved of no avail, until at last we thought of the stuff that tailors use for padding the breasts of coats, &c. I don't know exactly the right name to apply to this useful material, but it came in very handy for the purpose we wanted. I believe it is known among clothiers as black padding; be this as it may, it is to be had in very long lengths, I should say at least twenty feet lengths, and about a yard wide, and where the background is of a nice dark tint, the colour of this stuff just harmonises nicely with the same.

In building up the sea foreground, the wadding can be teased out into any desired shape, so as to give a very fair representation of waves and sea, and very little arranging will permit of the same being nicely arranged along the water line of the hull, so as to hide entirely the pedestals upon which the model is supported. After all is completed in the way of making up the sea with this tailors' wadding, much may be done in the way of giving effect to the whole by a judicious application of a little whiting here and there, so as to yield a little contrast to the foreground, and make it as natural as possible. Such little arrangements take up a trifle of time, but where, as in the case in question with me, the owners were determined to have the foreground built up, I know of no better way of faking up an artificial sea. Although against my own sense of what the photograph ought to be, I must say I was quite surprised at the result, and seeing my friend was pleased, of course all ended well.

As a rule, the hull of these models will be found to be enamelled, and where they have to be photographed upon a highly polished baseboard, as is generally the case, some little trouble will be found in dealing with the reflections on the lower parts of the hull; this will be nearly always present where it is decided to take the picture as a model only. I have tried nearly every conceivable plan of overcoming these nasty reflections, and have at last hit on the plan of dusting pepper on to the sole plate of the model: this gives a somewhat granular appearance to the sole plate in the finished picture, but it gets rid of the reflections on the hull.

I have already said that the tint of the background should be such above the sky line as to relieve the standing rigging of the model. When all is prepared for the exposure, should it be found that, owing to a cross lighting or other unavoidable circumstance, some of the rigging is in parts rather too dark for the tint of the background, the same can be remedied by a slight rub with moist pipe-clay, applied between the thumb and forefinger. This can afterwards be rubbed off quite easily.

As to lighting the model, this is a matter of the utmost importance, but is just one of those cases no writer can offer an opinion upon, for much will depend upon the place where the work is to be done. Whenever it is possible, however, it is very desirable to have a predominant light striking the model from the front, that is, so place the model as the bow will be *under* a direct front light, such as would be the case when the bow is pointed to a window. When this is done, cut off some of the lower light of the window, so as to give relief to the lines of the model.

Such are among a few of the important points to be considered when undertaking this class of work.

T. N. Armstrong.

ABOUT HYPO.

It has probably occurred to many who have read the numerous articles that have been written on the subject of silver printing, that much stress has been laid on that division of the process termed fixing—the purity of the hyposulphite of soda and the thorough removal of the unstable silver salts. It is vastly more easy to direct that the prints should be properly fixed, and a good sample of hyposulphite of soda used, than to carry out the recommendation. As far as any visible alteration goes, an improperly fixed print is undistinguishable from one that has been effectively treated. This has been always a great difficulty, for when a fault cannot be seen at the only time when a remedy is effective, the probability is that it will remain undetected until too late to be of any value. It has been accepted as a rule by most printers, that when the prints look clear by transmitted light during fixing, the operation is complete. This is right so far, that if they do *not* look clear they are but partially done; at the same time appearances are deceptive, for a print may conform to this standard and yet fail to be thoroughly freed from the silver hyposulphite, and so retain elements of instability that will develop themselves in a longer or shorter time to the partial or total destruction of the photograph. A weak solution of hyposulphite will be sufficient to form this salt, but will not redissolve it when formed. Impure is practically equivalent to weak hyposulphite; and it is important that the photographer should be able to distinguish between good and bad without the necessity of performing any elaborate chemical experiment which would be prohibitory to the majority. A certain amount of trouble must be incurred, as there is no off-hand easy method of ascertaining.

The only reliable easy plan available to the majority of photographers is one that has been repeatedly recommended, that is, testing the solvent powers of the hyposulphite on iodide of silver in a collodion film spread on glass side by side with that of a known pure sample. It is not a very great deal of trouble now, but in the days when wet collodion was *the* process, it was almost as easy as testing with litmus paper. Suppose we wish to test a sample of hypo. We first make a weak solution, say sixty grains to the ounce, or even weaker, of water, of a known pure salt—this is our standard; pour it into a glass vessel (a wine-glass will do) and set it aside; in another glass place a similar quantity of a solution of the hypo to be tested, of course of the same proportions. Make a solution of silver nitrate in distilled water, thirty grains to the ounce; in another glass pour a little iodized collodion on two strips of glass, drain, and as soon as the collodion has set, place them on the silver solution, moving them occasionally until on lifting them out there is no greasy appearance on the surface, and the film presents an even yellow coating of iodide of silver; wash under the tap, then simultaneously place one strip in each solution of hypo, that is, in the standard solution and that to be tested. Note carefully the time occupied in dissolving the iodide. If the hypo under examination dissolves it in the same time as the standard solution, the sample may be considered good and reliable, but if much more time is taken to effect a clearance the hypo may be condemned as impure; the more slowly the solution takes place the worse the hypo. Dirt may be present, and in the majority of cases generally is, but this is of no practical importance so long as the solvent powers are unimpaired. We may thus by a simple test know if we are or not working with an unreliable salt.

When the stability of our work depends so greatly on the quality of this chemical, it is surely worth while to be at a little trouble to ascertain its purity and suitability. Does hypo deteriorate? Under certain conditions it undoubtedly does; but as the change is but slow, it is of unfrequent occurrence with the majority of photographers. Light and moisture form the change, and gradually rob it of its solvent qualities. Strong solutions kept in the light are much more liable to change than if they are kept in the crystalline form and dissolved when wanted. On this account stock saturated solutions are not to be recommended.

Acid hypo is sometimes complained of, but I think it is of rare occurrence. If the sample has an acid reaction it is unfit for use. The addition of a little ammonia to assist its solvent powers was suggested by Mr. Spiller, and has its advantages; it has also been recommended as a cure for blisters on albumenised paper prints, but for this purpose I think its use somewhat problematical. Some hypo when dissolved has a faint sulphurous odour; in this case the addition of a little alkali, as ammonia or carbonate of soda, will be an improvement and can do no harm. The regular practice of adding a small quantity of liquor ammonia to the hypo bath is to be decidedly recommended.

How much hypo is required to properly fix a sheet of printed paper? This question has been frequently asked. The reply is that the quantity is dependent on circumstances. The temperature of the solution and the amount of silver in the paper are the principal factors in the matter; an ounce might possibly fix a sheet, but it would be very unwise to only use an ounce. Hypo is inexpensive, an extra quantity will do no harm, therefore the use of more than is absolutely necessary is a safe principle to work upon. I do not mean that the solution should be made so very much stronger, but that the quantity of the solution should be ample.

There are several drawbacks to the use of very strong solutions, the chief of which are loss of half tone and impairment of brilliancy. In some cases the image will be seriously damaged almost to obliteration. Twenty to twenty-five per cent. is a good strength; with weaker solutions it is doubtful if the print is thoroughly fixed, even if the time of immersion is very much prolonged. The image may be impoverished without the silver hyposulphite being dissolved out. The permanency of the print almost entirely depends on its being freed from this salt, the print being good in other respects. The unfortunate thing is, as before stated, there is no visible guide to this knowledge. The print may look all right and yet be in a very doubtful condition as to permanency. The safest plan is never to fix too many prints in the same solution, two baths being much better than one. Imperfect fixation is the most frequent cause of fading prints. There is such a temptation to treat too many in the same bath, and as they all look alike at the time of preparation, it is taken for granted they are alike. Some years ago a gentleman, I forget his name at the present moment, read a communication on this subject to the Photographic Society, advising an entirely new bath for every sheet of paper, and this position is unassailable from a theoretical point of view, but scarcely practical where many sheets have to be dealt with. The nearer we go to this the better for the prints.

After fixing comes the washing, to thoroughly free the paper from the altered and unaltered hypo, the last traces of which are supposed to be with difficulty got rid of, hence the system of long soaking in water with agitation. The remedy is almost as bad as the disease. Free the prints from the hypo by all means, but do it rapidly. An hour's alternative draining, squeegeeing, and washing will produce brighter and better prints in all respects than prolonged immersion, and will more effectually abstract the hypo than the usual twenty-four or thirty hours. Warm water is preferable to cold.

The moral of the whole process is, get rid of the hypo as *rapidly as possible*, and do not let the prints remain wet any longer time than is absolutely necessary.

EDWARD DUNMORE.

PLANE POLARISED LIGHT.

[A Paper read at the Camera Club and published in its Journal.]

STANDING up to address an audience devoted to science, I need hardly do more than remind you of certain fundamental facts in connexion with light. First, that light consists of a series of undulations or waves of a most rare and elastic medium, which has received the name of "the ether." Second, that these waves are executed at right angles to the direction of the ray of light, in the same manner as water waves. Third, that these waves vary in length, and that these variations give rise to colour: red light consisting of the longer waves, and violet light consisting of the shorter waves. Fourth, that white light (such as sunlight or the limelight) is composed of all the colours of the spectrum. Fifth, that if by any means we can destroy waves of one length, *i.e.*, one colour (say red) out of a beam of white light, we shall only have the remaining waves left, and they will together give us the complementary colour to the one destroyed—in this case a bluish-green.

Now, in what way can we destroy one colour out of a compound beam of white light? One way is by the interference of one beam with another; thus,—If we have two exactly similar series of waves sufficiently near to affect each other, we may either have the two acting in concert and producing a double effect, or we may have the two acting against each other and producing no effect at all. And you will see that the latter effect is caused when one wave series is half a wave length, or any odd number of half wave lengths, in advance of the other series. Hence we may have two beams of a monochromatic light (say red) producing no effect at all, *i.e.*, producing darkness by their mutual destruction. You will also see from my diagram that the advance of half a wave length of the longer waves may equal a whole wave length of shorter waves, and hence the same amount of advance or retardation may destroy the one colour (red) but strengthen the other colour (violet).

In passing, I may mention that there are several ways of causing this retardation of one series behind another. I will, however, give you only one instance—that of thin films of a transparent substance. For let A B be a ray of light falling upon a thin transparent film. At B part of it is reflected to B C, part passes through to D, and is there reflected on the other side of the film and emerges along the line E F. Now, manifestly E F is parallel to B C, and it is a little behind it in time, as it has had to travel the extra distance B D E. If, then, this distance B D E be equal to a half wave length of any coloured light (say red), the two series of waves will be in discord, and will, consequently, interfere with and destroy each other. Hence, if the original ray A B is white light, and we have thus cut out or destroyed the red rays, we have only the remaining colours of the spectrum left, and they together give us a green, or the complementary colour to red. We may show this experimentally by taking a thin film of air between two glass plates.

Let us now turn to the special subject of this evening, viz., plane polarised light. I said that light consisted of vibrations executed at right angles to the direction of the ray. In common light these vibrations may happen in any orbit, provided they are at right angles to the direction of the ray. But in plane polarised light they are executed in a definite plane, and hence polarised light shows special phenomena, which we do not see in ordinary light. First, let us see a few of these phenomena, reserving the explanation till later in the evening.

If we take a piece of Iceland spar and place it in front of the lantern, we see that the single spot of light becomes a double one: our original beam is split up into two; and as we revolve the spar, one spot rotates round the other. If, now, we put another piece of the spar in front of the first piece, we have in some positions four images; in others, two images; and in others, one. It is manifest that the pencils of light which have passed through the first piece of Iceland spar differ remarkably from common light, and that the difference essentially consists in this, that they behave differently according to which of their *sides* are presented to certain sides of the second piece of spar. We have here an analogy to the polarity of magnets and currents of electricity which has given to this description of light the name of "polarised light." And the analogy goes further. As we cannot detect magnetic polarity until we bring to our supposed magnet some other magnetic or diamagnetic subtance, by whose attraction or repulsion we detect the magnetism; so here, we could not detect that the two rays of light which we got from the first piece of spar differed from ordinary light, until we tested them by our second piece, similar to the first. This holds good throughout the subject. Much of the light we see in every-day life is in reality polarised, but it cannot be detected from ordinary light unless we examine it with some apparatus which itself polarises light. Such a piece of apparatus for examining whether light is polarised is called an "Analyser," and a polariscope consists of a polariser and an analyser. Thus, in the case of our two pieces of Iceland spar, the first acted the part of polariser, and the second the part of analyser.

But an Iceland spar polariscope would be awkward to use, as each piece gives two images, and we thus get, when we look through polariser and analyser, four images. This is confusing, and we can do better. There is a certain mineral called tourmaline, which has the power of splitting up a ray of light into two, like the Iceland spar did, and then of quenching one of these rays. This greatly simplifies the phenomena. If, then, we place one of these crystals in our lantern we get a slightly coloured image of it on the screen. If next we place another similar crystal in front of it and parallel to it, the light still gets through, and the only effect is that the image is a little darker. But if we rotate one of the crystals, the part where they overlap gradually gets darker, until, when the crystals are at right angles to each other, no light can get through, and we have a dark patch on the screen.

This is the same phenomenon that we had in the case of the Iceland spar, only simplified by the extinction of one of the rays. To show this more clearly, let us polarise our light with one of the tourmalines and analyse it with the Iceland spar. We then get on the screen two images of our tourmaline, one light and the other black; and if we rotate the tourmaline, the light image becomes dark and the dark one light. Evidently it makes a difference in what position our tourmaline is placed.

In 1808 it was discovered that light reflected from glass at a certain angle was polarised in the same way as if passed through tourmaline, and a few years later it was discovered that the light which passed through, or was transmitted by a series of plates of glass, was also polarised. I have here a series of glass plates fastened in this wooden frame at the right angle for polarisation, so that if we use it as our analyser instead of our Iceland spar, with our tourmaline as polariser, we see that when our tourmaline is in one position the image is light which is obtained by reflection from the glass, and dark which is obtained by refraction through the glass; whereas, if the tourmaline is rotated the effects are reversed. Also, if the analyser is turned on its side we get opposite results to what we had at first.

And now for a short explanation. If a ray of light vibrating in all directions strikes upon a reflecting surface, a portion of it is, so to speak, swung round so as to assume a plane parallel to the reflecting surface, the other part assuming a plane at right angles to it and passing through, *i.e.*, common light by reflection becomes polarised light. But we also saw that common light in passing through certain crystals, such as Iceland spar or tourmaline, becomes polarised. How is this? To rightly understand it, we must consider the architecture of the crystal itself. Let us, for brevity, confine ourselves to one system of crystals and take the

hexagonal prism as a sample. Now a hexagonal prism is built symmetrically round a line passing down its centre (as a tree trunk is built symmetrically round the pith in its centre). This line in crystals has received the name of the optic axis. Hence, if a ray of light were passed in this direction through a crystal it would pass through unchanged; but if passed through across the crystal, the light finds an easier path in one direction (parallel to the optic axis) than in any other, so part of the ray takes this path, whilst the rest takes a position at right angles to it.

Now we can understand the action of our two tourmalines. In our figure, let B be the first tourmaline. Light, entering it, has to take the direction of its optic axis, which in B is vertical. But tourmalines have the power of quenching or absorbing the rays which vibrate across this axis, hence only the vertical rays pass through the first tourmaline. If, then, the second tourmaline be placed in the same direction (*i.e.*, vertical), the light can again get through it; but if it be placed in the opposite direction (as shown at D in the figure), the rays which have passed the first tourmaline are stopped by the second one, and we have darkness—as we saw in our experiment.

Now a word or two on the form of polariscope I shall use during the remainder of my address. For private study a pair of tourmalines makes a good polariscope, but there are two serious objections to their use for lantern demonstration. First, you cannot get these crystals of large size, and consequently could not use sufficient light to make a brilliant image on the screen; and, second, the tourmalines are coloured green or brown. Iceland spar has not these objections; you can get good-sized crystals, and they are quite colourless. But you will remember that Iceland spar gives two images, and unless we could abolish one of these, we could hardly use this material. A clever optician, Nicol, however, hit upon a plan for suppressing one of these rays, which you will understand from my diagram. He cut a rhomb of spar in two in the direction shown and cemented the two pieces together with Canada balsam. A ray of light entering the first half is split up into two rays, which travel till they meet the junction of the two halves. Here one of them encounters the Canada balsam at an angle less than the critical angle and passes through; the other ray encounters the balsam at an angle greater than the critical angle, and consequently suffers total reflection. It is thus reflected to the side of the spar and so is lost. Practically, then, our Nicol prism acts as a tourmaline would, but gives a better and brighter image.

Undoubtedly the best way of polarising and analysing light is by passing it through a large Nicol prism to polarise it, and through a smaller one to analyse it. Unfortunately, a large Nicol is a very expensive thing, so I have to adopt some less costly means. I polarise my light by reflecting it from a series of thin glasses contained in this elbow, and analyse it with a small Nicol prism. Between them is a slit for holding slides and a series of lenses for focussing on the screen any object I may place in the slit. And now, notice, that when this polariscope is placed on the lantern and turned towards the screen, it acts exactly like our pair of tourmalines. When the analyser is rotated through a circle, there are two positions where the screen is lighted, and two where it is in darkness, whereas between the two it is in half shade.

But now let us consider what will be the effect of introducing between polariser and analyser, when they are crossed, a doubly refracting crystal. For our first experiment let us take one of our tourmalines, and let us place it upright or vertical. There is no difference, the field remains dark. Next let us turn it horizontal. Still no result; the field remains dark. But now let us turn it to an angle of forty-five degrees. Now where the green tourmaline is, light is restored. How is this?

A model will make matters clear. The plane of the vibrations of light when it leaves the polariser is, say, vertical, but when it reaches the tourmaline it can only get through in two directions (one the direction of the optic axis, and the other at right angles to it), hence the one plane is split up into two planes at right angles to each other, and so it goes on to the analyser. Here it is again turned back into horizontal and vertical planes; the vertical is stopped by the analyser, but the horizontal is not thus stopped, but is able to pass through to the screen, and so light is restored over the surface of the tourmaline.

If the doubly refracting crystal be thin we get another phenomenon, colour. And for this reason: The two rays which are at right angles to each other pass through at different rates, because light passes more readily in the direction of the optic axis than at right angles to it; hence one may (if the thickness of the crystal be right) gain just half a wave length upon the other of any special coloured light (say red). But you will remember from what I said in my opening remarks, that if one series of waves be half a wave length in front of another series, interference takes place (they are in discord), and that particular colour (in this case red) is cut out of the whole beam. If, then, red is deducted from the white light of our original beam, we have the complementary colour, green, upon the screen. And I think you will see that the colour we get must depend on the thickness of our doubly refracting crystal, and that if we have a crystal of varying thickness, we shall get several colours on the screen.

There are two minerals, mica and selenite, which split up easily into thin slabs, and are specially useful for showing these colours; and we may, by varying their thickness, produce designs which owe their colours entirely to the speed with which they transmit light in different directions. That these colours are really produced by the greater retardation of one ray in the film than the other, and by subsequent interference, may be proved in several ways.

First, we can stop half of the divided ray. Thus, if we put any coloured slide (say a Newton's ring slide) into our stage, and introduce in front of it the tourmaline, we stop, by absorption, one of the rays, and our colour disappears. Or, better still, we may, by taking two films of equal thickness, and placing them the reverse way, make one neutralise the other, and so our colour disappears. Thus, if we take two exactly similar wedges, and superpose them when equal thicknesses are at right angles to each other, we get darkness.

Lastly, we may prove the cutting out of certain colours by interference by the never-failing method of spectrum analysis. If we place a slit in the stage with a film which shows colours, and pass the light through a prism, we see our spectrum furrowed by one or more dark bands, showing exactly which colours have been cut out by interference. Or, if we use our double-image Iceland spar prism as analyser instead of our Nicol, we get a series of spectra, the middle one being continuous, and the upper and lower having colours cut out which are complementary to each other. Again, if we use our concave Newton's rings with our slit, we get a spectrum furrowed with several dark lines.

Another beautiful series of objects, showing gorgeous colours in polarised light, are crystallisations of various salts. I may show you, as samples, tartaric acid, silicia, and benzoic acid. We may, however, actually see the latter crystallising on the screen; for if I take two glasses, and melt, by the aid of heat, a little benzoic acid between them, and then introduce them into the polariscope, we see the needle-shaped crystals shoot over the disc as the substance cools. Again, many minerals show fine colours. Agate and zeolite polarise well. Here is a specimen of amethyst.

Most organic substances having a grain are more elastic in one direction than another. No doubt wood, if it were transparent, would polarise well. But we may show the colours if we take a slice of horn, or a quill pen. If, then, double refraction depends on a difference in the elasticity of the ether caused by a special grouping of the molecules of a crystal or other body, we might hope, by subjecting to strain a homogeneous substance (such as glass), to make it also show the phenomena of a doubly refracting crystal. That this is so, I may show you by my next experiment. I place a square of glass in a screw press, and insert it in the stage of my polariscope when the field is dark. As long as no pressure is put on the glass, it has no influence on our polarised ray, and the screen remains dark. But as soon as I apply pressure by turning the screw, light at once flashes through, and when the pressure is great, fine colours make their appearance, only to vanish when the pressure is relaxed.

Again, we may vary this experiment by applying our strain in the form of heat. You all know that heat causes a body to expand, and if the heat is unequal in its action, a strain is produced on such a substance as glass. Hence, if we apply a red-hot poker to a square of glass in our polariscope we again get results essentially similar to those in our last experiment.

In glass, this state of strain may be permanently retained by heating the glass to a red heat and suddenly chilling it. The glass is then unannealed, or in a state of permanent strain. I introduce three different shapes of such chilled glass, and you see what beautiful patterns we obtain.

Before concluding my paper I wish to refer to one more case of polarisation. If, when the sky is cloudless, we look at it through a Nicol prism, we find that in certain positions there is a darkening of the light, showing that the sky itself is able to polarise light. The maximum effect is obtained when we look at that portion of the sky which makes a right angle with the sun; *i.e.*, if the sun is in the south, the maximum effect would be obtained by looking east or west. The cause of this phenomenon is that in the atmosphere there are minute particles, and these particles polarise the light (probably by reflection).

Professor Tyndall has shown that *any* small particles, if sufficiently fine, are able to polarise light. He exhausts a glass tube of air and precipitates fine vapours in the tube, and on passing a beam of light through, the tube shines with a bluish light, and this light is polarised.

We may do the experiment in a somewhat different way. For if we take a glass jar full of pure water, in which are some very fine particles (obtained by stirring in the water a little mastic dissolved in alcohol), and

pass the beam from our lantern through it, we notice that it shines with a bluish light. And if each of us could examine it through a Nicol prism, we should see that the light is polarised. We know, however, that any instrument which can be used as polariser can also be used as analyser: hence, in order that we may all be able to see this experiment at once, I will first polarise our ray of light by passing it through the Nicol prism and then the jar of water will act as analyser; and if I place a selenite plate on the top of the jar, our glass tube shows colours. By placing two mirrors behind the tube, we see the image reflected in them, and we notice that in consequence of the light leaving the tube at an angle of ninety degrees, the images appear of complementary colours. Now this property of the sky may, I think, be turned to account in photographing clouds. You know the difficulty of getting a good photograph of a delicate cloud (such as a cirrus cloud) consists in the fact that there is very little contrast (photographically) between the white cloud and the pale blue of the sky. If now we place a Nicol prism in front of our lens, we darken the blue sky, but not the cloud, and we certainly get a greater contrast than before.

I cannot say I have experimented much in this direction; but the two negatives I now hand round were taken last autumn within a few seconds of each other: one with the Nicol in a position which passed the light through, and the other with the Nicol at right angles to this position; and I think you will see a marked difference in the contrast of the two negatives.

R. Tindall.

AN EASTER TRIP IN SOUTH DEVON AND CORNWALL.

After a dreary English winter, no wonder that the photographer looks forward eagerly to the advent of spring. At this time of the year it is a good plan to go to meet the coming season, *i.e.*, to go southwards. For in Devon and Cornwall the springtime arrives about three weeks earlier than in the Midlands. But another reason helped to draw me to the south-west coast of England. I knew that the stalwart arm of a junior member of the family would there be at my service—it is wonderful how lightly we estimate the burden of a camera when it is on another man's back!—and that this aid and his local knowledge would enable me to get over the ground as quickly as any *paterfamilias* who weighs nearly fifteen stone can expect to do.

Equipment for a Photographic Trip.

Having decided on a locality, the next question that arises is, "What apparatus to take?" This I will solve at once by giving a list of what I actually did take.

Outfit A:—1. Whole-plate Scovill camera. 2. Four double-backs in separate leather case. 3. Wide-angle Beck lens, five inches focus. 4. Dallmeyer rapid rectilinear, eleven inches focus. 5. London Stereoscopic Company's "Euryscope" lens, thirteen inches focus. 6. A "Place's" shutter instead of lens cap on the Dallmeyer. 7. Focussing glass ("Ramsden" type, by Dallmeyer). 8. Focussing cloth. 9. View meter, by Place. This is marked so as to show the field of view of each lens. By its use the right lens can at once be selected, or the fact that the position is unsuitable for any of them determined. 10. Hurter and Driffield's "Actinograph;" a useful little instrument—a sort of photographic slide rule—by which the approximately correct exposure is readily determined without any calculations to be gone through. 11. Thomas's dry plates: two dozen extra-rapid, thickly coated, and two dozen slow landscape plates same make. 12. Strong but light tripod stand.

Outfit B:—1. Hand camera to carry twelve quarter-plates. 2. Walking stick stand for ditto. 3. Two dozen Thomas's E.R., T.C.L. plates, and two dozen isochromatic plates for comparison.

Betrayed by the Hand Camera.

I had used this hand camera during the winter on two or three occasions for work in a town with complete success. But, alas! I had not allowed for the magnificent light on the sea-coast of the south-west of England in springtime. I can close the adventures of this hand camera at once by saying that on Good Friday—one of the grandest days imaginable, with light that would shame an Italian sky—I exposed its twelve plates on a dozen of capital subjects, chiefly fisher folk, including one scene in which a boat's crew of fisherwomen (the women often row boat races at the local regattas) had just beached their boat, and the "bow-oar" was springing ashore. Fortunately I developed the negatives that night. They were fully exposed, and in the boat scene the woman is caught in mid-air, with every line sharp. But—oh, that terrible but!—every plate showed an indistinct, crescent-shaped, black mark occupying a large part of the centre.

The cause of the damage was at first located in the sliding front which protects the lens while the shutter is being set, and which it was thought had not been properly closed. The camera was charged again, and used on the next day at a Rugby football match which "Archer, junior," wished to be specially recorded, inasmuch as he led the van of the crack team of the West of England (the "Devonport Albion") against a team from Portsmouth, who were signally defeated. In this case the sliding front was slipped down only the moment before the shutter was discharged, and several of the negatives are good. One shows the oval ball with which the game is played defined with perfect sharpness in mid-air. But in two negatives (in which the front had been removed from before the lens for several minutes before the exposure was made) the old black mark reappeared, telling of the entrance of stray light. It was now clear that the light managed to dodge round the shutter in some way. Opening the back of the camera, and placing it and the head beneath a large perfectly opaque cloth, the instrument was taken out into the garden and pointed upwards, the eyes being kept closed for a minute to increase their sensitiveness. A faint gleam of light could then be clearly detected getting round (by reflection from the wood) the lower edge of the shutter, and this was quite sufficient to affect the extremely sensitive plates employed. As the necessary alterations to block out this stray light were seen to be too difficult to make on the spot, the instrument was not used again during the trip. On repeating the examination after return to the murky atmosphere of the manufacturing town in which I dwell, not a glimpse of the entering light could be seen; and if its existence had not been known—so that one knew exactly what for and where to look—its entrance would certainly not have been detected. But on burning a piece of magnesium ribbon in front of the camera, the exact size and position of the spaces round which the light "dodged" (by repeated reflections) could be instantly and clearly made out. So much for the "change of light." Probably this increase in light is, from a sanitary point of view, not the least important of the agents which render a visit to the seaside so beneficial to the dweller in towns. Its existence was certainly brought home to me in a very practical manner.

Going to Meet the Springtime.

A journey southwards in early spring is a rich treat for an observing eye. Up in the north the dull hues of winter prevail; the trees and hedge-rows are uncompromisingly bare, and nature is still in her winter lethargy. Passing through the Midlands we see the first lambs—all legs and tail—and at Worcester the hedge-rows show just a suspicion of green. A few miles further south, at Cheltenham, the first primroses stud the railway embankments. At Bristol, on the south side of the station, we get a fine view of the famous Clifton Suspension Bridge, and then an hour's run across the plain of Somerset brings us to Exeter. From this fine old city the run westwards, round the estuary of the Exe and past Dawlish and Teignmouth, introduces us to charming coast scenery; and here the hedges are fully out, and some of the trees are in full leaf. The Great Western train makes but slow progress between Exeter, Devonport, and Penzance, for the country is hilly; but it will have to improve its pace soon, or the London and South-Western Line, by the new route from Devonport, through Tavistock, Crediton, and Exeter, will outstrip it in the race to London.

The Three Towns.

The Great Western train runs through the little suburban stations of Mutley and North-road, and deposits us at Millbay, in the centre of Plymouth. The "Three Towns"—Plymouth, Stonehouse, and Devonport—form really one large town of 140,000 (civilian) inhabitants, lying on the north side of Plymouth Sound; the central town—Stonehouse—being divided from Plymouth (on the east) by Millbay, and from Devonport (on the west) by Stonehouse Pool and Lake. Union-street is the main street, and a tramway runs along it over Stonehouse Bridge to Devonport.

As a guide-book to the whole district, I know of nothing better than *Baddeley and Ward's "Thorough Guide" to South Devon and South Cornwall.**

Hotels and lodging-houses are numerous and good. Of the former, the "Royal," in Fore-street, Devonport, and "Farley's," in Union-street, Plymouth, possess dark rooms; and plates, &c., can be bought at a photographer's shop situated near the junction of Union-street with Edgcumbe-street.

A Day's Work in the Three Towns.

There is "food for the camera" for many days in this picturesque spot. Riding on the tramcar we note the crowds of bluejackets, marines, soldiers, army-service corps, &c.—in numbers equal, or nearly so, to the civilians. Beginning at the east of Plymouth we inquire our way to the *Barbican*—a quay which overlooks Sutton Pool, now crowded with hundreds of fishing smacks. In the morning light good pictures of the fish packers can be obtained.

Walking south-west from the Barbican we are soon on the Hoe—an elevated grassy promenade, commanding a grand view of Plymouth Sound and Breakwater, and famous as the spot where Drake (whose name is still adored in Devon) was playing bowls when the news that the Armada was in sight was brought to him in 1588. The fine bronze statue of the old sea-dog will probably be thought worth a plate, and so shortly will its neighbour, the fine Jubilee memorial, which consists of a granite pedestal to be surmounted by a fine statue of Britannia. On the east end of the Hoe stands the Citadel, whose entrance archway should be photographed; and near it is the famous Lighthouse which Smeaton built on the Eddystone Rock in 1757, and which was taken down in 1882 (because its foundation had become insecure) and replaced by the present beacon. Archer, junior, agreed with me that we *must* have "Smeaton's Tower" to add to our collection of lighthouses; but the Hoe was crowded with juveniles, and we felt that we must proceed cautiously. Sitting down on the grass we

Dean & Co., 97, Soho-square, London. Price 4s.

succeeded in getting the camera ready without attracting much attention, and with my view meter I selected the exact spot from which the best available view of the structure was to be obtained. In five seconds the tripod with its camera was in position on that spot, *with its lens pointing towards the pier*. But a few seconds more were necessary to level the instrument; but the Plymouth juveniles are pretty cute—it was Bank Holiday—and "in the twinkling of an eye" a crowd had rushed to the front. At this moment the camera was slewed round to point at the Lighthouse, and before the crowd could take up a new strategic position we had exposed our plate and were packing up!

Those who want fine studies of heads should frequent the various quays from the Barbican on the east, by the Hoe Pier, Millbay Pier, Admiral's Hard, Mutton Cove, North Corner, and Ferry-road (or Pottery Quay) on the west. At each of these points a dozen or so of hardy boatmen may be found ready to row you anywhere, and with tanned skins, splendid beards, and picturesque attire. It would pay well to select the best models in turn and go for short boat excursions, sitting in the stern and taking occasional shots with a hand camera at the man with the oars; but for this purpose the "detective" ought to focus for objects as near as six feet. My own hand camera was the very article for this work, and I obtained two "splendid failures" of real old salts—"failures" owing to the cause described above.

The new Plymouth Guildhall and Municipal Buildings form a fine block at the end of Union-street; close at hand is St. Andrew's, or the Old Church, which has a good interior. It is a fifteenth-century church, but was restored by Sir G. Scott in 1875. There is little else in the town worth photographing, unless it be some old buildings in the streets near the Barbican.

Fine panoramic views are obtained from three points:—1. *The Hoe*, as already described. 2. *Mount Wise*, in the south of Devonport, just above Mutton Cove; 3. *The Blockhouse*, on the north of Devonport. These show us the rolling hills of Dartmoor on the northern, or land side; on the south we see Plymouth Sound, dividing into the various tongues of water called the Hamoaze, the Catwater, &c., and covered with a noble fleet of vessels, mostly men-of-war. Across the mouth of the Sound stretches the Breakwater, with the beautifully wooded heights of Mount Edgcumbe on the west, and Staddon Fort on the east; while far to the south extends the English Channel, in which the new Eddystone Lighthouse, fourteen miles distant, stands up against the sky, looking somewhat like a lead pencil. On the landward side the great girdle of forts which defend this invaluable naval and military centre is seen, forming the greater part of a circle, only interrupted by the seaward opening of the Sound. These forts look less formidable than they really are, being earthworks, whose grassy slopes harmonise with their surroundings.

Work on the Water.

Steamboats and ferries run across the Sound in almost every direction, and trips on these occupy but very little time, and offer valuable opportunities, more especially for hand-camera work. From the Barbican a little steamer runs to Turnchapel and Oreston, on the east side of the Sound. At Oreston there are very extensive limestone quarries. A second excursion is up the Hamoaze to Brunel's famous bridge, which spans the Tamar at Saltash. After landing at Saltash, cross the river by the steam ferry and ascend the heights, whence admirable views of the bridge can be obtained. Steamers run at holiday times, Saturdays, &c., much higher up the Tamar—to Calstock, Morwell Rocks, and Weir Head. The views of rocks and foliage in these upper reaches of the river are very charming.

A row from Mutton Cove to the Breakwater is an agreeable diversion on a fine day. This colossal work has a lighthouse at one end and a fort in the centre. In summertime excursion steamers run frequently to the Eddystone Lighthouse, and trading steamers make regular passages to Falmouth, &c.

There is an almost inexhaustible field of work in the craft which stud the surfaces of Plymouth Sound and its arms. Men-of-war by the score, from the glorious three-decker of 131 guns—a pleasure to see and delightful to cruise in—down through all the grades of ironplated ships, turret-ships, and armour-clads, to the cigar-shaped torpedo craft, in which the life of the crew must be miserable indeed when at sea in bad weather. With a camera, either held in the hand or standing on a short tripod in the boat, on a fine day any amount of pictures of nautical work can be secured or standing on the little quays the approaching and departing steamers, the man-of-war boats, the steam launches, &c., furnish a large and charming variety of subjects.

In the Dockyards.

The two grand dockyards of Devonport and Keyham—practically one—are most interesting sights. Police are stationed at each entrance, and visitors are shown round the yards at each hour, from 10 a.m. to 4 p.m. Application for permission to photograph should be made by letter, some days beforehand, to the Admiral-Superintendent—Sir W. Hunt Grubbe—but it is sparingly granted, and then only allowed during the dinner-hour.

The Royal William Victualling Yard in Stonehouse is an immense establishment connected with the naval commissariat.

Over Dartmoor with a Camera.

Leaving the South-Western Railway Station at Devonport by an early train, we book for Horrabridge. The train runs northward through the picturesque Bickleigh Vale, and beyond this, on the right, appears the lofty tower of Walkhampton Church, a well-known landmark. At Horrabridge we cross the old bridge which there spans the Walkham River (a tributary of the Tavy), and steer north-east for Princetown, eight or nine miles distant, and nearly in the centre of Dartmoor. Taking the right hand or Sampford Spiney-road, we find that we have a companion in the shape of an intelligent dockyard pensioner, who takes the deepest interest in our proceedings, and insists upon carrying the greater part of the "traps." We soon reach a blacksmith's shop at the cross roads, and then turn to the right down a steep decline, which leads to Huckworthy Bridge, a charming spot indeed, with the picturesque bridge over the Walkham, and the farmhouses clustering behind it. The foreground is rather bare, but some Devon cows come along handily, and the pensioner marshals them to the water's edge as if he had been a farmer's man all his life. Now the bridge itself has too unbroken a line of wall. Glorious accident! a farmer's boy drives up with an old cart full of calves and drawn by a white horse. Archer, junior, stops the said boy on a *forte point* on the bridge; we give a pull at the shutter string, and "it's all over." By this time the village has got quite excited, and the entire population, of about five and three-quarters, appears on the scene. But time is short, and plates are few, so we take the anglers' path which runs along the riverside, and for the next half hour we tramp through one of the prettiest valleys which it has ever been our lot to explore, until we reach Ward Bridge, where we turn first left and then right to the village of Sampford Spiney, which consists, apparently, of a church and a farmhouse. The lovely river valley has led us right into Dartmoor without our suspecting it, but we now see a long stretch of stony moorland before us, rising here and there into the rock-topped hills called "tors." The nearest tor to the village on its northern side is Little Pu Tor, and beyond it lies the much finer ridge of Pu Tor. These are masses of granite which have weathered along their joint lines, so that block lies upon block, something like a pile of cheeses—a structure of which the famous "Cheese-Wring," near Liskeard, a few miles further west, is a well-known example. Walking (the slope is so gentle that we cannot dignify the ascent by the name of "climbing") up these tors, we secure first distant and then near views of the rocks. On the east side of Pu Tor is a farmhouse at which milk can be obtained. The surface of the moor here is about 1000 feet above the level of the sea. Continuing our walk northwards, in five minutes we come within sight of Vixen Tor, a grand and peculiarly shaped ridge of granite, split in half at one point by a cleft called "The Chimney," and much resembling the Sphinx when viewed from its western side. Three "rock basins" are said to exist on the top, but the ascent is a very difficult bit of climbing. Archer, junior, has been up once, and he is anxious to repeat the feat, so as to "be took" standing on his head on the top, and the valiant pensioner offers to "help him up with a line-prop!" But time forbids us the attempt to secure the interesting "landscape with figures," which would doubtless be the result of their efforts. From either of these tors beautiful and extensive views are obtained. Plymouth Sound flashes in the sunshine far away to the south, westwards the Cornish hills roll in billowy succession, matched on the east by the hills round Princetown. Northwards we see the abrupt cone of Brent Tor, crowned by a tiny church. Brent Tor is composed of old lavas and ash beds, and was undoubtedly once part of an active volcano. It is two only miles distant from Mary Tavy Station, but is quite out of our present course.

From Vixen Tor we turn sharp to the east, and make for the Walkham River (here a babbling brook), which we cross by stepping-stones, thus saving a long detour round by Merrivale Bridge. Climbing the other side of the valley we make for the telegraph posts, which lead straight to Princetown. About half way between the river and the Princetown road we literally "stumble upon" the "Druidical" remains for which Merrivale is famous. They include two stone circles, two Hoarstones, and two stone avenues. As to the nature, origin, and date of these remarkable objects we can but conjecture. The most probable theory is that which connects them with burial ceremonies of the Celtic tribes who inhabited this country before the advent of the Romans. Stonehenge, Avebury, &c., are of like age and purpose.

From this point we walk along a good road for two and a half miles, which leads on into Princetown. A "short cut" might be taken over North Hessary Tor (1488 feet), but we have no mind for more hill-climbing. All along the road the views over the moor are, to the trained eye, full of exquisite beauty. The moorland is full of colour, graded most delicately, and set off by the glorious cloud-forms which sail in the blue sky. Doubtless Dartmoor is a dreary place in bad weather, but to-day it is a scene of beauty. Round Princetown a very large acreage of the moor has been reclaimed by the labours of the convicts, and we see several gangs of men at work in the fields. One warder mixes with and directs the labours of each gang, while a second warder, with loaded rifle, watches at a distance of about twenty yards. Guards are also placed at every prominent point, and there is a system of signalling which renders it quite futile for any man to attempt to run away. Sometimes, however, the fogs descend, and in a few minutes envelop every object. The convict gangs are then hurried to the prison, but occasionally an individual makes a bolt and gets away for a few miles. In such cases pursuit and recapture invariably—or all but invariably—follow within a few hours. Regretting the want of our "detective" we stroll into Princetown and call at that capital hostelry, the "Duchy." Princetown is the highest place of any size in the kingdom, being 1400 feet above sea-level. It is

naturally a somewhat dreary spot, but the air is most invigorating, and invalids are beginning to find their way thither.

From Princetown the evening train carries us down a series of sharp curves and steep gradients to the junction at Yelverton, whence we return to Plymouth again, well satisfied with our day's walk over Dartmoor.

TALBOT ARCHER.

(To be continued.)

DEVELOPMENT AND FINENESS OF GRAIN.

THE question has been recently raised whether the composition—*i.e.*, relative fineness or coarseness—of the precipitated silver is due to the method of development employed. My opinion was that the development very possibly might have some effect on the coarseness of grain. This view, however, met with a good deal of contradiction, and I was consequently induced to examine the question mathematically.

I exposed a plate to the light of a stearine candle for ten seconds, and then cut it up into eight strips, which were developed as follows:—

No. 1 with ordinary iron oxalate.

No. 2 with iron oxalate with addition of 0·1 per cent. bromide of potash.

No. 3 with Eder's pyro-soda developer.

No. 4 with Eder's pyro-soda with addition of 0·1 per cent. bromide of potash.

No. 5 with fresh hydroquinone-potash (according to Baltin.)

No. 6 with hydroquinone-potash (Baltin), twice used.

No. 7 with hydroquinone-soda (fresh solution).

No. 8 with hydroquinone-soda, twice used.

All the plates were developed until they began to show grey, and were then fixed in the acid fixing bath. After drying, the plates were separately examined under the microscope. No difference in the fineness of the precipitate could, however, be observed; on the contrary, it appeared that about the same number of large grains were mixed among the small in every case. It is these large grains, however, that are most sensitive to light, for when an under-exposed plate is rapidly developed, it consists of them almost entirely. It is owing to the fact that powerful developers are almost exclusively used for instantaneous photographs that the mistaken view has gained currency that the coarse grain is due to the action of the developer, and that a finer-grained negative could be obtained by developing more slowly. As a consequence, over-exposed plates, no matter how developed, are always of finer grain than plates which have been exposed for a short time only.

DR. A. MIETHE.

—*Photographisches Wochenblatt.*

Foreign Notes and News.

DR. K. BOECK gives an amusing account in the *Wochenblatt* of the misfortunes which may befall the photographer, especially the continental photographer, when attempting a tour in out-of-the-way places. To be left in the lurch by porters, and to have to carry all his baggage himself, to excite the suspicions of a boundary sentry, and have himself and his camera arrested as spies—these were the commencement of Dr. Boeck's *contretemps*. Finally, he arrived at the summit of the mountain which he had started to scale, and from which he expected to obtain some unparalleled negatives; but behold! his friend, his own familiar friend, whom he trusted to pack up his plates, had carefully packed up the exposed plates, and left the unused ones behind.

THE Berlin *Papier Zeitung* in a recent issue describes what appears to be a decidedly improved method of etching metals, such as zinc, from which it is desired subsequently to take prints. The image is transferred in the ordinary way to the surface of the zinc plate, which is backed with asphalt and immersed in a bath of dilute acid. One terminal of an electric current proceeding from a dynamo is connected with the liquid, the other with the zinc plate. As soon as the current passes, the metal commences to be attacked with such rapidity, that in a few minutes the exposed portions are eaten in to the depth of the thickness of a sheet of paper. In this manner the zinc may be very rapidly etched to any depth desired.

ANOTHER rapid method of reproduction has recently been patented in France by Balagny. A gelatine plate is immersed for a length of time in a solution of bichromate of potash, and after having been removed and thoroughly dried, is exposed for some minutes behind a negative in a copying frame; it is then removed and subjected to the action of light for some seconds from behind, after which it is washed till all the soluble bichromate is removed. The plate may then be secured in the slide of a lithographic press, rubbed over with printers' ink, and employed for printing from. An hour suffices for obtaining in this way a number of photo-lithographic prints from a negative. Balagny employs a special plate by Lumière, in which the gelatine is very hard and firmly attached, as the rolling is likely to detach the film from ordinary plates.

LIESEGANG has recently been experimenting on the effect of pressure in modifying sensitiveness to light. His researches do not appear to have extended very far, but he, at any rate, found that chloride paper, on the back of which pencil marks had been made, after lengthened exposure to light, appeared very little affected at these points.

HE goes on to point out, however, that Braun had previously obtained some interesting effects, showing that percussion as well as pressure of this kind affects the sensibility. Braun placed some unexposed plates in a changing box at distances of half, one, and one and a half metres from a cannon at the moment of discharge. On development it appeared that the plates were clouded, from which fact Braun drew the inference that shocks of this kind, when sufficiently powerful, are capable of acting similarly to warmth and light.

LIESEGANG goes on to suggest that the phenomena observed in certain diseases, in which the patient experiences the presentation of a certain colour on hearing a certain sound, may owe their explanation to some analogous cause. Would it be irreverent to suggest that "seeing stars," which is notoriously the result of the sudden impact of a hard body upon the organ of vision, may also be susceptible of a similar interpretation?

IT appears that a leading Berlin photographic publication recently appropriated without acknowledgment an article from the *Revue Suisse*. "We are flattered," says our witty contemporary, "at this occurrence, but we would prefer that our learned colleague would lay to heart a little more the motto of the house of Brandenburg—'*Cuique suum.*'"

GERMANY suffers from time to time from a mania for the expulsion from the language of all words and terms of foreign origin. Recently this spirit made itself felt in an attempt to substitute "Fern-sprecher" and "Fern-schreiber" (distant-speaker and distant-writer) for the familiar "telephone" and "telegraph." Now it is the photographer's nomenclature which is to fall before the innovator's axe. If this gentleman's proposal gain acceptance, "photography" and "photographer" will come to be known in the Fatherland as "Lichtbildnernesse" and "Lichtbildner," and the uninitiated reader with a smattering of German will be terrified by such apparitions as "Lichthochton panse verfahren!"

PHOTOGRAPHY IN COURT.

VANDYKE *versus* MARION & CO.

AT the Nisi Prius Court, Liverpool, on May 16, before Mr. Justice Lawrance and a special jury, the case of Vandyke *versus* Marion & Co. was heard.

The Plaintiff, Aaron Vandyke, photographer, Bold-street, Liverpool, brought an action against the Defendants, Marion & Co., wholesale dealers in photographic and fancy goods, Soho-square, London, to recover damages for breach of contract. The Defendants had supplied the Plaintiff with enamelled cabinet mounts for photographs, and the Plaintiff alleged that the mounts were not of quality agreed, as photographs mounted on them had become "streaky." The Defendants alleged that the cards were of proper quality, and the streakiness was caused by something during the process of mounting by the Plaintiff, probably by bad or sour starch. Mr. Bingham, Q.C., and Mr. Little appeared for the Plaintiff, and Mr. Kennedy, Q.C., and Mr. Pickford for the Defendants.

In opening the Plaintiff's case, *Mr. Bingham* said they supposed the cause of the streakiness in Marion's mounts was the presence of hyposulphites used in manufacturing the cards from wood pulp, and which had not been sufficiently washed away from the pulp. The Plaintiff did not bring the action to recover damages for loss to his business in consequence of people complaining about the streaky photographs, but what he really wanted was a verdict from the jury in respect of the breach of contract, which would show the public that the Defendants were wrong in charging him with doing bad work.

Carl Vandyke, photographer, of London, described the process of mounting photographs with starch. He said he had not seen streaks produced in his cards. In cross-examination he said he was now using Marion's mounts, and never found fault with them.

The *Plaintiff* stated that in August, 1886, he ordered 50,000 cabinet mounts from the Defendants, with whom he had dealt for twenty-five years. Some time ago he noticed that certain photographs mounted about twelve months, on Defendants' mounts, had become streaky. Two other makers' cards he used showed no signs of streakiness. He had not had many complaints from customers, because in the case of photographs persons did not complain, but refrained from again patronising the establishment if anything was wrong. He wrote a letter of complaint to the Defendants in October last.

Cross-examined.—In May, 1888, he had not discovered any faults with the photographs. The book produced contained photographs taken and mounte

in April and May, 1888, and looking through it he found two streaked and five beginning to streak. During the last six months he had received complaints from five or six persons. He could only show one written complaint. He could not, with any degree of certainty, show a single card with streaks brought to him before the present action was commenced. For part of the mounts in question he had paid the Defendants a composition of 5s. in the pound, he being in difficulties from outside causes. Fresh starch was always used by his girls for mounting photographs, and there was nothing in the starch to cause the streakiness. Streaks might be caused by negatives, but not in his case, as he could produce his negatives. He had used Marion's *carte-de-visite* mounts, but made no complaint about them. He could that day point out *carte-de-visite* with streaks in.

Re-examined.—About ninety per cent., he thought, taken during the last twelve months had shown signs of streaks.

Miss Violet Bradford said she was employed by the Plaintiff to mount photographs, and used a solution of starch. She applied the starch with a brush, and then "licked down" the photographs.

Mr. Bingham.—Do you mean that you licked these photographs all the way down?

Witness.—Yes.

Mr. Bingham.—My friend Mr. Kennedy may suggest that the streaks were in consequence of your bad licking.

Miss Kate Morris, formerly in the employ of the Plaintiff, produced a number of photographs from her album. She sorted them out, and fourteen with streaks on them were found to be the Defendants' cards and three others cards by other makers.

Mr. Cook and *Mr. Kendmann*, of Liverpool, and *Mr. Cain*, Master of the Ormskirk Workhouse, stated that they complained to the Plaintiff about photographs.

Mr. Barraud and *Mr. G. E. Thompson*, photographers, of Liverpool, stated that nothing in the process of mounting described by the Plaintiff's witnesses would cause streakiness. Mr. Thompson said that the licking of the photographs was new to them.

In cross-examination Mr. Thompson said he was now using Marion's mounts, and found no fault with them.

Mr. William Thompson, analytical chemist, of Manchester, said that he analysed a card given to him as one of Marion's defective cards, and found traces of hyposulphites. These would cause the streakiness in time, when the moisture had time to penetrate and dissolve the sulphites.

Cross-examined.—What he found belonged to the lower oxides of sulphur. He dare say that lactic acid, produced by sour starch, might similarly affect photographs. Before he tested the cards he scratched away the enamel; the latter, however, would not prevent the influence of the hyposulphites. He had not tested the enamel.

Mr. Edmund Dennis, analytical chemist, Liverpool, also gave evidence on behalf of the Plaintiff.

Mr. Kennedy, for the defence, said it was not immaterial to remember that of the last consignment of cards the Plaintiff had sold them all, but had only paid one-fourth of their value. The Plaintiff had written to the Defendants stating that he had complaints about the cards, and yet when he was examined in the box he could only say that prior to the writing of the letter he might have had one complaint. The Plaintiff had bought *carte-de-visite* mounts from the Defendants, and they were included in the order for fifty thousand, and yet not a complaint had been made in respect of them. Those *carte-de-visite* had been made from the same paper as the cabinets, and, therefore, it was a fair suggestion to make that the streakiness in the cabinet photographs must have been due to the Plaintiff's process of mounting. The Plaintiff's case was a most improbable one. The Defendants were perhaps the largest manufacturers of mounts on this side of the Atlantic, and had made the mounts of paper from the same mill for some years. Evidence would be called to show that nothing in the paper or enamel could cause the streakiness, and the suggestion was that the streaks were caused by lactic acid, produced by germs from the air getting into the starch used in mounting.

Dr. John Attfield, F.R.S., &c. (Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain), said he found no hyposulphites in the mounts. He found nothing deleterious to a photograph in the material of the mounts. His opinion was that the streaks in the photographs were due to lactic acid, or other corrosive acids that accompanied lactic acid in fermentation; and that such lactic acid resulted from the fermentation of the starch employed, either before the photograph was fixed, but most probably afterwards.

Cross-examined.—He had not tried to detect lactic acid in the back of the cards, because he knew it would be impossible to do so, as the acid did not submit to delicate tests. The presence of lactic acid, as an acid, could be easily found. Apparently sound starch might have in it germs from the air which would cause fermentation, and the fermentation would cause sourness, which was lactic acid. The germs might not develop for two years if the photograph was kept dry. If he found no other mounts showed signs of these streaks except the consignment of Marion & Co. he should begin to suspect them.

John Spiller, F.C.S. (Vice-President of the Photographic Society of Great Britain, &c.), said he examined two mounts taken from the consignment, and found no sulphites or hyposulphites.

Mr. Auguste Léon Marion, the senior partner in the Defendant firm, and residing at Paris, described the mode of manufacturing the mounts.

In cross-examination, the witness said the paper for the mounts was supplied to his firm, and the firm then made the mounts by pasting pieces together. The paste is so made from starch.

Mr. Bingham.—I wonder whether your starch produces lactic acid?

The witness added that he added alkali to his starch to correct any sourness.

At this point the Court adjourned.

The hearing of this case was resumed. The evidence for the Defendants was continued, among the witnesses called being Mr. Thomas Bolas, F.C.S., F.I.C.; Mr. Frank Bishop, a partner in the Defendant firm; Mr. Cowan, a specialist; Mr. George Taylor; Mr. Downey, photographer, of London; and Mr. Mole, of Liverpool.

The jury retired at a few minutes to four o'clock, and on returning at a quarter-past four, said there was no hope of a verdict being arrived at. They were then locked up until 6.15 p.m., the Court adjourning in the meantime. On being called upon at the appointed time the jury said there was no hope of agreement, and they were discharged.

—*Liverpool Mercury.*

Our Editorial Table.

Watkins's Exposure Meter.

For an explanation of the principles underlying the construction of this exposure meter we refer the reader to the able paper read by Mr. Alfred Watkins before the Hereford Photographic Society on *The Mathematical Calculation of Exposures, and a New Exposure Meter*, and published in our issues of April 18th and 25th respectively. The exposure meter shown in the cut consists of a brass cylinder two and a half inches long and one and a quarter inch in diameter. One end of this forms a capped box, the lid of which is attached to the body by a chain ten inches (which packs inside), and thus when made to swing beats half seconds. At the other end is a tinted disc perforated with an aperture across, which is made to pass a strip of paper made so sensitive as in a few seconds to change colour under exposure to light until it coincides with that of the disc. The number of seconds required to effect this being noted, a rotating circle on the body is moved until its finger stands opposite to this number on a graduated circle. In like manner are other factors brought into requisition, these being the sensitiveness of the plate, the colour of the subject, or its light-reflecting capacity, and the aperture of the stop in the lens. These being duly noted, and the figured circles moved in succession until their pointers are opposite each, a final pointer will now be found indicating the exposure necessary in seconds or portions of a second.



It is a most ingeniously devised little instrument, and is constructed on mathematical principles. Perhaps an extract from the last letter we have received from Mr. Watkins will show, better than all we can say, the value of the little instrument when applied in practice to unequal exposures. He says:—

"On Saturday I exposed four negatives,—

	Exposure.
Indoor photograph of mantelshelf	7 minutes.
Indoor photograph of dark-oak carved cabinet, bad light, five to six in the evening	65 "
Cloud negative	½ second.
Evening landscape (6.15 p.m.)	4 seconds.

All developed together *in one dish* with the same developer; they came up equally well."

Picturesque Wales.

(London: W. J. Adams & Sons; and Simpkin, Marshall, & Co.)

This, which is only a sixpenny handbook of the scenery accessible from the Cambriand, yet contains quite a fund of information to the tourist, and incidentally to the tourist-photographer who is sighing for new worlds to conquer pictorially. The descriptions are well written by Godfrey Turner, and it contains several wood illustrations and maps. It ought to be useful to those who purpose visiting Chester with their cameras during Convention week next month.

Beckers & Co.'s Catalogue.

A comprehensive price list of everything connected with photography: lenses by all makers, cameras of all sorts and classes, paper, plates, films, albums, mounts, and formulæ.

Aluminium: Its Uses and Alloys.

A handbook issued by the Alliance Aluminium Company, Limited. It contains a vast fund of information concerning the nature, uses, properties, working, and alloys of aluminium.

Photographic Society of Great Britain.—Technical meeting, Tuesday, May 27, at eight p.m., at 5A, Pall Mall East, when *Stereoscopic Work* will be discussed.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
May 26	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 27	Great Britain (Technical)	5A, Pall Mall East.
,, 27	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 28	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 28	Burnley	Bank Chambers, Hargreaves-street.
,, 29	Halifax Photographic Club	Mechanics' Hall.
,, 29	Liverpool Amateur	St. George's-crescent North.
,, 29	Oldham	The Lyceum, Union-st., Oldham.
,, 29	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 14,—Mr. P. Everett in the chair.

Mr. F. W. Pask showed some untoned albumen prints, and inquired the reason of certain reddish patches that appeared on them. In a toned print the places showed only as weaker than the rest of the picture, and not as redder in colour.

Mr. W. E. DEBENHAM had no doubt that the patches were due to insufficient silvering; perhaps there had been air bubbles during part of the time of flotation on the silver bath.

Mr. W. H. PRESTWICH inquired how to decolourise albumen paper. He had a quantity of paper that had had a blue tint mixed with the albumen, and he wished to remove the colour. He had succeeded in this by the addition of nitrate of potash to the sensitising solution, but wished to know of any other method.

Several members failed to understand how nitrate of potash could have such an effect, and one member said that with pink albumen paper the use of a chloride of lime toning bath caused a good deal of the pink colour to be discharged.

The CHAIRMAN showed some thick blotting paper made from raw unbleached cotton. He thought it should prove eminently serviceable for use as the basis of carbonate of soda paper for storing sensitised albumen paper, also for drying off prints. It was, or would shortly be, in the market.

Mr. PRESTWICH inquired whether the stability of the print was increased by the use of the alum bath after fixing, as sometimes recommended.

Mr. DEBENHAM said that, according to some experiments which he had published in THE BRITISH JOURNAL OF PHOTOGRAPHY a few years since, he had found that the probability of permanency was increased. It must be understood, however, that the hypo should be well washed out first; the alum bath then acted by rendering the sizing of the paper less liable to decomposition.

The CHAIRMAN inquired whether it had been noticed that an albumen print improved in tone after a few days from its production.

Several members thought that there should be no change after the print was dry. Before becoming quite dry a print looked somewhat redder than afterwards, so, perhaps, the supposed change of tone was only due to the first observation having been made whilst the print was as yet somewhat damp.

Mr. J. S. TEAPE had noticed the circumstance referred to by Mr. Everett, and added that the change of tone after a few days' keeping was not slight. There was a considerable difference.

A question from the box,—"Can any one tell a means of removing the yellow stain left after reducing the intensity of a negative with ferricyanide?" failed to elicit any satisfactory reply.

Mr. T. E. Freshwater showed a series of photographs taken at the recent outing of the Society at Waltham.

WEST LONDON PHOTOGRAPHIC SOCIETY.

MAY 9.—The annual smoking concert took place at the Richmond Hotel, Shepherd's Bush-road, under the able chairmanship of Dr. Low; a most enjoyable evening was spent.

On the 3rd inst. about thirty members of the Society met at Jack Straw's Castle, Hampstead, and spent a pleasant afternoon in seeking "bits" in the neighbourhood of the Heath; the members afterwards took tea at the Bull and Bush.

On the 17th inst. twenty-eight members met at Weybridge and sought out some of the charming scenery in the neighbourhood of St. George's-hill. An enjoyable afternoon was spent.

HOLBORN CAMERA CLUB.

MAY 16.—Mr. COBB gave a demonstration on *Toning Silver Prints* before about twenty-five members, using the phosphate and acetate soda baths, with both of which he obtained good tones. Owing to shortness of time he was unable to go into the matter of mounting prints, which was also on the programme.

Next Friday will be a lantern night.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

MAY 14,—Mr. George Bankart in the chair.

Two members were elected.

The report of the Excursions Committee was brought up, and the following recommendations were accepted:—June 19, Excursion to Stratford-on-Avon; July 17, Forest district; August 14, Miller's Dale (half day); September 11, Maxstoke Priory.

The medals were then presented to the successful competitors in the print competition, held April 15, as follows:—Society's medals, for prints over whole-plate: Silver medal, Mr. George Bankart; bronze medal, Mr. F. Pierpoint. Past President's medals, presented by Mr. George Bankart, for prints under whole-plate: Silver medal, Mr. A. W. Wilson; bronze medal, Mr. W. Jolliffe.

Mr. A. W. Wilson was elected Treasurer.

BRISTOL AND WEST OF ENGLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

MAY 2,—Colonel Playfair in the chair.

A considerable number assembled to witness the exhibition of slides entered by members in the Association's lantern competition. The slides were entered in three classes, under the heads of "Landscape," "Architecture," and "Figure Subjects," and in sets of six or more, numbered. Members present voted during the exhibition of the several lots.

A special feature of the evening, which materially enhanced the success of the exhibition, was the use with the limelight apparatus of the patent saturator invented by Mr. A. W. Scott, of Weston-super-Mare. For the purpose of comparison, the ordinary mixture of oxygen and coal gas was first employed, some slides outside the competition being passed through. On the employment of the saturator, however, so marked a superiority in the illumination was at once perceptible that all present were of opinion that the light was more than doubled. The saturator consists of a spiral worm or perforated tube coiling through a cylinder packed with asbestos or some similar material, and soaked in gasoline previous to use. This arrangement is encased in an outer cylindrical body of tin or brass having a small box in conjunction with one of its sides in which burns a wax night-light which gives off just enough heat to vaporise the gasoline about as fast as is necessary. The tube from the oxygen cylinder being connected with the lower end of the spiral worm, a current of oxygen gas is allowed to pass through, and it "saturates" itself on its way with the gasoline vapour liberated by the warmth in the interior cylinder. Thence passing directly to the jet, it is employed precisely as the mixed gases are in the oxyhydrogen limelight, and the result is probably as good. Certainly there can be no comparison between it and the blow-through or oxyealcium arrangements, and it has the signal advantage of being perfectly safe, there being no receptacle of sufficient magnitude to contain enough mixed gas to form an explosion greater than a small pistol shot.

Professor SCOTT, the father of the inventor, conducted the demonstration, and shortly recounted the various advantages of the saturator.

At the conclusion of the lantern exhibition the members of the Association held a business meeting.

IPSWICH PHOTOGRAPHIC SOCIETY.

MAY 17.—An excursion took place to Claydon, where the party divided, part going along the picturesque River Gipping as far as Blakenham Magna, where "subjects" were found in the mill, the old church, and the Chequers Inn. The other portion of the members took the fields to Barham, finding work for camera and lens on the old Manor House, the church, and the "Slade," the latter being an old deserted lime quarry.

BERLIN PHOTOGRAPHIC SOCIETY.

APRIL 24,—Dr. F. Stolze in the chair.

A visitor was present, Mr. Horsfall, of the Madras Photographic Society, who received a friendly greeting from the Chairman.

An extensive collection of photographs taken during the previous year was then laid before the meeting by Dr. de Lima. The items of the collection consisted of figures, landscapes, and seascapes, and from the animated discussion to which they gave rise, appear to have been of special artistic excellence. The extraordinary gradation of tone formed the ground of special commendation, and Herr Jahr did not hesitate to compare the resulting play of light and shade to the effects obtained by the old Dutch painters. It is interesting to note that these extremely delicate effects were obtained by the employment of the old pyro developer. Herr Franz Kühn also exhibited two views from Zanzibar—one of Emin Pasha, the other of Stanley's reception.

Herr ROGNER (Messrs. Brandt & Wilde) introduced a new camera—the Baedeker Camera. This apparatus belongs to the class of hand cameras, and appears to have a fixed focus. It is capable of holding a large number of plates, and its chief peculiarity consists in a mechanism by the action of which each plate, when exposed, is removed from the field and a fresh one brought into focus; a pointer indicates the number of plates that have been exposed at any given moment, and so obviates all danger of exposing the same plate twice.

Dr. MEYDENBAUER remarked that he had as yet seen no camera in which the plates could be changed with such rapidity, and Dr. STOLZE especially commended the appliance for indicating the number of plates exposed; nothing, as he said, being more annoying than to make the mistake of twice exposing the same plate, and so losing two impressions at once.

The question of the peculiar sharpness observed in magnesium flash-light photography then became the subject of discussion. This Herr M. STOLL attributed to the comparatively monochromatic character of the magnesium light.

To this Dr. STOLZE demurred, very properly pointing out that magnesium light is richer in the more refrangible rays than daylight. He was inclined to the opinion that the majority of studios, situated as they are at or near the top of lofty buildings, are exceptionally sensitive to the effects of vibration due to traffic in the streets below, the result being to interfere with the sharpness of definition. In the case of flash-light photography, which is usually conducted in ordinary rooms and at night, this disturbing cause is absent.

The subject was discussed at considerable length, Herr HIMLY contesting Dr. Stolze's explanation, and pointing out that in Siemen's *atelier*, which is in the same building with a 200 h.p. engine, and is in constant vibration, no want of sharpness was observable, and that in the case of instantaneous photography the effects of vibration ought to be eliminated.

The explanation given by Dr. JULIUS STEINDE would, however, appear to be the most satisfactory. He attributed it to the smallness of the area of the source of illumination. This, we should have thought, has long been recognised as the cause.

In support of this view Herr PAUL GRUNDNER pointed out that focussing is much harder by diffused than by direct sunlight.

Herr JAHR then delivered an address on the subject of *Photography in Natural Colours*. He dealt with the subject from an historic point of view, and alluded to the remarks of Professor Herschel in the *Yearbook of Photography* for 1890, in which he said that he had examined one of Becquerel's helio-chromes of the spectrum in the year 1886 which had been kept in the dark, and found the colours still quite brilliant. He also mentioned Mr. J. Traill Taylor's results in the same field. Herr Jahr concluded his address with the inquiry as to what the alleged improvements of Herr Vereser really consisted in.

Dr. STOLZE then made a few remarks concerning a coloured Marienburg plate, and the proceedings terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

A RECENT LAWSUIT.

To the EDITOR.

SIR,—May I, as a close observer of all the proceedings in the case of Vandyke *versus* Marion & Co., tried here in Liverpool before Mr. Justice Lawrance and a special jury on May 15, 16, and 17, for breach of contract in supplying defective cabinet mounts, be allowed to say what a curious thing it was that the cause of the very decided streaks and marks shown on the photographs put in evidence was only looked for in the cardboard of the mounts, and the lactic acid from sour starch? Of course, I only look at the case as a photographer, but it strikes me most photographers would have looked to the print itself for such terribly distinct yellow stains, as whatever caused them must have been most decided in its action, as there was no indecision about them in the only photograph I saw, but distinct yellow blots and stains extending down the picture: they certainly could have been formed by other than the two causes given.

Had the jury been composed entirely of photographers it would have been doubtful if they could have come to a unanimous verdict any more than the jury who tried the case, and I am sure I, with many more, will read with interest what you may have to say in reference to some of the points raised.—I am, yours, &c.,

FRANK MOWLL.

45, *Hardman-street, Liverpool, May* 20, 1890.

[Some remarks on this will be found elsewhere.—ED.]

ZINC ETCHING AIDED BY BICHLORIDE OF PLATINUM.

To the EDITOR.

SIR,—In the April number of *Photographic Answers*, page 102, Mr. W. T. Wilkinson points out the "crowning absurdity" of adding a little bichloride of platinum to the acid solution for etching on zinc to "very powerfully accelerate" its action. Mr. Wilkinson has clearly written without having tried this way of accelerating the action of the acid. An experiment is simple.

Take a mixture of acid and water *so dilute* that it will *just not be strong enough* to have any effect upon a piece of zinc placed in it; now drop in upon the surface of the zinc a crystal of bichloride of platinum (sulphate of copper will do equally well) and note the result: metallic platinum is almost directly precipitated on to the zinc all round the crystal, and a powerful galvanic battery formed, and then the etching commences in real earnest, shown by the amount of gas that directly comes boiling off from wherever the platinum has been precipitated, and *there only*. If a design be on the zinc in ink the platinum will not be deposited where the ink is, and the weak etching solution will therefore have no tendency to act on the zinc under the ink.—I am, yours, &c.,

90, *Queen-street, Cheapside, E.C., May* 19, 1890. A. E. SMITH.

KALLITYPE PROCESS.

To the EDITOR.

SIR,—Allow me to correct an error Mr. Bedding has fallen into in the course of the remarks he made on the kallitype process in your last week's issue. The passage I take exception to is where he quotes from my specification, and in the next paragraph goes on to say, "I should take the foregoing to premise that a mixture of ferric chloride, &c." to the end of the paragraph.

Mr. Bedding is probably correct, in so far as he states that no such process with ferric chloride has ever been made public, but all the former processes of this kind involved the use of the ferric salts of acids, the silver salts of which are insoluble in water, thus necessitating the use of some fixing agent. For this purpose sodium thiosulphate has been generally recommended, though a dilute solution of ammonia has, I believe, been used. Even in cases, if there are any such, where ferric salts of acids, which do not form insoluble silver salts, have been used, fixing could only be avoided by using distilled water for washing, the expense of which would be fatal to any process.

With regard to toning, the colour of the silver image in all such processes has hitherto left much to be desired. There has been a lack of brilliancy and general greyness that is frequently referred to in accounts of the old processes. I cannot, of course, enter into a discussion of the mysteries of patent law, but I can assure Mr. Bedding that I take his remarks in good part, and shall be very pleased to make his acquaintance and argue the matter if he happens to be in Birmingham and will call upon me here.—I am, yours, &c.,

W. W. J. NICOL.

The Mason Science College, Birmingham, May 17, 1890.

[We may here state that we have received (although not in connexion with this correspondence) two specimens of kallitype. The tone is remarkably good.—ED.]

PHOTOGRAPHING IN PARIS.

To the EDITOR.

SIR,—In the foreign letter in your last issue I read that all the difficulties of amateur photographers in Paris may be regarded as at an end, since "no foreigner is now allowed to take photographs in the streets of Paris."

The intelligence may well seem incredible, but no doubt it is true, experience having again and again shown that it is impossible to sketch even the most ruinous castle in France without danger of arrest, or even to sketch anything at all without being at the mercy of the next leaden-headed *gendarme*, who thinks proper to interfere.

For my own part, I read the news with a sentiment of platonic disgust, merely being not much of a photographer and never likely to need to photograph with a foreign and unhallowed camera the too-too sacred streets of Paris. As for the French Republic—I have nothing to do with it, and wish it no ill—if my wishes were of any account, I think one may enjoy twice the liberty, with at least twenty times the dignity and decency, under a monarchy such as ours, yet I can quite see how France has been driven into a Republic by the incomparable badness of her former governors. But will no Frenchman who is really in favour of his present form of government warn those in office, ere it be too late, of the effect of restrictions, childish in their absurdity, and mediæval in their bigotry? We may not sketch a ruin which a single shot would reduce to a heap of rubbish, because perhaps three men and a sergeant garrison it. We may not photograph the streets of Paris, which are presumably not exactly fortifications. We may not do this, or that, or the other, or, in fact, anything, but go over and spend our money under conditions which would be regarded as trivial in an infant school. It will not be long ere Frenchmen, who find they can do what they will abroad, will begin to understand that freedom does not exclusively consist in tall talk; or before Englishmen, who have had enough of this silliness, will begin to see that, slightly paraphrasing the words of Milton, "New Republic is but old tyranny writ meanly"—and very meanly, too.—I am, yours, &c., P.

THE AUTOMATIC PHOTOGRAPH COMPANY.

To the EDITOR.

SIR,—In commenting on the prospectus of the Automatic Photograph Company, it escaped you that the calculation as to the profit of 31,000*l.*, or thirty-one per cent., is based on their working 365 days in a year, without any allowance for fogs and continued wet weather when people would scarcely go to be taken. The accounts given make no allusion to any means of regulating exposure to the light, which now is different to what it will be at Christmas.—I am, yours, &c., D. W. HILL.

Silvermere, May 17, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, whole plate rectilinear lens; exchange, Kangaroo-pattern bicycle in good condition.—Address, MANAGER, The City Studio, Wells.

Three-inch astronomical telescope (three eyepieces, sun glass, and garden stand), also one field, marine, and opera glass combined, a Ross *carte* lens, and a whole-plate lens, wanted, stereoscopic camera and lenses, half-plate set complete, also whole-plate dipping bath.—Address, SALE, New Arcade, Sunderland.

Single landscape lens (focus not less than twenty-eight inches) wanted in exchange for single lens, three different foci in one mount (12, 15, 18), by Hermagis, Paris.—Address, G. MANSFIELD, Naas.

Wanted, half-plate bellows camera (two or more slides), also a binocular stereoscopic camera (one or more slides for plates 6½×3½ or larger); exchange, various useful and ornamental house requisites.—Address, A. H., 6 Berachah-road, Torquay.

Enamelled zinc syphon washing tank suitable for up to 10×8 negatives; wanted head and body rest. Also wanted, carved oak studio table or chair with backs, in exchange for a rolling machine, fifteen-inch silver-plated rollers.—Address, W. WALKER, 156, Noel-street, Nottingham.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for* "*Answers*" *and* "*Exchanges*," *must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

H. C. Jennings, Chester.—*Two photographs of* "*Ye Old Crypt*," *Watergate-street, Chester.*

BROMIDE.—No; but you had better use the proper proportions.

W. M. E.—Refer to the advertisement columns; several painters advertise. All dealers in photographic goods supply backgrounds.

S. P.—It will be quite safe to give the same exposures in Norway as you would in this country. For special apparatus and plates let this be determined before going abroad.

T. JONES.—We ourselves employ No. 1 on your list. As a combination, it is of the focus mentioned; but one of the elements can also be used as a single landscape lens of double the focus.

ROBERT HOTZ (Calcutta).—1. Remittance received.—2. We cannot say which is the fastest drop shutter procurable, but a slow one can have its speed greatly accelerated by a spring or a rubber band.

G. W. W.—Whether the clearing be done before or after fixing the result is the same, provided acid and hyposulphite of soda are brought together in the print. In either case the "hypo" is decomposed.

PERPLEXED.—This is such a purely legal question that we cannot take the responsibility of answering it. We think, however, that the agreement made under the conditions mentioned is of no value. Your safest plan is to consult a respectable solicitor.

W. G. MANNING.—Celluloid is composed of pyroxyline and camphor, and the latter is freely soluble in alcohol; therefore celluloid dishes must not be used for drying negatives by alcohol. You will now see the reason why your dish behaved as described.

GELATINE.—A saturated solution of bichromate of potash is one of variable strength, as it is dependent upon temperature. What would be a saturated solution at one temperature would be far from being so at another. The best plan is to make a stock solution of a definite strength.

SILENDO.—1. The bath will keep.—2. Toning and fixing proceed simultaneously.—3. Sulphur toning from such a bath is a possible disadvantage. We have prints toned and fixed by a formula similar to the one given, and although over fifteen years old, they are still as good as they originally were.

F. E. J.—Your difficulty is not an uncommon one with ready-sensitised paper. Some samples are very difficult to tone beyond the red-brown stage without getting mealiness. Such would certainly be the case with the print enclosed. The print before toning is mealy and uneven. Better procure a good sample of paper.

R. W. (Staines).—Coat the inside of the wooden tray with paraffin wax. That will be the best material to use when only cold solutions are employed. Paraffin has no injurious action on silver solutions. This is not the case with many waterproof substances which have from time to time been recommended.

F. A. BELLAMY.—On applying to Chance, Fiel, Schott of Jena, and other makers of glass, you will receive from them the information respecting the refractive index of the various kinds they make. Information concerning the radii of curvature of lenses may be had in almost all treatises on optics, or in articles on this topic in encyclopædias.

C. F.—No good would result from a discussion on the subject in our columns. We hope, if the Company be formed, that the shareholders will receive the expected dividend. We are not in the "secret" of the preparation of the chemicals, so cannot answer the question. Nothing is said about the formula for chemicals in the specification of the patent granted to the promoters of the Company.

SCOT.—Gas, as a source of heat, should be avoided when drying gelatine containing bichromate of potash, that is, if the products of combustion are permitted to come in contact with the material. The tendency of the fumes from burning gas is to render the bichromated gelatine insoluble. In some cases this may not cause much trouble, but it will always introduce an element of uncertainty.

P. O'DOWD asks whether collotype prints could not be transferred to stone and then printed in an ordinary lithographic steam machine at a rapid rate.—Yes; but it requires considerable skill to make a successful transfer, and even then there is a tendency to "clogging" of the delicate tones. This trouble may, however, to an extent, be overcome by preparing the collotype plate, in the first instance, specially for the purpose.

G. G. O. complains that a photograph taken by him, a local view, with the name of the place and his name and address upon it, has been reproduced in one of the illustrated periodicals with an entirely different title appended. He asks if he has any redress.—This is by no means an uncommon experience, and there is no remedy unless the photograph is copyright. Some of the illustrated papers are very unscrupulous in such matters.

D. TURNER.—There is nothing to prevent you from photographing the building if you can do so from a public highway. If you have to go on private property you become a trespasser, unless you have previously obtained permission. The fact that another photographer has taken the abbey from an adjoining property and made the picture copyright will not prevent you photographing it from the same point if you get the property-owner's consent.

PUZZLED.—The terms "ordinary," "rapid," "so many times," &c., have no real value. Some brands labelled ordinary, or the slowest, are equal, and even superior, in rapidity to those of other brands stated to be of the more sensitive series. Even the sensitometer number is not always to be relied upon. One make of plate stated to be, say, 22 is sometimes found to require quite as long an exposure as another which may only be marked 20. Again, so much depends upon the developer and the method of working.

C. HOY says: "I see in the index supplied with the JOURNAL of January 3, that there was a remedy for the bichromate disease in the previous volume, page 245, but I have looked amongst my previous numbers and cannot find it. Would you be kind enough to give me the remedy in your 'Answers to Correspondents,' as I am suffering from that disease?"—Our correspondent has mistaken the page, it is 206. Articles on the subject also appear on pages 173 and 209 of the same volume.

E. M. says: "A short time ago you condemned bromide prints being issued as platinotypes. I should like to know why. Customers do not know the difference; the pictures are quite as good. Where, then, is the harm?"—E. M. appears to have a tolerably elastic conscience. It is decidedly immoral, and equally illegal, to sell one thing for another. When a bromide print, whatever may be its excellence, is sold for a platinotype, it is a false trade description, and comes within the Merchandise Marks Act, and subjects the offender to all its penalties and punishments.

G. H. P. J. says: "I have a French quarter-plate portrait lens which used to cover a quarter-plate quite crisp up in the corners. Some time ago it was lent to a friend, who took the central diaphragm out of the lens tube. On recovering possession of the lens, and seeing what he had done, I set about putting in a new centre stop, which I placed exactly midway between the front and back lens. Since doing this the lens will not cover a quarter-plate up to the corners; the negatives all fall off thin at the corners. I shall be pleased if you will kindly suggest a remedy for this fault."—Either the diaphragm has not been replaced in its original position or the lens must have in some way been altered.

WOODPECKER writes: "Could you give me advice in the following?—A photograph has been brought to me to copy, on which I see it is registered; the photograph was printed in 1879. Can I copy it without infringing any one's rights?"—If the photograph be copyright, any one renders himself liable to penalties for copying it, notwithstanding the order may have been given by a third party. Many photographs are labelled "copyright" or "registered" in which no copyright exists, so that the imprint on the picture cannot always be relied upon. Our correspondent should refer to Stationers' Hall to see if the photograph be copyright or not, or get a legal guarantee from his customer to take all responsibilities in the matter.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.—An outing will take place on Monday, May 26. The members will meet at Paddington Station at ten a.m., and proceed to Cookham, and work to Maidenhead. Friends invited to join.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, May 28, *Photographic Fog;* June 4, *Photo-mechanical Processes.* Bank Holiday Outing at Uxbridge. Train from Paddington at five minutes to eleven, Westbourne Park at two minutes to eleven.

DEATH OF MR. W. H. GEDDES.—We are sorry to learn of the death of the senior member and founder of the firm of W. H. Geddes & Son, Photographers, Arbroath, which event took place on the 12th inst., at his residence. While taking his tea he suddenly lay back in his chair and expired, death taking place instantaneously. He was seventy-three years of age. He had been a photographer since 1851. Since then the business has been much developed by his son, Mr. John Geddes, who for some time has taken the chief part in its management, and by whom it will continue to be carried on. The firm has received several medal awards for their work.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1569. Vol. XXXVII.—MAY 30, 1890.

DEFECTS IN WIDE-ANGLE PHOTOGRAPHS.

ONE of the tricks rendered possible by the employment of a wide-angle lens is referred to in a paper on the *Ethics of Photography and Photographers* on another page. The defect to which we purpose alluding at present is one which, unfortunately, it is beyond the power of any one, whether he be photographer or optician, to prevent. We allude to the tendency of such lenses to broaden all objects in proportion as they recede from the centre of the picture. Is there no exception to be made in favour of absolutely rectilinear or non-distorting lenses? it may be asked. None whatever, we reply. A lens of this class will certainly produce pictures which shall be absolutely orthographic when they are relegated to the duty of copying a flat object such as a map, and they also will give negatives in which there is no curvilinear distortion; but this is not what we are alluding to at present.

If a row of pillars or spherical balls, each one absolutely like its fellow, is drawn upon paper and then copied by a wide-angle lens, giving full effect to its powers of covering a wide angle, then will the resulting photograph be a perfect facsimile of the original drawing.

But far different will be the case if real pillars and real balls be substituted for the drawing of the same; for here, if the central one of the photographic representation be taken as a standard and accurately measured, it will be found that those on either side of this central one will increase in width as they near the margin of the plate. A spectator would not see this expanded effect if he placed his eye at a distance from the photograph equalling that of the focus of the lens by which it was taken; if he did so, everything would appear natural. In photographs on flat plates taken by a stationary lens the perspective is *plane*, and as the perspective view of a sphere is an ellipse, the whole row of the spheres or spherical balls referred to will in every case—except that of the centre one, supposed to be in the axis of the lens—be more or less elliptical.

In *panoramic* perspective the case is different, for here the extreme sides of the picture are projected under circumstances similar to that of the centre, the image being received on a cylinder of which the lens is placed in the centre. A panoramic picture, therefore, ought to be examined under such conditions as to bring each part of it at a right angle with the axis of the eye; or, in other words, it must be curved, the eye being at the centre of curvature—a feat that is in a large measure impracticable unless the picture be of very great dimensions. In like manner will not the recommendation be regarded to view the photograph made by plane projection from the centre at a distance equalling that of the focus of the lens.

Happily, apart from having the acme of accuracy, it is not of vital importance how a photograph is viewed, although in his *Handbook of the Practice and Art of Photography*, Dr. Hermann Vogel records a ludicrous instance of the defect in wide angles to which we have alluded. It was a view of a castle taken with a wide-angle lens, and in front of the castle was a row of statues, and it was, he says, really comical to notice how the faces and bodies grew broader towards the edge of the picture, and the slender Apollo Belvidere, who unfortunately happened to be at the extreme edge of the plate, had such a broad face, and his body showed such a remarkable rotundity, that he looked like Dr. Martin Luther!

SOME POINTS OF DARK-ROOM PRACTICE.

SINCE last writing upon this subject we have met with a very singular instance of the fallacy of the plan we so strongly deprecate—the "saturated solution" idea, showing also that photographers are not the only class who hold it. While examining the varied array of bottles in the sanctum of a dispensing surgeon we came across one of such singular aspect that we were tempted to ask what it meant. "Oh, that is my solution of Epsom salts; I like to have it saturated, so I pour hot water down a tin funnel into the bottle, shake it up, and there you are." A plan excellent enough the first time it was tried, but worthless afterwards; for the salt had recrystallised out of the hot solution and formed a hard, compact mass at the bottom of the Winchester the solution was kept in, which mass would be very little dissolved indeed next time hot water was poured upon it. We mention the incident to show that even in employing boiling water, as we have instructed, judgment must be used, or the desired end will not be attained. Alum, for instance, would be by no means well treated if placed in a bottle after the style just described; for the crystals it would form would be hard and compact, alum being capable of dissolving in less than its own weight of boiling water, while ten times its weight is needed for a saturated solution in the cold.

Leaving aqueous solutions, we may turn our attention to those requiring alcohol, &c., as a solvent. Probably the first that would call for consideration would be varnish, as, whatever chemicals a photographer may be able to dispense with, he usually finds one or other kind of varnish a necessity. We will not raise the question whether it is economical to make varnish on a small scale instead of purchasing it ready-made; it is enough that to many the very fact of having been their own manufacturer of some or all of the materials employed adds a zest to the pleasure the pursuit of their occupation produces. With regard to varnish there is little to be said

beyond pointing out the usefulness of a quantity of small pieces of glass added to the mixture during solution. Resinous and gummy matters behave in quite a different way from crystalline substances during the act of solution. In the former, the moment solution takes place the particles of solid cohere; and, even when the whole is repeatedly shaken, it is almost impossible to avoid obtaining a glutinous cake, which requires a long time to dissolve. With the latter, as is well known, the more quickly the action of solution is set in play the more quickly are the whole number of solid particles dissolved. By adding small pieces of glass the pieces are so kept apart that solution is facilitated very considerably. The plan is efficient whether shellac is being dissolved in spirit, or some of the resins in turpentine, as is often needed for "retouching medium," where, as there is no need to say, economy is undoubtedly practised in using home-made medium —so long, that is to say, as a good recipe is made use of.

Next, we should consider collodion now required so rarely in British studios, though once an inevitable necessity. Glass should not be used here, although if the pyroxyline be added to the mixed ether and alcohol, it will form a glutinous mass that will take a considerable time to dissolve. Let, however, the pyroxyline be dropped into the alcohol first (after being well teased out), and then, when it is well saturated with it, the ether be added, and solution will take place without a hitch, provided of course, we should say, the cotton is a soluble sort. Gun-cotton proper, which is still the false, but most popular name for the photographic preparation, is almost entirely insoluble in the usual solvents, and there are all stages of solubility between it and the "soluble cotton," or pyroxyline, which when of good quality dissolves almost entirely in ether and alcohol. With regard to the solvents themselves, we may here interpolate a repetition of oft-given advice when using methylated spirit, to ask at the store not for what is termed "methylated finish," which requires no license to sell because of its containing shellac or other such kind of substance in the proportion of one gallon to an ounce. For mixing with water it is obvious "finish" would not answer, as it would at once become milky from the precipitation of the resin, and so interfere with, at least, the proper appearance of the solution. For varnish there would be no objection, except that the nature of the dissolved gum would not be known.

We may now with two hints conclude the series of articles intended to have an entirely practical bearing for the less experienced of our readers and those unfamiliar with the minor items of practical laboratory work. They are, first—let every one handling a bottle of ammonia, especially during hot weather, be most careful when removing the stopper to keep the bottle away from the face; many serious injuries to the eye have occurred through the squirting of the ammonia, almost inevitable when the stopper is taken out. Secondly, whether for water of ammonia, soda, or other agent apt to act upon glass, much convenience will result by keeping all stoppers slightly smeared with vaseline or other similar substance.

STARCH, as we said a few weeks back, has till recently passed without challenge as a mountant for photographs. But, as we said at the time, there were conditions under which it would not be so, and mentioned that when it was made from inferior material it may not be the inert subtance that is generally imagined. In the recent lawsuit at Liverpool—*re* photographic mounts, reported in our last issue —Dr. Attfield attributed the cause of the streaks on the photographs shown to "lactic acid, or other corrosive acid that accompanied lactic acid in fermentation; and that such lactic acid resulted from the fermentation of the starch employed, either before the photographs were fixed" [to the mounts.—ED.], "but most probably afterwards." He added that apparently sound starch might have in it germs which would cause fermentation; also that the germs might not develop for two years if the photographs were kept dry. This is not very reassuring to those who, up to the present time, have placed implicit reliance in starch as an inert material for mounting silver prints. Almost every adhesive that has been used or suggested has from time to time been condemned as being likely to cause fading in the picture. If starch is now to suffer a similar fate, it will necessarily be followed by the cry, "Wanted, a mountant!"

THE result of the attempt to float the Company to take portraits by dropping "a penny in the slot" has evidently been such as to warrant its promoters in attempting to launch a new venture—"The Automatic Photograph (Foreign and Colonial) Company, Limited," this time with the modest capital of something over a quarter of a million. Of this sum over 200,000*l.* is to go for the foreign patents and "the secret for preparing the chemicals." This amount, together with the 60,000*l.* for the English patent, is a tolerably good sum to realise for a patent in connexion with photography. We know many patentees of far more useful photographic inventions than this who would accept considerably less than 260,000*l.* for their patent rights, and would, moreover, throw a few "secrets for preparing" into the bargain.

THE above two Companies, it appears, are not to have it all their own way, for there is a third one now in the field. This is the "Ferrotype Automatic Photographic Company, Limited." This Company is being promoted on very similar lines to the others, but on a more modest scale, so far as advertisements and capital are concerned. The latter is fixed at 75,000*l.* only, and the price for the patents, of which in this case there are three, is 60,000*l.*, but only 5000*l.* in cash. The promoters of this Company claim for their patents: "Priority of invention;" "Machine can be made at a cost not exceeding twelve pounds;" "Very small and portable in size;" "Provision has been made under the patents to apply the electric light automatically to enable the machine to take the photographs at night as well as by day." It is, perhaps, upon the latter grounds that the promoters estimate that each machine is to take fifty portraits, and supply half that number of frames daily, as the other Company mention but thirty portraits per machine per diem. The cost of the photographs will, so it is stated, be less than with the other Companies, though no "secretly prepared chemicals" are mentioned. The figures of the prospectus, as arranged, show anticipated profit of over fifty per cent. on the capital, and even this is exclusive of the profits which are to be made from advertisements and other sources. We shall wait and see this profit realised before we invest; probably most persons knowing anything on the subject will do the same.

FOR a time at least the manufacturer may anticipate an increased trade in ferrotype plates. Of late these plates have not been in much demand for their legitimate use—for photographs. "Ferrotypes" and "tintypes" were never considered very artistic productions. There was always a wonderful difference between even the best of them and a good collodion positive of the old school. Perhaps, however, the productions of the automatic machines will be an improvement.

A PRACTICE is becoming very general which did not exist a few years back, or only to a very limited extent—that of professional photographers taking apprentices, with a premium, for a term of years to learn the business. In the earlier days of photography there was certainly much more for an apprentice to learn than now in an ordinary portrait business. In the wet collodion days the beginner had, of course, to learn how to prepare his own plates. This necessarily involved the knowledge of how to compound the requisite materials, and to keep them in working order, for without this essential good negatives were an impossibility. Now any such qualifications are not required, as the plates are purchased ready prepared. In some establishments even, ready sensitised paper is employed exclusively, so that it really

becomes an important question to consider what a photographic apprentice should be taught. This question has been put by a correspondent this week, and we refer to it here instead of in the correspondence columns, as it is an important one in the profession generally.

As photographers do not, or cannot, make their own plates, they certainly are not capable of teaching their apprentices how to do so. Retouching has now almost become a distinct branch of the business, and many photographers have no knowledge of the art. The same remark applies to colouring, and very generally this is not, like the retouching, done on the premises at all. A large majority of portraitists do not make their own enlargements, hence they cannot teach that part of the business. Considering these facts, it seems that, in an ordinary portrait establishment, all the knowledge an apprentice is likely to acquire is posing, developing, printing, and mounting, and, possibly, retouching. Can this really be considered teaching an apprentice "the business of a photographer," and for which a substantial sum has been charged?

If a student joins any of the classes for instruction in photography—the City and Guilds of London Institute, or the Polytechnic, for example—he is instructed in such processes as the wet collodion, making his own plates, in the different processes of enlargement, albumenising and sensitising paper, platinum and other processes of printing. Also, theoretically at least, in most of the photo-mechanical processes, of which processes many of those who take apprentices are totally ignorant themselves.

The question may some day arise, in a law court, as to what a photographic apprentice should be taught as his business, therefore we advise those who take apprentices, and the friends who bind them, to have it clearly stipulated in the indentures what branches of the craft are to be taught, and what are not. For example, in a court of law enlarging by different methods which are in daily use might be considered a part of a portrait business. So might all the various methods of printing now employed, though only silver might be worked in the particular establishment. In court it might be ruled that the trade was not properly taught unless the apprentice was practically instructed in making his own plates, albumenising his own paper, and even to work some of the simpler processes of mechanical printing. They are all different branches of photography.

If any evidence were required of the increasing popularity of amateur photography, it is furnished on each succeeding Bank Holiday. On Monday last the number of photographic apparatus to be seen at the different railway termini and junctions far exceeded that of any previous occasion. At some stations, we are informed, camera stands were to be seen by the dozen. This is easily accounted for from the fact that most societies had arranged for a collective outing, and in some instances two or more combined to start together. On the Saturday previous it was interesting to note that a very large proportion of the luggage of holiday folk on the tops of cabs included camera stands. It would not be a rash speculation to say that more plates were exposed on Monday than on any previous day in the history of photography.

THE ART OF RETOUCHING.

Chapter IX.—The Lower Portion of the Face (*continued*).

Having bestowed all the necessary care upon the treatment of the forehead, eyes, nose, and upper lip, we come to a very important feature indeed. It is not always that it requires much at the hands of the retoucher, but when it does it demands his utmost skill to successfully treat it. This very important feature is *the mouth*. How much the success of a picture is dependent upon the successful treatment of the mouth will appear evident to all students who have more or less closely examined the portraits painted by our most famous artists. It is a feature that may be said to give tone to the entire expression of the face. What portrait can possibly be accounted a success if the mouth be not successfully represented? The answer is easily found: *None!* To the operator who aspires to the production of really good and artistic work it is always a point upon which he bestows his very best attention. He arranges the light, turns the head, and tries numerous other ways to get this feature in such a position as will show it to the greatest advantage. If, then, this feature demand so much attention at the operator's hands, so must it also when it comes to the retoucher.

Many times the operator is not able to photograph the mouth in the exact position he would wish, owing in many cases to the fact of the nose not suiting favourably to the same view of the face. In such a case the operator often decides to compromise the matter and go between, not wishing to sacrifice one feature for the other, and trusting to the co-operation of the retoucher to aid him in securing a pleasing and successful picture. In most cases where the operators and the retouchers work well together, and take a mutual interest in the works they turn out, many successful portraits will be produced of people who will willingly confess that they have successful pictures for the first time in their lives. It is an easy matter to please them; it only wants a little thought and friendliness between the two departments—operating and retouching—to produce the desired result.

In retouching mouths it must be constantly borne in mind that their form and expression are quite as susceptible of change under the various conditions and influences of time, ill-health, hardship, study, &c., as any of the other features which at different periods of life alter their formation and expression. As the mouth, too, is capable of giving expression to most of the human passions, great care must be taken not to deprive it of any of its individuality when retouching it. It is needless to say that when the expression of a sitter's mouth is *hard* or *unpleasant*, or generally giving the idea of unamiability of character, much can and should be done by careful and skilful retouching to render it more pleasing and acceptable. It may be laid down in regard of all changes wrought by retouching that it is very seldom, if ever, that the *total* obliteration or taking away of any expression, however unpleasant it may be, will succeed in giving complete satisfaction to the party most concerned. Of course, this applies where the said expression is *natural*, and not *accidental*.

In the case of children still in the age of infancy, the mouth is a great feature in their pictures. Its round and well-defined form should always be retained, and the natural beauty of its construction must not be tampered with and spoiled by a too lavish employment of high lights. No doubt the latter, judiciously placed, do much to impart a brilliancy and finish to a portrait, but when all is said and done, half tone and *softness* are much more preferable to the, in many cases, meaningless white of the exaggerated high lights. In the mouths of infants beauty of formation is more noticeable than expression. Children, while young, invariably smile and laugh with their eyes more than any other feature, and these carry more expression in their emotion than the mouth. This, however, soon changes, for as the child advances in age, and the teeth begin to make their appearance, a distinctly different formation is noticeable, the mouth becoming gradually more and more elongated with the advancing growth of the teeth, and thus coinciding more in expression with the eyes. There is nothing more interesting than the study of these changes, and nothing that will aid more in cultivating our appreciation of the various delicacies of facial anatomy.

As time rolls steadily along, age will be found to produce other and equally remarkable changes; as the teeth begin to disappear the mouth seems to shrivel up and lose its power of varying expression. All this may seem very unimportant to the casual reader, and no doubt is, but to the careful and diligent student who wishes to become a master in his art it is not so. It is a matter of vital importance that all these points be kept well in the minds of all retouchers when they essay to beautify or flatter an image on a negative. Every retoucher should endeavour to become familiar with these and suchlike changes, as a thorough knowledge on these points will enable him without very great difficulty to impart a youthful appearance to a negative, when such is desired, and at the same time not make any such alteration too apparent, or, as is often the case, grotesque by reason of its ridiculous exaggeration. In this way a portrait may be made to please a sitter—for it will look a little younger, and at the same time possess a more pleasing expression—because the retoucher's work will have been carried out *thoughtfully* and with due avoidance

of exaggeration. A picture treated successfully in this manner will be rendered acceptable as a whole, and yet it would be almost impossible, even taking each feature individually, to point out the difference between the picture and the sitter. All the various indications would be there, but in a judiciously modified form. The real excellence and artistic merit of the picture being in exact ratio to the skill and artistic culture of the retoucher.

A light should be placed, but with great care and judgment, upon the upper edge and nearly in the centre of the lower lip. This, if properly done, will add to the form and expression of the entire mouth. The upper lip seldom, if ever, requires our aid. The lips will often be found to have a number of small upright depressions or seams, which give them a very unpleasant appearance. This is caused by the skin becoming dry or cracked, and might have been avoided, had the operator observed it in time, by his requesting the sitters to moisten their lips in the usual manner. These marks when found in the negative must be entirely softened. The shadow to be found under the the lower lip generally requires but little work, merely softening so as to lead it into the chin, and thus avoid too much rotundity or projection.

Another portion which should receive our most particular attention is the corner of the mouth. The lighting will have much to do with the strength of this marking, and great care should be bestowed in order to preserve its significance. In some faces the hollows at the ends of the mouth are very deeply marked, while in others they may be absolutely unobservable. I have known many mouths which seemed to break off at the corners, and not leave the least shadow at the corner. This is a very unpleasant form of mouth, and not at all likely to please the possessor when shown it on a portrait. When possible (in such cases) it would be well to try to induce a slight shadow by brightening the surrounding portions of the face, and thus procure it by contrast. Sometimes, too, when these markings are rather deep they will, when combined with a plump or fat jaw, throw a fairly long shadow in a downward direction. This peculiar marking carries a vast deal of expression, and therefore must command our attention. Should these shadows fall or drop, describing a portion of a circle, the ends tending inwards, they should be softened, and, if possible, made to take an outward tendency, as a more pleasant expression will be found by their so doing.

In some formations of faces the furrow running downwards from the wing of the nose will seem to join the one from the corner of the mouth. Such a portrait will give excessive trouble to the retoucher before he successfully manages to make it acceptable. The continuity of these lines must at all hazards be broken, but very carefully, or ruin will attend our efforts. We must, in such cases, not only break the continuity of the shadow, but we must try to raise the muscles of the surrounding portion of the face. Generally, with care, all this may be carried out successfully, but if *careless lighting* should unduly accentuate the furrows on a face naturally deeply marked owing to the fatness of the cheek, it may be found impracticable to carry out such a treatment.

In cases where the lips come very dark, be it either through defective lighting or under-exposure, something must be done to help the shadows, or else the mouth will look like a black gash, hard and crude. Under these conditions we should leave all the half tone we can on the surrounding portions of the face, for if we brighten up same it will be impossible to help up the mouth, but with the half tone well preserved a few touches will make the mouth itself fairly acceptable.

It is not at all unusual to be called upon to alter the *shape* of the mouth; to do this demands not only judgment and experience, but a certain knowledge of drawing as well. In such cases the lower lip may appear too full, or even coarse; we will then be expected to reduce it, thereby bringing it within ordinary dimensions, and so considerably flatter the sitter. The upper lip, when requiring treatment, will generally be found to only want the shaping of same made more decided. Sitters will many times want their mouths made smaller, and in such cases great care must be taken lest in making the mouth smaller we should produce a certain hardness of outline. In this regard no pains should be spared if we wish to be successful. I do not think there is much more to say about this feature, so we can leave it and pass to the treatment of the chin.

The chin is a much more characteristic and difficult feature to treat than is generally supposed. Chins vary so much in shape and form that each must be treated in a different and special manner, and really should form a separate study. The general character or power of a head is very considerably influenced by this feature, and it should be brought forward with due importance. If it should possess an incidental characteristic which would tend to make an unfavourable allusion, the same should be subdued and modified. In the case of a very flat or a greatly elongated chin, too much predominance will prove objectionable, therefore our efforts should be directed to subdue it. This suggestion will also apply to the dimples in the cheeks of youth. It is not always justifiable to argue that because these markings are strongly indicated in nature they should be similarly represented in a monotone portrait; for however skilled and careful an operator may be, and however much he may have mastered the anomalies of photography—and we will give him credit to the utmost point—still he can never make his portrait a living creature; and until he secures the power of being able to do this, all blemishes and personal defects will be represented more strikingly than they are in nature. I hold it the same, that *monochrome* work must always compare unfavourably with *coloured* work in the delineation of these peculiarities of nature.

The chin, although varying considerably in form, is generally more or less round, and mostly with a slight indentation in the centre. If this indentation be strongly marked and tending to a point, it forms what is called a dimple, and however much we may modify it we should never totally lose it. In the majority of cases, however, it does not merit the appellation of dimple, but is, if I may so describe it, an undulation. The light should never be too strong upon this feature, and in retouching it, therefore, we should be careful not to work it into too much prominence. In some heads the chin will be found to be of a square formation, and if not very carefully lighted this will appear much more remarkable on the negative than in nature. The retoucher in such cases may, with much benefit to the portrait, round off the sharp ends, just in the same manner as he would take a point off a heavy or square jaw, and so relieve the heaviness that would otherwise assert itself. I need not say care should be taken not to carry this kind of work too far, as the line which separates the sublime from the ridiculous in this regard is very fine indeed.

With these remarks I think we have nearly exhausted the different treatments for the various portions of the face proper; and assuming that we have carefully stored them up for future use, we can unhesitatingly turn our attention in other directions.

REDMOND BARRETT.

THE HISTORIC AND PICTURESQUE QUALITY OF CHESTER.

"RARE old city of Chester! Even in these days of rocket-like travelling a man might fly all over Great Britain and Ireland, with an extra day ticket for Berwick-upon-Tweed, before he saw anything half so fine as the mouldering old red sandstones which form the walls and towers of that venerable place; or looked upon anything half so fair as the prospect of vale and mountain, wooded headland and spire-pointed plain, that surrounds it." So wrote the author of *Christopher Tadpole* nearly fifty years ago, and so will think many members of the Convention by the time its proceedings have terminated, and the days spent in the city of "old black beams and carved uneven gables" are "by beauty's franchise disenthralled of time."

A strong love of contrast seems to have animated the Convention Council in their choice of a camp for 1890, as no greater contrast can be imagined than that between London, with its noise and swirl of life, its entire absence of repose, and Chester, where the sun makes a dial-plate of some half-timbered house, and his rays creep lazily across the black oak carvings that cover its surface. London, where the only camera work possible has to be done with the angry snap of an instantaneous shutter from the murky depths of some covered van, and Chester with the sylvan beauties of its placid Dee, "which Britons long bygone did call divine," whose banks invite lounging, deliberation in all things, and the use of the cap in exposure. Not from a pictorial aspect alone has Chester been a wise choice: it is such an important railway centre that the several Companies vie with each other in making it easily accessible from various parts of England. The London and North Western expresses, travelling *vid* Rugby, Lichfield, and Crewe, reach Chester from Euston in a little

over four hours, whilst from Paddington the "Zulu," thundering along through Reading, Oxford, and Shrewsbury, steams into Chester Station in about four hours and three-quarters after leaving London. During the summer months Chester Station presents a scene of great animation: huge trucks of holiday-makers' luggage are being wheeled about by perspiring porters, anxious females are rending the air with shrill inquiries for the Llandudno train, while an excursion train full of hilarious holiday-makers passing slowly through the station adds the climax to a magnificent display of confusion and noise.

The most characteristic feature of Chester is its "Rows," a style of street architecture almost impossible to intelligently describe by words, and very difficult to depict with the camera owing to the continuous stream of foot-passengers, and the want of sufficient light to permit of a shutter being used. Albert Smith in his humorous manner speaks of the passengers' footway as, "passing through the first floor fronts of the houses—which are cleared away altogether—and above the shop of ordinary normal position by the roadside; and thus the back drawing rooms, or whatever else they may be, are turned into more shops, and great is the puzzle of the stranger as to whether the roadway is down in the cellar, or he is up on the landing, or the house has turned itself out of the window; and, finally, he decides that there is nothing else in the world at all like it, except the lithographs published by the enterprising librarians who live there."

The origin of these "Rows" seems to be a bone of contention among the learned in such things, some claiming for them a Roman origin, while others consider them to be merely "a rude approximation to the mode of building in many towns of Northern Italy." However this may be, they are a most picturesque feature of Chester, whether seen from the exterior or interior, the most representative being, perhaps, those in Watergate-street, where the oak beams and pillars are black with age, and highly polished by the procession of individuals who for some two or three hundred years have brushed against them.

In Watergate-street are some fine examples of the old houses for which Chester is so noted, but the photographer will have need of his wide-angle lens to get them in their entirety, Bishop Lloyd's house being a particularly difficult subject for the camera. The Stanley Palace is a carved, three-gabled house in a confined situation at the bottom of Watergate-street, and was once the city residence of the family whose name it bears. In Bridge-street, again, will be found some picturesque groups of half-timbered, gabled houses, some of them unfortunately bearing too plainly the impress of the renovator's hand, but all of them easy to photograph owing to their south-eastern aspect and the breadth of the street hereabouts. The Bear and Billet Inn near Bridge Gate, once the city residence of the Talbot family, has been judiciously restored, and is a most suitable subject for the camera, whether considered singly or in connection with the curious old Edgar Tavern. In the vicinity of Bridge-street are numerous interesting evidences of Chester as a Roman station, the Sudatory and Hypocaust at 117, Bridge-street being among the lions of Chester.

The gates of Chester have neither pictorial nor antiquarian value, and are the only discordant feature in what otherwise would be a dream of mediævalism. The wardenships of the various gates were at one time a great privilege, and bestowed only on families of note, and when the ancient Gothic edifices that preceded the present anachronisms were in existence, we find members of the Shrewsbury and Darby families filling the office of Sergeant of the Gate.

Chester is the most perfect example remaining to us in England of a city completely environed by walls, and the two-mile circumference of this stone bracelet forms a promenade of which the visitor to Chester never tires. At intervals along these walls occur towers of high antiquity, and sufficient interest for camera subjects, the most picturesque and archæologically interesting being Bonewaldesthorne's and the Water Towers, both serving the purpose of museums, while the small piece of ground in which they stand contains Roman remains found in and near Chester. The River Dee, it is asserted, once flowed at the base of the Water Tower, and rings for the mooring of boats were remaining in the wall until a recent period. From the summits of these towers the mountain ranges of North Wales can be seen stretching away into the blue distance, and from an eminence some miles distant the ruins of Beeston Castle keep watch over a huge plain strewn with church spires and baronial dwellings.

The ecclesiastical architecture of Chester seems somewhat devoid of interest after having revelled in the wealth of Roman foundation, crumbling sandstone tower, and half-timbered house that here obtains. St. John's Church, overlooking the Dee, is a most interesting structure, and at one time was of far more extensive proportions than we find it now; even so late as 1881 it possessed a very fine north-west tower, which fell in the April of that year, destroying the adjoining porch. Curiously enough, part of this tower fell in 1574, and a central tower fell twice, great damage to the edifice resulting from each fall. Those who are responsible for the erection of the present tower seem to have effectually provided against any such disaster occurring again, if one may judge from the squat, ugly structure that has recently been built. Adjoining the church are some picturesque remains of St. John's Priory.

The Cathedral church of St. Werburgh is built of red sandstone, a geological formation that seems to have found favour in the eyes of bygone Chester architects. The west front of red stone, encrusted with the soot of ages, should make a good subject for orthochromatic photography, as will the views of the interior. Ecclesiologists will not fail to notice the great length of the south transept as compared with the north; this is due to the fact of the south transept having once been the parish church of St. Oswald, and for a long time it was separated from the remainder of the Cathedral. The Chapter-house on the north side is a building of singular beauty, and with its early English work and rows of leather-covered volumes it makes an interesting photograph. The vestibule from which the Chapter-house is entered is also of great architectural beauty, but very difficult to photograph owing to the scarcity of light.

Far away in the solitudes of the Aran and Arenig mountain ranges "the wizard stream that doth by Chester tend" has its sources; with many a cascade and fall it starts down the mountain side on its placid journey to the sea. Flowing through Bala Lake, with whose waters the ancient legend declared it would not mingle, it passes Corwen of Owen Glyndwr associations and becomes the chief point of beauty in the far-famed vale of Llangollen; hence it grows more placid and broad, until at Chester it becomes tidal. Fortunately the tidal action ceases here, so that the river above the city is not marred by the unsightly mud-banks that obtain in tidal rivers. During the summer small steamers ply at frequent intervals up the river to Eccleston Ferry, and occasionally as far as Farndon; but the pleasantest way for any one desirous of doing camera work is to hire a boat, though the Conventionist learned in history must not hope to follow the precedent of the Saxon King Edgar, who for his boatmen on these waters had eight tributary kings. Even in the immediate vicinity of Chester the Dee is eminently pictorial, the old Dee Bridge, black with age, forming a substantial contrast to the slender proportions of the Suspension Bridge some distance above, where the surface of the water is ruffled by the evolutions of boats starting on or returning from a journey up the river.

Given a day in June—one of the irreproachable days that do occasionally stray into our climate—a day when a light breeze, after having whipped round and freshened things up, retires from business again, and the small boughs that commenced beating time to its movements once more settle down into quietude; one of those days that seem specially made to the order of some landscape photographer who knows all about it; add for the second side of this equation in human felicity a boat on the River Dee, a friend who is an expert oarsman and won't let you touch the oars, some bottled beer, and the product is an amount of bliss that wants getting used to. Just such a day in the memory of the writer is associated with the Dee. The beautiful foliage on the river's banks was but half-opened, and the various shades of green, and transparence of shadows made the results of woodland photography more pleasing than they would have been later in the summer. Once past the Long Reach, the slopes on either side of the river become thickly wooded, and soon the sylvan beauties of Eccleston Ferry invited landing and a commencement of camera work. From Eccleston Ferry to the Iron Bridge there seemed quite a plethora of subjects: here an old stile, hoary with lichens, gave access to a woodland path chequered with sunlight and shadow, there an opening in the foliage disclosed a long vista of the slow-flowing Dee, on whose bosom—

> "Shadows dark and sunlight sheen
> Alternate come and go."

Leaving the riverside with reluctance and glances backward, our onward path took us through many a meadow of tall June grass, many a narrow copse blue with wild hyacinth and musical with tinkling streams, until eventually we reach the river again at the Iron Bridge, in close proximity with Eaton Hall. Here is a small landing-stage, where visitors from Chester tie up their boats previous to dispersing in the woods and grounds of Eaton Park, and many are the subjects for the camera of the industrious Conventionist. The Iron Bridge, a not inelegant structure, is placed amid lovely surroundings, and utilised as the background for the landing-stage, with its animated groups of boating parties, cannot fail to invite the attention of the photographer.

Considered as a centre from which to make excursions, Chester will satisfy the most critical. It is the natural threshold of North Wales, whose beauties are easily reached in day excursions from

Chester; even a journey to the summit of Snowdon and back in one day is possible to the energetic tourist by leaving Chester at 6.30 a.m. The ruins of Beeston, Conway, and Carnarvon Castles will be almost certain to create a desire for extra double-backs; but of a castle called Flint let the ruin-hunter beware. Inspired by a celebrated painting of Flint Castle the writer visited the spot, and after groping among pit-banks and ironworks for several hours, returned to Chester, having killed the painter of that picture in various tentative ways on the homeward journey. GEORGE T. HARRIS.

AN EASTER TRIP IN SOUTH DEVON AND CORNWALL.*

TWO WALKS IN CORNWALL.

1. *To Cawsand and Rame Head.*—It was a glorious morning when I walked down to Mutton Cove with Archer, junior, and got a genuine old salt to row us across the Hamoaze to Cremyll, the little village which nestles under the woods of Mount Edgcumbe, on the Cornish side of the water. The lovely grounds and woods of the Earl of Mount Edgcumbe are open to the public on Wednesdays, and on other days by special permit, to be obtained at the Manor House, Devonport. The Italian, French, and English gardens are exquisitely laid out, and are adorned with busts, fountains, &c., and there is a fine orangery. But Mount Edgcumbe is not for us to-day, so we turn to the right and enter a grassy field, in which is an obelisk (pronounced "hobblers," invariably, in the South of England), overlooking the Hamoaze. At our feet lie two fine ships. The fully-rigged vessel is the *Impregnable*, an old three-decker of one hundred and thirty-one guns, now a training-ship for the navy; while not far off a sister ship, the *Royal Adelaide*, lies at anchor. Never again will so gallant-looking a ship as the *Impregnable* be built to carry England's flag; and we carefully point the camera to secure her presentment. Thence uphill and westward we cross to the road which leads us to Maker Church, whose position on the top of the Mount Edgcumbe promontory makes it a conspicuous object. The porch of the church is ivy-covered, and is surmounted by a fine sun-dial. Altogether it is "plateworthy," and we give it ten seconds with *f*-64 on one of our slow plates.

Now we take the field-road to Cawsand, passing a fort on the way, and with glimpses of the Sound and Breakwater on our left. The twin villages of Cawsand and Kingsand will well repay any photographer who will take up his abode there for a week. Nestling under parti-coloured slaty cliffs the place is full of fishing-gear and boats and hardy boatmen, while every girl can "pull a good oar." Cawsand was a famous smuggling centre in years not long gone by. A great fort frowns over the little bay, and the houses are so irregularly arranged that it seems as if the place had been "dumped down" out of a cart. From the rocks on the north side of the bay good early morning views of the village and the cliffs can be obtained; but it was mid-day, and we preferred the panoramic views obtained by taking two or three pictures in succession—rotating the camera meanwhile—from the cliffs on the south side. At a Temperance Hotel here fair refreshment can be obtained.

From Cawsand it is a lovely walk along the rocky coast to the Grotto and Penlee Point, a projecting cape which the fishing smacks hug closely as they beat into Cawsand Bay. From this point a stretch of moorland extends westward for nearly two miles to Rame Head, the moor being covered with yellow gorse. On Rame Head stands a tiny ruinous chapel, with—as the guide-book truly observes—"no architectural pretensions." But the lambs and sheep which crop the short grass around console us for the want of symmetry displayed by the stones. The view from Rame Head is very fine, extending eastward over the rocky island called the Mew Stone to the shores of Devon, while to the west our eyes range over the long extent of Whitesand Bay, whose cliffs are crowned by the gigantic forts of Tregantle, Scraesden, &c. But long experience has warned us that "big landscapes make bad photographs," so we leave the Head and walk due north through the little village of Rame, with it grey stucco church, and onwards in the same direction for some three miles more to Millbrook, whence the little ferry steamer conveys us back to Devonport, thoroughly well satisfied with our walk.

2. *From Devonport to Torpoint, Antony, and St. Germans.*—There is a steam ferry from "Ferry-road," Devonport, across the Hamoaze to the little village of Torpoint, but we prefer to patronise one of the little group of boatmen who lounge about the riverside. As he pulls across, the old salt tells us all about the ships lying at anchor, and points out the famous *Calliope*, far down the Sound, which has put in this morning on her way to Portsmouth. Torpoint appears to be famous only for manure works, so after landing we steer north-west (of course, no photographer is without his compass, even a little one attached as a "charm" to the watch-guard being most useful) for Anthony Passage, on the St. Germans or Lynher River. A church close to the road on the right hand proves uninteresting, but some very pretty cottages nestle near it.

Just here the road enters Antony Park, famous for its ilex or evergreen oaks, planted in 1725. Passing Antony House we are soon at the ferry across the St. Germans River, by which we could cross to Trematon Castle, and thence to Saltash. But this is not our route to-day, so we sit down to watch some most interesting torpedo practice. The big man-of-war which lies near the mouth of the river is a torpedo training-ship, and her boats are out and at work. Two buoys are moored about a vessel's length apart, and a row-boat lies near them to pick up the torpedo. A third buoy is moored at a distance of several hundred yards. Steaming round, the torpedo vessel fires her deadly instrument when she reaches the distant buoy, and it runs fair at its mark, passing almost "plumb centre." The torpedo is charged with phosphide of calcium, a chemical which burns when in contact with water, and thus it is easily traced and picked up by the men in the row-boat.

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After watching this performance for half an hour we retrace our steps to the main road, and soon arrive at the village of Antony, about a mile and a half to the west. Here the village inn affords refreshment, after which we walk round the churchyard and expend a plate on the fine view to the east which it affords. The church porch contains a pair of stocks "as good as new," in which Archer, junior, is promptly sentenced to have his portrait taken, though he did not bargain for the appearance of the Vicar's two charming daughters in the middle of the exposure.

There is a fort here, but forts are "not photographic," so we continue westward to Sheviock, where there is *another* pair of church stocks, and we sit down in the church to rest. We were pleased to find all the Cornish churches we visited open all day and every day. There are some wall paintings in this church, and we tried an exposure on the interior of twenty minutes with *f*-22. Still tramping westward we pass grassy banks and wayssides literally carpeted with primroses and violets, until we reach the little inn at Polbathic, where we cross the bridge and turn to the right for St. Germans, half a mile further on. The church of St. Germans was, until the year 1049, the cathedral of Cornwall. Its west front is very imposing, with its two dissimilar towers and a grand Norman door. The latter is worthy a plate to itself, and should be taken from within the churchyard. But for any general view of this fine edifice we must apply to Mr. Lock, the gardener, for permission (readily granted) to enter the fine park and grounds which surround the Earl of St. Germans' mansion of Port Eliot on the north side of the church. A fine view of both church and house is to be had from the grassy slope of a hill. Our note-book shows that the eight plates with which we started have now been all expended, so we hurry to the St. Germans Station just in time to catch a train which conveys us over the Saltash Bridge back to Plymouth.

SUMMING UP.

And now our short holiday is over, and we must leave the sunny South for the murky Midlands, so let us see how we have expended our ten days' vacation:—

Going and returning	2 days.
Dartmoor	1 day.
Walks in Cornwall	2 days.
Plymouth and the Dockyards	2 ,,
On the water	2 ,,
Wet—Indoors	1 day.

With the whole-plate camera we have exposed forty-two plates, or an average of six per day, and we do not remember any subject which we regret to have left "untaken." This may seem a small number to some who carry changing bags and roll-holders, and doubtless the number might have been doubled had we known the country thoroughly, so as to have been able to select our subjects, points of view, and hours of correct lighting; but for a stranger in a strange land I am convinced that more exposures would have been of no benefit to anybody but the plate makers.

If these notes on a week's work with the camera in one of the most charming and picturesque parts of England should prove of service to any "children of the sun" who may wander westward, it will be a source of great pleasure and satisfaction to— TALBOT ARCHER.

ETHICS OF PHOTOGRAPHY AND PHOTOGRAPHERS.

(A Communication to the London and Provincial Photographic Association.)

SOME are unkind enough to allege that there is no system of ethics applicable to photographers and photography, unless in the inverse application of the term, and they adduce examples in favour of this negation, to some of which I shall have occasion to allude.

Can photography lie? it has been asked. Can photographers lie? or, to put it more plainly, Do photographers lie, and why, or under what circumstances do they lie? Is it necessary they should, and is it expedient that the strict and severe Temple of Truth be erected in its midst? In the social world strict ethics are largely ostracised; ethics and politeness, popularly so called and practised, are not invariably in harmony.

In what I say I am not supposed to have reference to photographers as social, private individuals, but merely to them *as* photographers. In itself photography is but a plastic tool in the hands of those who know how to employ it, and it may be made to subserve good or evil. My present purpose will be served by pointing out certain directions in which deviations from pure ethics are occasionally made by those who handle the camera. In doing so I take no cognisance of departures from accuracy of statement made to serve the exigencies of trade or commerce. De-

liberately false or misleading representations do not enter into the topic before me: this being simply *falsehood* open and palpable. Neither do the tradesman's arguments to his innocent purchaser that such and such a piece of apparatus is the thing for him to have, because such an one uses none else, and he has obtained a plethora of medals at exhibitions: this is *humbug*. Nor does my category include the one who assures me a lens is ten inches in focus, while measured properly instead of from the posterior end of the brass work it is twelve: this is *ignorance*. Nor the tramp who, pointing his camera at a house under pretence of photographing it, secures the money in advance, without having any intention of developing his plate, if plate there was in his camera: this is *fraud*. Nor the young Daguerreotypist who, having succeeded in taking one or two fairly good Daguerreotypes, handed his camera over to a more experienced man, after having, unseen, smeared iodine on the shutter of the dark slide, by which his rival failed *in toto* in producing a picture: this is *treachery*, and under some circumstances pardonable. Nor the one who rubs powdered nitrate of silver inside the front of the dude's hat at a picnic with ladies when the thermometer is in the nineties: this is *practice*. These, and numerous examples of like nature of departure from the straight path which might be adduced, scarcely come under the heading of *mal* ethics, although they are not ethical. And yet the line of demarcation is hard to draw.

Nice distinctions may even be drawn between artifice, deception, fraud, charlatanry, empiricism, delusion, white lies, and black lies, but they all belong to the same family.

Photography is in itself so absolutely truthful that it is accepted as evidence of realism. The camera merely depicts what is placed before it. But realism is not necessarily, and does not necessarily convey, truth. The large lump of coal placed on a cloth covered table with a few miniature shrubs and twigs around its base, and then photographed on a large scale to do duty as a scene in the Rocky Mountains, or anywhere else, cannot be said to be in accord with ethics if such be done with intent to deceive, even although the trick cannot be discovered by the experienced geologist who examines the perfect strata through his magnifying glass.

A point of view may be selected for a view which when aided by a lens of short focus shall give as a result a photograph true as a piece of realism, but conveying the false idea that the duck pond in the foreground is a large lake, and that the shrubs or trees of six foot height almost rival the giants in the Mariposa Grove in California. A realistic photograph, while true geometrically true, may not only fail in conveying a truthful impression, but one the every reverse.

Stepping from nature outside to inside the studio, who has not heard of the two sets of solid furniture—one being in miniature, to be had in use solely when men of Zacchean like stature desired that their circumscribed longitude should be elevated into that of mid-stature by contrast with the surrounding tables and chairs. I touch only lightly upon one of the most prevalent of *mal* ethics in the studio, because it is the outcome of the ignorance of the photographer; I refer to the two entirely different kinds of perspective to be so often found in one picture—that of the background and side scenes on the one hand, and that of the figure on the other. In a portrait—a standing figure of a lady full length—which was seemingly much admired at a recent exhibition, the point of view of the background was below the knee, that of the figure itself was about opposite her eyes. But some background painters and photographic artists so called do not appear to think that perspective has anything to with their art. The amateur who takes his portraits out of doors with natural surroundings never encounters this anomaly; the perspective of his figure and background necessarily harmonise, and is it to be wondered at if the educated artist or observer of nature is found to give preference to one over the other?

Artists seem to arrogate to themselves a prescriptive right to improve upon nature. I have heard the late Sir George Harvey, President of the Royal Scottish Academy, speak in approving terms of a local artist who always enlarged the eyes of his subjects when working them up by the brush or pencil; photographs in the estimation of this gentleman always made the eyes too small—for artistic taste I presume. But æsthetic truth and ethical truth are not the same thing, although there are cases in which one may with advantage be made subservient to the other. I heard a famous New York photographer giving directions to his managing printer, who was one morning submitting to him rough proofs from the negatives of the preceding day. "Take a big slice off that lady's belly" (indicating with a pencil) "and place it on behind. It will much improve her appearance." And it did so. "But that is not like ——," I remarked of a new portrait of a famous actress since extensively published. "she is rather sour and scraggy, while this one is amiable and somewhat fleshy." "Oh," remarked the photographer, "a retoucher has been working a whole day on that face in order to obtain this effect. She doesn't care whether it is a good likeness or not, so long as we make her good-looking."

Retouchers! oh, what ethical sins have you not to answer for! You supply all the crudities and deficiencies of nature. At your magic touch strabismus vanishes. Where nature has been unkind in the matter of eyes 'tis yours to supply the required number, and convert monocular into binocular vision; to round the sharp angles of the features by the transference of adipose tissue from where it is not wanted to where it is needed; to fill up the furrows dug by time; to enact the chiropodist upon facial excrescences, and the dentist, in case the taker of the negative has forgotten to stuff cotton wadding pads inside the mouth to ensure a pleasant rotundity to the wan cheeks—a thing a New York photographer never omits. You do not believe that the man or woman exists who in his or her heart endorses the sentiment of Oliver Cromwell about being painted with his wrinkles and warts. And you are right. They may assert as much as they like, but you well know such phrase and fact do not coincide, and accordingly you dress your ewe in lamb fashion, taking shelter behind Luther's dictum, that a great artist portrays a man as he should be, and not necessarily as he is.

Perhaps it is in the West States of America where retouching has its highest development. A reporter in California interviewed a photographer and conversed on retouching.

"What do you think of that?" said the artist, showing a cabinet portrait. It was simply the likeness of a mild, motherly, middle-aged lady, and the reporter said he could see nothing remarkable about it.

"I suppose not. How do you like this?"

"Good Lord, what a fury!" exclaimed the reporter, as he looked on the deeply seamed face of an old woman, with lowering brows, thick, cruel lips, and a brutal chin.

"Same subject," explained the photographer, putting the two pictures side by side. "Shows what retouching can do."

"But the retouched one does not look a bit like the woman who sat for it."

"Of course not; that's the beauty of it. The old woman wouldn't have taken the picture if it did. A photographer these days has to be a barber, surgeon, and dentist. Look at this."

It presented a man with a bald head and a twisted eye. In the finished picture the eye was straight and the baldness gone.

"For friends of his youth in the West, you know. Here's another."

This time a young man with two of his upper teeth protruding repulsively was shown. The tusks had been extracted by the artist's brush.

"Corresponding with a Boston girl he had never seen, but that he wanted to come out and marry him."

The reporter looked over piles of negatives, and compared them with the pictures made up from them, and sent out unblushingly by the sitters as likenesses. Plain women were made pretty, pretty ones given beauty, and in all cases the looks had been vastly improved. No woman seems to want to have herself shown just as she is, and the men are quite as vain. Very young men are frequently amazed at finding how much heavier their moustaches and downy siders are when photographed. The camera makes lean women plump and fat ones slimmer, knocks off ten years at least from the age of the mature, and in ninety cases out of a hundred lies shamelessly. Of course, it is the camera, not the photographer, who is to blame.

A funny instance of slightly unethical behaviour comes to my recollection. The once well-known Marcus Sparling was intent upon taking a stereoscopic view of an old house in the Edinburgh Cowgate, but when the light suited, the street was usually full of boys just out of school, who invariably persisted in standing in front of his camera. In this dilemma he applied to me for advice, and, as a consequence, the next day found him with a huge, highly-polished French portrait lens attached to the *back* of his camera, and pointing in the direction opposite to that where stood the coveted old house. This time the boys, true to their instincts, posed in front of the showy lens in the rear, and stood still patiently during the three or four minutes (these were the days of long exposures) required to get the building photographed. This may be off-colour from the ethical standard, but what was one to do under the circumstances?

Here is a view, fully exposed, taken of a railway carriage when the train is certified by the engineer as having been going at thirty-five miles an hour, and yet every one of the occupants of the compartment is sharp and distinct. As the story stands it is simply a marvel, but "seeing is believing." Where the ethics come in is the withholding the explanation that it was taken from the window of a carriage in another train which on a parallel track was moving at the same rate of speed, and when consequently one was motionless as regards the other—a phenomenon that can be witnessed every morning about nine o'clock between Finsbury-park and Holloway stations on the Great Northern Railway.

Double printing when practised by one imperfectly skilled may prove a fertile cause of departure from truth. Clouds of a nature totally inadequate to the character of the scene may be introduced. The foreground of a picture may be Indian, and in the distance may be seen the Crystal Palace with its Sydenham surroundings. One of our members has, by way of joke, introduced in a view in Epping Forest an alligator disporting himself by the bank of one of its pools; but many things equally non natural are sometimes to be discovered in a combination photograph. Thus we have the incongruities arising from the attempts to combine in one picture pieces of landscape or incidents taken with lenses the foci of which are widely different. Not only so, but we have in one inharmonious whole parts of views lighted differently from each other, and as many kinds of perspective as there are elementary parts in the finished result. I have seen in a pseudo moonlight photograph the orb of night printed the size of a threepenny piece, when that of even a split pea would have proved too great. Nay, I have, and you all have, seen moonlight photographs in which the dominant light fell upon the objects from a point thirty or forty degrees to one side of the position of the full moon by which the scene was supposed to be illumined.

The mere mention of photography in the law courts will recall an incident narrated by one of our members a few years ago. It was a case of ancient lights, and in the morning he, as a well-known professional, undertook the task, in the interests of the plantiff, to show by truthful photography that the erection of a building then in progress would most certainly cause a serious obstruction of the light. He did his work to the satisfaction of the solicitor, and received his well-earned fee. But next morning the solicitor for the defendant employed him to establish the fact by truthful photography that by the erection of the building in question no light whatever would be obstructed. He effected this, as in the previous case, in a satisfactory manner, and received his fee. He, doubtless, reasons that there is no more immorality in this than is reputed to be found in the daily practice of legal or patent experts, and other counsel, who give "opinions" usually favourable to those by whom their advice is sought. Nor is there.

A humorous application of *mal* ethics in photography is to be found in the photographer in an agricultural district who had often occasion to take negatives of cattle and horses. He overcame the difficulty so often experienced of the animals whisking their tails and spoiling the exposure by the ingenious expedient of keeping a large and various assortment of negatives of cows' and horses' tails, from which he selected one that matched that of any given specimen, and printed it in, having previously stopped out the original that was blurred by motion. This suggests the practice of the photographer in the military town who kept a stock of well-taken figures in uniforms but minus the heads, which he supplied from those of the gallant patrons of his studio. And this in turn suggests mention of a practice, horrible in its abomination, which more than twenty years ago was—happily not frequently—adopted by some foreign photographers of printing the heads of respectable ladies on the undraped bodies of some of the same sex to whom this qualifying term could not possibly be applied. Of all ethical sins in photography this one was the vilest, as the junction of head and figure was so perfectly effected as to deceive even photographers themselves.

And dry-plate manufacturers, what of them? Are they ever guilty of practices contrary to ethics? Honestly I believe they are not. The day has long gone by since any manufacturer sought to utilise his waste or "shady" plates by inserting two or three of them in every dozen package of good plates. Happily, this system being suicidal quickly effected its own cure, so it no longer exists.

"Borrowed plumes" is a term which covers several departures from the strict ethical path. I allude particularly under this heading to professional photographers who display in their showcases as their own work that which has been executed by others, and also to amateurs who, buying their plates ready prepared, get their developing, printing, mounting, and finishing done by others more skilled, and then exhibit, and possibly obtain medals for it, as their own work. A case is on record in which this was carried to an extreme, for not only was all the foregoing done, but it was done with a borrowed camera, and an artist present had indicated the spot on which to erect it and the exposure to be given. Well might the narrator ask *who* of all these should have got the medal that was awarded the picture made under these circumstances?

I have mentioned an amateur of one type, there is another, viz., the one who, posing as an amateur, yet enters in some respects into pecuniary competition with the professional, doing work for his friends and such of the public as apply at so-called prime cost—that is, cost of material—thereby in many cases depriving the man who has to subsist by the exercise of his profession of his means of living. On the unfairness of such a proceeding it is not necessary I should dilate, especially as it is not un-ethical and does not come properly within the scope of my subject.

Photographic authors and writers do not usually lend themselves to the encouragement of departures from ethics, but Elbert Anderson in his book, *The Skylight and the Dark Room*, is not so fastidious. He advises that, even "if your sitter sits still and has a good expression, but upon developing the negative you find you have committed a blunder, rush out of the dark room and tell him with a bold face that he *moved! You* must never be in the wrong; it must always be *his* fault."

Over a month ago I was discoursing on stereoscopic photography at another Metropolitan society, and after speaking of the expedient that had to be resorted to when photographing the moon, namely, taking advantage of her librations, and thus increasing the stereoscopic base from the two and a half inches between the eyes to many thousands of miles in order to show her in the stereoscope as the spherical ball we know her to be, by parity of reasoning I adduced my own experience in photographing a coast line from the deck of a yacht, allowing a space of a few hundred yards between the shots in order by such abnormal displacement to show every creek and jutting headland as they existed in nature, although undecipherable in the monotonously straight coast line as seen by the eye. It was objected that this was not truth. Not, perhaps, as a representation of what the eye saw at the moment, but literal truth all the same. This expedient is an aid to vision on the same principle as looking through a telescope to see an object at a range too great for normal vision, or photographing by microscopic aid an object otherwise altogether invisible.

But mention of the stereoscope suggests malpractices with it which are altogether contrary to ethics. For instance, trimming pictures so as to impart a fictitious acclivity to a railway ascending a mountain which is already fairly steep in itself, as practised by a well-known photographer; or making a stereoscopic pair of pictures from one and the same negative, by which they undoubtedly coalesce when viewed in the stereoscope, but which are devoid of relief.

"Dodges" are not necessarily antagonistic to ethics. They are generally expedients for expediting the means to the end. Many of them could be mentioned were it desirable or necessary.

Do not look upon me as hypercritical in regard to the latitude permissible to photographers. All things are or may be lawful; the expediency thereof must be determined by circumstances. Let photographers practise every conceivable dodge that they can think of, and no offence against the strictest code of ethics will be perpetrated, so long as it is not done, to quote Truthful James, "The same with intent to deceive."

J. Traill Taylor.

ON THE MIXING OF EMULSIONS OF WIDELY DIFFERENT SENSITIVENESS.—A NOTE ON EIKONOGEN.

It is now several years since I wrote a communication to The British Journal of Photography in which I recounted the results of experiments in mixing together, in various proportions, emulsions differing considerably in sensitiveness. The general conclusions that I then came to were, that if a slow and a rapid emulsion were mixed in about equal quantities, the sensitiveness of the "blend" would be more nearly that of the rapid than of the slow emulsion, and that, moreover, the mixed emulsion would show a longer curve of density than either the rapid or the slow emulsion alone. The explanation of this latter phenomenon I stated to be, that whilst an exposure was soon reached beyond which the rapid emulsion alone would show no further increase of density for an increase of exposure, the slow emulsion was still capable of showing such increase, not having had nearly that exposure that would give the maximum obtainable density, and that in this way the curve was extended. To put it briefly, there was a longer gradation of density; and a truer gradation, too, in the case of the mixed emulsion than in that of either the slow or the rapid emulsion of which it was compounded.

I have lately had so striking a confirmation of the conclusions that I have just mentioned, and that in the case of sensitiveness differing so much more than those of the emulsions that I experimented with some years ago, that I think it worth writing a short description of my experiments to The British Journal of Photography.

The circumstances were just as follows:—For about two years there has been a dry-plate factory in this country, known by the name of the Japan Dry-plate Factory, and, in connexion with it, it has been my duty to test a sample plate from every batch of emulsion made, and to give advice generally when called upon to do so. Lately, two batches of emulsion were condemned for the following reasons: One was intended for "rapid plates" (not the most rapid that can be made at the present day, but such as are generally preferred for studio

work, giving twenty to twenty-two on the sensitometer), the other was intended for making transparency plates.

The "rapid" emulsion came out of just the rapidity intended, and worked clearly enough, but there was difficulty in getting density, even when the plates were coated thickly. The "transparency" emulsion, on the other hand, gave any amount of density, and gave shadows transparent enough for anything but lantern slides; but would not, with normal developer, give that absolute transparency that is necessary for this kind of work. I do not mean that there was anything approaching that veil that there generally is in even slow or "landscape" plates when used for negative work. Those who are accustomed to the making of lantern slides will know what I mean when I say that the lack of transparency was such that no one would notice it in the case of a window transparency, but that a lanternist would notice it in the case of a slide.

I may as well say that the rapid emulsion contained iodide to the extent of about five per cent. of the silver haloid present, and that it had been made by the method of converting about one-eighth of the silver nitrate into ammonia nitrate and emulsifying with this at a high temperature, following with the rest of the silver nitrate dry, and allowing the large vessel containing the whole, and which cooled very slowly, to stand aside for an hour or so.

The slow emulsion, on the other hand, contained about three per cent. of chloride, and was made by emulsifying at a moderate temperature, in the presence of about one-eighth of the gelatine and some acid, using the whole of the silver nitrate dry, stirring for a minute or two to ensure thorough emulsification, and of then adding the bulk of the gelatine and at once precipitating in alcohol.

When the slow emulsion was tested in the camera, it was found that it gave splendid negatives, but with exposures of about twenty times those needed with the rapid emulsion.

It was with very little expectation of any successful results that I began a set of experiments to find the result of mixing two emulsions differing in sensitiveness, as twenty to one, and the results astonished me greatly. Briefly, I found that, using the slow emulsion and the rapid in various proportions, there was no appreciable reduction of the sensitiveness of the rapid emulsion if less than equal parts of the slow were mixed with it, whilst a comparatively small proportion of the slow emulsion added to the rapid entirely cured the tendency to thinness of image.

The only way in which to account for the facts that the rapidity of the rapid emulsion was not reduced by the addition of a large quantity of the slow emulsion, whilst the density, even of the finer details, was greatly increased, is to assume that the particles of silver already reduced by the action of the developer on the rapid emulsion acted as nuclei for the reduction of some of the slow emulsion that would not have been reduced by the combined action of light and the developer alone.

On the other hand, it is necessary to account for the equally noticeable fact that the high-light detail was much better in the case of the mixed emulsion than in that of any emulsion that I have ever been able to make at any single process. In fact, I consider that the gradation of density was much longer than it would be possible to get with an unmixed emulsion. This can only be accounted for on the assumption that, even when the greatest possible amount of silver had been reduced from the rapid emulsion by the combined action of the light and the developer, it had the power of causing the reduction of only a part of the silver haloid of the slow emulsion that was in contact with it.

I will give a rough method of testing whether the gradation of an emulsion is good, at least as regards the high lights. Every one who has used the Warnerke sensitometer knows that even the square marked "1" is by no means transparent. In fact, it probably destroys about half the light. Now, in the case of my own sensitometer, I have scratched away a bit of the film on this square, and I consider that if I give such an exposure to a plate under this screen—disregarding by two or three tints—that the last figure will be distinctly visible after development and fixing; and if I can still see a difference of density between that part of the square that I have scraped clear and the rest, the curve of gradation is very good, at least at the upper end. It is not often that I see any difference in the case of plates made with an unmixed emulsion. If there is any difference, it shows that the plate is still capable of showing the effect of moderate differences of light beyond about 240 times that light that will give a developable image. In the case of the mixed emulsion that I referred to, I saw for the first time a fine gradation in the higher figures corresponding to the shadow detail; and just in the case of the first square a difference of density apparently about inversely proportional to the amount of light passing through the scraped and the unscraped parts of the square. In the case of negative work, where the first consideration was the representation of the details of the high lights without losing that of the shadows, the improvement in the mixed emulsion over any unmixed that I have worked with was remarkable.

It is fair here to say, that although the two emulsions were mixed in about equal quantities for the final coating of glass, a very little more of the rapid than of the slow being used, the quantities of silver were not nearly the same, as the slow emulsion had been made only half as rich in silver as the rapid, a thing that will be readily understood by all that are familiar with emulsion work.

The results given above do not, it is to be understood, rest on a single experiment only, but on many that have all tended to confirm the deductions that I drew from the first series. Another thing I can state that is more remarkable than any of what I have already stated, but that rests on the results of one experiment only up to the present time. The results of the mixing experiments reminded me that there was another condemned emulsion in the factory that had not yet been sent to the residue barrels, one that was actually fogged. This emulsion was very rapid, and there was no tendency to thinness, nor was the fog such in intensity as to make it impossible to get good negatives with it, but it was such that plates coated with it could not be sent out to the general public. I tried the result of mixing this in equal parts with an emulsion that was probably more than twenty times less sensitive. Again, the sensitiveness of the rapid emulsion was not appreciably reduced, while the resulting plates worked even exceptionally clearly. This is a result that I certainly cannot pretend to account for.

The practical result of these experiments is that the Company previously referred to have determined habitually to use mixed emulsions. The advantages are evident. There are those that have been mentioned already, and the additional one that there is much less inclination to halation in the case of the mixed emulsion than in that of a rapid emulsion used alone, because of the deep red colour of the slow emulsion; and there is also the fact that a mixed emulsion will go further than an unmixed rapid emulsion, on account of the great covering power that is given by the comparative opacity of the slow emulsion—that is, of course, measured by the amount of silver used.

As I have lately sent a note or two to THE BRITISH JOURNAL OF PHOTOGRAPHY on the subject of eikonogen, I may, perhaps, be allowed a word or two more. The other day there came to hand about a dozen and a half bottles of various sizes of this substance that have been on order for a long time. I was thus able to see and use for the first time the so-called white crystals. It may be remembered that I received a bottle of the new form of eikonogen some time ago, but that the colour, far from being white, was a dark brown. None of the last that I have just got is actually white, but the contents of all but one bottle are of a light yellow colour, almost the same as that of ferrocyanide of potassium (yellow prussiate of potash). The curious thing, however, is that the contents of one bottle that appears to be as securely corked and capsuled as the others are quite black!

I have experimented with the yellow eikonogen, and must admit that it is an improvement on any eikonogen that I have yet used; in fact, I think there can be no doubt that, for some kinds of work at least, eikonogen, when it is in the proper condition, is distinctly superior to pyro, but it is a great pity that there seems to be such uncertainty as to its keeping qualities. Surely some who advertised that it would keep in the dry state better than pyro were very premature in their statements.

I have been trying the formula recommended by Mr. Warnerke for eikonogen, but fail with it for two reasons. In the first place, I cannot dissolve nearly the amount of eikonogen that he mentions, and in the second place, if I use a solution nearly as strong in caustic alkali—either caustic potash or soda—as he advises, the film frills right off the plate!

W. K. BURTON.

A NEW HELPER IN PHOTOGRAPHY—ACID SULPHITE.

For some time past our German correspondents and exchanges have been speaking very highly of the merits of solution of sodium acid sulphite as an addition to the fixing bath. As this special material was not obtainable in the United States, we induced the publishers of the *Bulletin* to import a quantity of it, that American photographers might have an opportunity of looking into its action and merits. It is now upon the market, and we have been experimenting with it both in the fixing bath and also as a preservative for the several organic developers.

When pyrogallol was first used for dry-plate development in conjunction with alkalies, several formulæ were proposed using sulphite of sodium as a preservative agent, and it was found that the addition of sulphurous acid had a very beneficial effect. This acid was added directly, as such, in solution, or it was developed in the mixture of

pyrogallol and sulphite of sodium by the subsequent addition of sulphuric acid, which caused the formation of a certain amount of sulphurous acid in the fluid, and at the expense of the sulphite of sodium. No matter which method was employed, the final result was the formation of a small quantity of acid sulphite of sodium, which preserved the pyrogallol for a much longer period than when ordinary sulphite of sodium was used. But the trouble about these early efforts at preserving pyrogallol was that the quantity of acid sulphite present was small compared with the amount of ordinary sulphite. We have now presented to us in a very convenient form a very strong solution of acid sulphite of sodium, that in the compounding of developers will prove extremely useful. The material is in the form of a pale, yellowish fluid, smelling strongly of sulphurous oxide gas, with which it is saturated, and containing over fifty per cent. of acid sulphite of sodium in solution. That is to say, it contains half its weight of acid sulphite of sodium, while ordinary sulphite of sodium in crystals contains half its weight of normal or neutral sulphite of sodium. From the nature of the two salts the acid-sulphite solution contains, therefore, twice the amount of the preserving element, sulphurous oxide, which the ordinary sulphite crystals contain. This would be true if the ordinary sulphite crystals were pure, but it is next to impossible to make them so, for they usually contain from four to six per cent. of sulphate of sodium, and two or three per cent. of carbonate of sodium. The new acid-sulphite solution contains a little sulphate of sodium, but the excess of sulphurous oxide gas with which the fluid is charged compensates for this.

Such is the new material placed in the hands of the photographer. Now a few words as to its uses.

The first important application of the new fluid is in the fixing bath. If to a quart of fixing bath (one to four) we add about two ounces of acid-sulphite solution, the bath is rendered acid, but no change takes place otherwise. In this bath any negatives can be fixed, and with a rapidity and clearness that is really startling. Some of the slow varieties of plates are remarkably long in the ordinary bath before they are fixed nicely; but in the new acid-sulphite and hypo bath they fix in about one-fourth of the amount of time ordinarily taken. And what is yet more pleasant to note, they are remarkably clean and free from stain. In fact, they look exactly like plates developed with ferrous oxalate after they come out of the new bath, although they may be badly stained before fixing. The new fixing bath is beyond question the best remedy for stained plates from organic developers. One thing must certainly be remembered at all times, the fixing bath must be kept acid by the addition of new acid-sulphite solution from time to time in order to have it maintain its efficiency as a clearing bath. If the proper care is exercised, the use of the alum clearing bath can be entirely omitted when the new acid-sulphite solution is used; thus eliminating a step in the present negative process when clear, crisp, and quick negatives are desired.

We must now say something about the application of the acid sulphite to the developer. With pyrogallol the application is very simple: to every grain of pyro in solution add one drop of the acid-sulphite solution as a preservative. Thus, you may take:—

Pyrogallol	1 ounce.
Acid sulphite	1 „
Water to make	10 ounces.

This solution contains five and a half grains of pyro to the fluid drachm, and will keep a long time. To develop: In one ounce of water use from one-half to one fluid drachm of the above solution, with from one and a half to two fluid drachms of alkaline solution, made as follows:—

Sodium carbonate (crystals)	5 ounces.
Water to make	10 „

In the case of eikonogen it works equally as well as with pyro. In this case the formula becomes:—

Eikonogen (finely powdered)	1 drachm.
Acid sulphite	1 „ (fluid).
Water to make	10 ounces.

Dissolve the eikonogen first, then add the acid sulphite. This solution contains three-quarters of a grain of eikonogen to the fluid drachm, and keeps as well as the pyro mixture above. In developing, if sodium carbonate is used, to every ounce of the eikonogen solution add from one to two drachms of the solution given above for pyro, and no water. If carbonate of potassium is preferred, use one to two drachms of the following solution:—

Potassium carbonate (dry)	3 ounces.
Water to make	10 „

In each case the negatives come up clear and full of detail, without any tendency to fogging. Judged by experience with the ordinary developers, these new mixtures with acid sulphite work a little more quickly; and if the negatives are fixed in the acid-sulphite fixing bath, the results leave nothing to be desired as to quality.

With hydroquinone we have not yet obtained any desirable results, the mixtures tried working much too slowly to be of practical use.

As the developers given above work more rapidly than those ordinarily employed, care must be taken in regard to the light used in the dark room that it is of the proper non-actinic quality. It is best to use as little light as possible under any circumstances, but always enough to see what you are doing.

We are sure that those who use the new acid sulphite of sodium will find it a great help to the production of clean, stainless negatives, closely resembling those of wet-plate days.

—*Anthony's Bulletin.*

NOTES FROM NEWCASTLE.

The bulk of the honours in connexion with the recent exhibition must undoubtedly rest with Mr. J. P. Gibson, of Hexham, this gentleman's two lectures being the best attended of the series; in fact, the interest taken in the second lecture was remarkable, and not a seat was to be had after eight o'clock.

Mr. James Bacon, of Northumberland-street, who has, by the way, for some months been advertising an "Exhibition of Photographs," at length opened to the press and public the collection of portraits, enlargements, &c., which is generally to be seen, with slight variations, in his reception room. This was probably intended as a counterblast to the larger and more imposing show at the Art Gallery. Looked at in *this* light, it would be a failure; the local press notices were extremely laudatory *and amusing;* these gentlemen had evidently forgotten all about their "high art" principles of three weeks previous. The photographs themselves were up to, and some superior, to the usual work of a high-class studio.

The weather here just now is magnificent, and I have an idea we are going to have a good photographic season. I mean, of course, a lot of new work for the autumn exhibitions.

I have heard some talk of a new photographic society being projected, and I presume this means really a separation of the amateur and professional element. The show made by the local amateurs was moderate in the extreme, and yet there are several first-rate amateurs within ten miles of Newcastle. I don't fancy these men will join the association on the present rules, and there is no doubt at all that the professionals in the local society, though in a very small minority, completely overpower, in artistic and technical ability, the amateurs. I am inclined to think, however, that the amateur element would do better *apart* from the professional. They would be put more on their mettle, and I imagine that a general all-round improvement might result. Many amateur members shrink from exposing and displaying their work before a mixed company containing professionals, and I don't feel much surprised at this. There is no question whatever of the *entente cordiale* as the society is at present constructed, *i.e.*, in connexion with the present membership, and I have no doubt that in the event of a separation it would not prevent a friendly reunion and co-operation at times.

The Y. M. C. A. Photographic Club promises well for the coming season. Several new members have joined, the dark room has been put right, and is now in constant use. The fee is five shillings per annum, which includes use of hypo and alum. The first turn out was to Belsay on the 26th.

Your critic, in his review of our recent exhibition, fell foul of an interior of Durham Cathedral. I noticed a few days afterwards that a much better print—a bromide, I think—of the same subject had been substituted. I expect this would be rather a stretch of the rules, but in this case allowable for the general good effect of the exhibition.

Cullercoats, a pretty fishing village some ten miles from Newcastle, is a place much affected by artists. There are, in fact, two or three resident there. I cull the following little anecdote from the *Newcastle Weekly Chronicle*:—"A local fisherman's wife had been invited to see some pictures which a Cullercoats artist had just painted. A clergyman happened to be in the room at the time. One of the pictures showed a well-known fisherman returning from a shooting expedition with a number of ducks and other sea birds slung over his shoulder. As soon as she saw the picture, the visitor exclaimed, 'That's the biggest leer i' Cullercoats. Must have bowt them birds. Couldn't hev shutten 'em if he'd tried.' When the clergyman retired, the good woman asked who he was. The artist gave the name of a vicar or rector in the Church of England. 'Eh, hinny!' cried the fishwife, in distress, 'as dune it this time. Aa shuddent hev said *leer;* aa shud hev said *liar!*'"

Mr. J. P. Gibson, of Hexham, opened an exhibition, comprising some four or five hundred of his views, in that town on Whit Monday. The pictures, many of which are well-known, include the Northumbrian castles and peel towers, views of the Roman wall and remains, and "bits" and studies of all the most interesting parts of Northumberland. The exhibition was opened on Saturday the 24th, in the Town Hall, Hexham.

D. D.

PHOTOGRAPHS OF RAPIDLY MOVING OBJECTS.

At the meeting of the Physical Society, May 2. Mr. C. V. Boys made two communications:—(1) *On Photographs of Rapidly Moving Objects*, and (2) *On the Oscillating Electric Spark*.

A collection of apparatus by which he had been able to photograph drops of water in their various stages of formation was exhibited. It consisted of a lantern and lenses by which a trough in which the drops were formed could be strongly illuminated, combined with a camera and revolving disc with one perforation. By this means exposures of about one six-hundredth of a second could be made about twenty times a second. The circle of the camera was about three feet long, and could be moved across the field by hand, so as to take the consecutive impressions on different parts of the plate. The resulting photographs show with remarkable clearness the formation, breaking away, the oscillations of the drops, and their rebounding in the liquid into which they fell. By cutting the photographs into strips, each strip representing a single exposure, and mounting them on a disc, Mr. Boys had arranged a kind of Thaumatrope, which represented the phenomena in a very realistic manner. He also exhibited photographs of small water fountains broken up into drops by musical sounds, which he had taken by the electric spark without the aid of lenses. The shadows of the drops were sharply defined, even when magnified considerably, and the various stages of transition from the liquid column to the detached particles were well shown. Finding it possible to obtain such good results from a simple spark, it occurred to him that he might get a succession of photographs from the intermittent light of an oscillating spark, and in this he was very successful.

An apparatus devised to show the oscillatory character of a discharge was next exhibited in operation. It consisted of a disc carrying six lenses arranged in two sets of three. The members of each set were at different distances from the axis, so that the images of the spark on the screen do not coincide. The disc can be revolved at a high speed, and the successive sparks are seen as bright patches on the screen. By this apparatus a single discharge can be examined, whereas with Lodge's apparatus it is desirable to have a fairly rapid succession of sparks. Photographs of an oscillatory discharge taken with the apparatus were exhibited, and these show that the duration of the illumination is a considerable fraction of a complete period.

Lord Rayleigh said he was greatly interested by Mr. Boys' apparatus. He (Lord Rayleigh) had photographed water fountains both when broken up and when made to coalesce under electrical influence, but it had never occurred to him that it would be possible to get enough light or sufficient sharpness from a single spark. Mr. Boys' success he believed to be owing to the fact of his using no lenses which would absorb the ultra-violet rays. He also thought the method might be developed so as to give shaded pictures instead of mere representations in black and white.

Mr. Gregory asked Mr. Boys if he had tried to get greater potentials for his oscillatory discharges by using Dr. Lodge's "impulsive rush" arrangement.

Mr. Trotter inquired whether the single sparks used to photograph the water fountains were as large as those required to show oscillations.

Mr. Boys said he had not tried Dr. Lodge's "impulsive rush" arrangement because of the enormous capacity of the condensers required. The sparks used to photograph the broken-up fountain were very small, being only about a quarter of an inch long and from a few jars.

Professor Perry asked Lord Rayleigh whether it would be possible to compare the shapes of the water drops shown in the photographs with the shapes of the liquid surfaces of revolution given by Sir W. Thomson at the Royal Institution some years ago, or whether the changes of shape were too rapid to permit of the surface tension being all-important.

Mr. Boys thought the motions of the drops would be too rapid, and that inertia would play an important part.

Lord Rayleigh pointed out that by forming a drop slow enough the effect of inertia might be made negligible until such time as the unstable state was reached, after that, however, inertia must have considerable influence on the shape.

—*Chemical News.*

Foreign Notes and News.

The death of M. Vermeesch Adet is announced from Dixmude, in Belgium. The deceased gentleman—one of the oldest members of the Association Belge—was a distinguished amateur. He succumbed to an illness of some weeks' duration.

A number of photographic impressions of the luminous clouds, to which attention has frequently been made in the foreign column of the JOURNAL, have been taken during the current year in Germany. The result of comparing the various results obtained at different observatories goes to show that these clouds have the extraordinary altitude of eighty-two kilometres (fifty-one and a half miles) above the sea level.

The last number of the *Photographische Nachrichten* gives space to the complaints of an amateur correspondent concerning his misfortunes when experimenting with magnesium flash light. This ingenious individual made up a flash powder according to Professor Müller's receipt, and then *blew it through the flame* of a flash lamp; result—a few sparks but no flash. To test the lamp, pure magnesium was then employed, and the result was satisfactory. Why is this, asks the ingenious one?

We are not aware whether it has ever occurred to an amateur in this country to commit the same blunder. Primarily, one would be inclined to suppose that no one would go to the trouble of preparing or procuring a flash powder to blow through a lamp when magnesium powder is known to be supplied for that purpose. Should, however, any of our readers have fallen into this error they will, perhaps, be glad to know the cause of the failure. This, as our learned contemporary points out, is due to the blowing through the flame, causing the bodies that are intended for giving off the oxygen to become separated from the magnesium; they pass through the flame without being much decomposed, and cool it so much that the magnesium does not burn.

Another ingenious correspondent suggests in explanation of the alleged spirit photographs that the spirits may have the faculty of intercepting and reflecting the invisible ultra-violet rays, and inquires of the editor of the *Nachrichten* if this may not be so. The query certainly recalls to the mind Liesegang's excellent little skit about the "invisible oil." The editor, however, contents himself with remarking, "On the possibility of such a phenomenon no one can speak—it is another matter as regards the *probability*."

M. Jarrt devotes some space in *La Photographie* to the question of certain defects in gelatine plates. These he attributes to the presence of small air bubbles in the films, which, as the gelatine solidifies, burst, and give rise to shallow depressions of sufficient size to be rendered visible by a lens. Gelatine films which suffer from this defect when employed for collotype take up the ink in the minute depressions, and so cause the impressions taken from them to be disfigured by a number of small black points. By allowing the gelatine films to harden slowly these troubles may be avoided, as the bubbles have then time to rise to the surface and escape.

Our Editorial Table.

We have before us the first two numbers of Messrs. Boussod, Valadon, & Co.'s *Figaro Illustrée*, now a monthly periodical, and must congratulate these well-known art publishers upon their complete success. The numerous plates, coloured and otherwise, are certainly among the finest of their kind yet offered to the public, and show a most appreciable advance upon the ordinary electrotype. Of course the interest we take in this work is owing to the close connexion of these productions with our own art: it is well known and acknowledged that photography has played a most important and progressive part in the very best productions of this well-known firm.

The Art and Practice of Interior Photography.

(By F. W. Mills. Huddersfield: A. Jubb.)

We learn from the preface that this book is an extension of a lecture which the author was prevented by ill-health from delivering to the Huddersfield Photographic Society. From this source we learn also that when extracts or information have been taken from works or journals devoted to the service or art of photography the author has endeavoured to acknowledge his indebtedness in footnotes, and yet we find more than one page of matter that was prepared for and appeared in The British Journal Photographic Almanac, which the author has forgotten to acknowledge. Although the *raison d'être* of this work is *Interior Photography*, by which is understood the taking of interiors by photography, yet, strange to say, only a *very* small portion is devoted to it, the remainder treating of topics peculiar to all handbooks, such as developing solutions, printing on albumenised, bromide, autotype, and platinum papers, and on fabrics. But, perhaps, we ought not to criticise the book *as* a book, but rather look upon it as a discourse intended for a provincial society. There are several idiosyncrasies in the spelling adopted, yet is the work (115 pp.) well printed in fine large type. It is illustrated by three photographs. The price is said to be 7*s.* 6*d.*, but as to this we only quote from hearsay.

Professional Substratum Varnish.

(Percy Lund & Co., Bradford.)

In the old collodion days the term substratum would convey only one idea, namely, that of something to ensure the adhesion of the collodion to the glass; this, however, is for another purpose, namely, forming a substratum to the varnish which is to be applied to the gelatine

negative. This makes the film impermeable by damp, and consequently ensures freedom from stains when, by accident, moist paper may be printed upon. As a retouching varnish "Professional Substratum" is really excellent; it bites the pencil firmly, and the subsequent varnishing does not disturb the retouching. We accord it a hearty welcome as another aid to the facilitating of producing effects in photographs. Applied to the *back* of the negative it enables cloud effects to be readily obtained by a soft pencil or crayon stump.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 7411.—"A New or Improved Light-tight Developing Dish for Photographic Purposes." H. M. Hastings.—*Dated May* 13, 1890.

No. 7453.—"A Process for Photographing by Means of Organic Compounds." A. G. Green, C. F. Cross, and E. J. Bevan.—*Dated May* 13, 1890.

No. 7489.—"Improvements in Photographic Cameras." C. C. Vevers.—*Dated May* 14, 1890.

No. 7578.—"Improvements in Roller Holders for Photography." W. G. Thomson.—*Dated May* 15, 1890.

No. 7589.—"Improvements in Apparatus for Producing Photographic Pictures." W. E. Gibb.—*Dated May* 15, 1890.

No. 7650.—"Improvements in Photographic Shutters." J. R. Gotz.—*Dated May* 16, 1890.

No. 7842.—"Improvements in and relating to Automatic Photographing Machines." J. Hines, E. Howell, and A. Howell.—*Dated May* 20, 1890.

No. 7965.—"Improvements in and connected with a Combined Store and Change Box, and Dark Slides, and Apparatus for Effecting the Transfer of Photographic Plates between the same." J. Potts.—*Dated May* 22, 1890.

No. 8099.—"Improvements in Photographic Cameras." S. H. Burchell.—*Dated May* 23, 1890.

No. 8160.—"Improved Photographic Burnishing Machine." Communicated by W. Entrekin. J. P. Bayly.—*Dated May* 24, 1890.

SPECIFICATION PUBLISHED.

1889.

No. 18,897.—"Photographic Films." Communicated by Eastman. Boult.—Price 6*d*.

PATENTS COMPLETED.

Process for Rendering Cardboard and the like Impervious to the Action of Photographic Chemicals and suitable for Photographic Purposes.

No. 7747. William Friese Greene, 92, Piccadilly, London.—*May* 3, 1890.

This invention relates to a new or improved process and means for rendering cardboard and the like innocuous as regards any action on and suitable as a basis to or upon which any suitable sensitising medium with which it may be desired to coat the same may be directly applied, and innocuous as regards any action on and impervious to the action of photographic developing chemicals or solutions, and suitable for photographic purposes as hereinafter referred to.

The special object of the invention is so to prepare ordinary commercial cards, such as those whereon photographic prints as ordinarily produced on sensitised paper are at present mounted, as to enable the same to be sensitised with mediums suitable for the production of permanent photographic prints of the highest excellence and artistic value, so as to enable such prints to be produced directly on such cards, so as to avoid the tedious process of mounting and the subsequent process of rolling the prints, whereby the cost, time, and labour required for the production of such prints will be materially lessened.

Cardboard and such cards and the like as ordinarily manufactured, and without suitable preparation such as that contemplated by the present improvements, is or are not suitable for the reception of such sensitising mediums, or for the production directly thereon of such prints, on account of the absorbency thereof and of the chemicals or ingredients used in the manufacture thereof and contained therein, and of the liability of such chemicals to effect a deleterious action on such mediums if applied thereto directly, and on developing solutions and on prints if obtained thereon directly, causing such mediums to become unreliable, and such prints to become discoloured and to fade, and to be quickly destroyed so far as the artistic merit or value thereof is concerned.

To avoid all such disadvantages, and to obtain the aforesaid object and the important advantages attendant thereon, I cause, in accordance with the present improvements, the cards or the like to be subjected to a process or treatment which will be effective in rendering the same innocuous as regards any action on and suitable as a basis to or upon which any suitable sensitising medium with which it may be desired to coat the same may be directly applied, and innocuous as regards any action on and impervious to the action of photographic developing solutions, so as to render the same suitable for the printing directly thereon of any desired photographic representation, either by exposure under any suitable negative to daylight or artificial light, or in the camera, or otherwise in any ordinary manner of obtaining photographic prints or representations.

I attain such objects firstly by destroying all organic matter at the surface of the card which would be deleterious to sensitising mediums or to developing solutions, and, as it were, parchmentising the surface of the card, and rendering it specially suitable for the subsequent operation hereinafter described, and this is effected by dipping the card into or otherwise subjecting it to the action of a mixture of about two measures of strong sulphuric acid and about one measure of water, subjecting it to such treatment for a time depending upon the quality of the card, after which I thoroughly wash the card to free it from all acid, and dry it.

I then render the card or the like impervious to the action of developing solutions, and otherwise suitable as aforesaid for photographic purposes, by brushing or otherwise coating the card by hand, or by suitable mechanical means, one or more times, according to the relative fineness of the texture of the surface of the card, and according as to whether a dull or matt or a glossy surface is required, with a mixture prepared by gradually pouring about three parts by weight of spirits of turpentine into about one part by weight of zinc oxide, stirring the mixture the whole while, and by gradually adding to such mixture about one part by weight of pale gold size, continuing the stirring all the while, and for a sufficient time subsequently to ensure homogeneity in the product.

All such operations should be conducted in perfectly clean containers, preferably formed of glass, and with glass stirring rods, and they may be conducted at ordinary atmospheric temperatures.

After being thus coated, the card is dried, and will be suitable, as aforesaid, as a basis to or upon which any suitable sensitising medium may be applied directly, and it will keep suitable for such use so long as it is kept free from the access of dust and under other appropriate conditions, and after being sensitised it should also be kept until required for use under usual appropriate conditions, and may then be used and treated as if it were ordinary sensitised paper, but will possess the advantage of dispensing with the operations of mounting and rolling, and consequently effecting a material saving in the cost, time, and labour involved in the production of the required prints.

If the cardboard or the like is of a sufficiently good quality as to be innocuous as regards any action on sensitising mediums or developing solutions, then the aforesaid preliminary operation may be dispensed with, it then only being necessary to render the same impervious to the action of the developing chemicals and solutions as set forth.

If any particular colour of card be required there may be added to the zinc oxide, before the admixture therewith of the spirits of turpentine, any suitable colouring matter innocuous as regards any action on sensitising mediums or developing solutions.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The hereinbefore-described new or improved process for rendering cardboard and the like innocuous as regards any action on and suitable as a basis to or upon which any suitable sensitising medium with which it may be desired to coat the same may be directly applied, and innocuous as regards any action on and impervious to the action of photographic-developing chemicals or solutions, and suitable for photographic purposes. 2. Subjecting cards and the like which are not suitable as a basis for the reception of sensitising mediums, or for the development directly thereon of photographic prints by chemical solutions, to a process or treatment which will be effective in rendering the same innocuous as regards any action on and suitable as a basis to or upon which any suitable sensitising medium with which it may be desired to coat the same may be directly applied, and innocuous as regards any action on and impervious to the action of photographic-developing chemicals or solutions, and suitable for photographic purposes, substantially in the manner hereinbefore set forth. 3. In the treatment of cards and the like for the purpose of rendering the same suitable for photographic purposes as aforesaid, subjecting the same to the action of a mixture of sulphuric acid and water, as set forth. 4. In the treatment of cards and the like for the purpose of rendering the same suitable for photographic purposes, as aforesaid, coating the same with a mixture of zinc-oxide, spirits of turpentine, and pale gold size, as set forth. 5. In the treatment of cards and the like for the purpose of rendering the same suitable for photographic purposes, as aforesaid, subjecting the same to the action of a mixture of sulphuric acid and water, and subsequently coating the same with a mixture of zinc oxide, spirits of turpentine, and pale gold size, as set forth. 6. As a new article of manufacture, cardboards, cards, and the like, which has or have been rendered suitable for photographic purposes, as aforesaid, by being subjected to the process referred to in Claim 1. 7. As a new article of manufacture, cardboard, cards, or the like, which has or have been rendered suitable for photographic purposes, as aforesaid, by being subjected to the treatment referred to in Claim 5 hereof. 8. As a new article of manufacture, cardboard, cards, or the like, which has or have been rendered suitable for photographic purposes, as aforesaid, by being subjected to the treatment referred to in Claim 4 hereof. 9. As a new article of manufacture, cardboard, cards, or the like, which has or have been rendered suitable for photographic purposes, as aforesaid, by being subjected to the treatment referred to in Claim 5 hereof, and by being subsequently coated with any suitable sensitising medium. 10. As a new article of manufacture, cardboard, cards, or the like, which has or have been rendered suitable for photographic purposes, as aforesaid, by being subjected to the treatment referred to in Claim 4 hereof, and by being subsequently coated with any suitable sensitising medium.

Improvements in or relating to Instantaneous Shutters for Photographic Cameras.

(A communication from George Eastman, of Rochester, County of Monroe and State of New York, United States of America.)

No. 9869. Alfred Julius Boult, 323, High Holborn, Middlesex.—*May* 3, 1890.

In carrying out this invention, I provide a pivoted plate or shutter having a segmental slot, preferably considerably longer than the lens opening. The edges of the shutter may be turned up or provided with stops, and pivoted at the same point as the shutter is a cover narrower than the shutter, having no slot, and also having one side turned up and provided with one or more stops. This cover is so controlled by a spring or springs as to have a tendency always to lie at one side of the shutter, and when in this position is entirely clear of the slot in the shutter and the lens. The shutter is also spring-controlled,

with a tendency in the direction opposite to that of the cover. In its normal position, the shutter lies so that the slot is entirely past the lens opening, and a part of the solid portion of the shutter, as well as the cover, both lie behind the lens, so that no light passes. In setting the shutter prior to making an exposure, the shutter is pulled over to its farthest limit on one side by any suitable means, such as a lever or a cord provided with an external button and secured around a pulley on the shutter spindle, this pulley being so arranged as to carry the shutter with it in one direction, but to leave it free in the other direction. The shutter is provided with two or more peripheral openings, into which falls the end of a spring controlled or spring lever pivoted. The cover also is provided with one or more slots.

The action is as follows:—

When the shutter is drawn over by the cord the cover remains behind the lens, being retained in that position by the spring lever until the opening in the shutter has passed the lens, when a suitable projection upon the periphery of the shutter or special peripheral formation causes the spring lever to rise out of the cover, which then, under the influence of its spring, passes over to the side of the shutter, out of the way of the slot in the shutter. The shutter is held in its set position by the spring lever entering a slot suitably arranged for the purpose, and to make the exposure a press button or equivalent on the outside of the case may be pushed in against the reversed end of the spring lever, with the result that the setting out of the lever is removed from the slot in the shutter, which then, under the influence of a spring, flies over, making an exposure for the length of time during which the slot passes the lens opening, the shutter finally resting in the original position when both shutter and cover are behind the lens.

The cover is arranged with a peripheral slot or projection, which takes on to the spring lever so as to raise it clear of the portion of the shutter necessary to allow the slot to pass the lens opening during the setting of the shutter, after which, as already explained, the lever is raised by the shutter itself, and the cover flies clear.

By this means it will be seen that there is no occasion for capping the lens during the setting of the shutter, as the previously described cover prevents the passage of light through the lens during the setting of the shutter.

The shutter may, of course, be arranged in front of the lens, or behind the lens, or, in the case of double lenses, between the two, according to requirements.

By providing suitable peripheral slots, both shutter and cover may be held by a spring lever in a position to leave the unreversed slot in the shutter opposite the lens opening, so that a prolonged exposure may thus be made.

IMPROVED APPARATUS FOR COATING PHOTOGRAPHIC PLATES.

No. 396. FRANK ELSDON, 23 and 29 Solio-square, Middlesex, and ALEXANDER COWEN, Chase-side, Southgate, Middlesex.—*May* 3, 1890.

THIS invention relates to improved apparatus for coating photographic plates with sensitive emulsion.

The invention relates first to the construction and mode of mounting of the coating trough, and has for its object to ensure the even distribution of the sensitive emulsion and enable the thickness of the deposit to be easily regulated.

The trough is V-shaped in cross section, and is constructed of two strips or plates of glass or other suitable material, the one forming the inclined bottom side of the trough being bedded upon a hot-water or heating chamber, and the other forming the upright side of the trough, being clamped in position with respect to the first-mentioned plate, its lower edge being truly ground at a suitable angle and set at such a distance from the surface of the bottom plate as to regulate the escape of the emulsion, and allow it to flow in an even stream down the lower projecting part of the bottom plate. The ends of the trough are closed by blocks which assist to hold the two plates or strips in proper relative angular position. The hot-water chamber extends the whole length of the trough, and to it are fixed at intervals clamps, having set screws adapted to hold the plates forming the two sides of the trough in their proper relative position at all points of their length. The trough is supported by the ends of the hot-water chamber being united on balanced levers, mounted to oscillate at the sides of the coating table, over which the trough extends, the lower edge of the inclined side of the trough resting lightly on the plates to be coated as they are carried beneath it upon the coating table.

In the case of a long trough a lip formed by a strip of flexible material interposed between the bottom plate and the hot-water chamber would be used to compensate for inequalities in the glass, and would rest upon the plates to be coated instead of the lower side of the trough itself.

The invention further relates to the means of supporting and guiding the plates whilst and after being coated, so as to avoid defects in the film due to local differences of temperature consequent on the contact with the under sides of the freshly coated plates of their carrier rollers or other supports.

It also relates to means of receiving waste emulsion from the plates, so as to avoid the coating of the under face of the plates with emulsion.

For this purpose the plates are supported at their extreme edges only by knife-edged rails, and run between guiding rollers or pins mounted alongside the knife-edged rails, the edges of the plates overhanging gutters formed to receive superfluous emulsion, the guttered rails being arranged above a hot-water tank, by which an even temperature is maintained.

THE PHOTOGRAPHIC SURVEY OF WARWICKSHIRE.

A MEETING of those interested in the Warwickshire Survey was held at St. Edmund's College, Birmingham, on Thursday, May 22, the Mayor of Sutton Coldfield, J. B. Stone, J.P., F.G.S., F.L.S., &c., being in the chair. There was a numerous attendance of the members of the Birmingham Photographic Society, together with representatives from the Vesey Club, the Municipal School of Art, the Coventry Photographic Society (Mr. F. W. Dew), the Philosophical Society, &c.

Mr. Stone said that the object of the meeting was to organize a County Survey Council which should take charge of, organize, and carry out a survey of every object of public interest in the county of Warwickshire. The survey would include photographs of buildings, ancient and modern, of ancient manuscripts, of paintings, of objects of geological and botanical interest—it would, in fact, form a record which would enable future generations to have some idea of the state of the county as it existed in the latter part of the nineteenth century. He referred to a letter which had been received from the Secretary of the Birkenhead Photographic Association, claiming originality for the idea of making a photographic survey. There could be no originality in the idea, for it had been carried out—after a fashion—many times. He had himself made what he supposed the Birkenhead Society would call a photographic survey, by photographing all the old buildings in the hundred of Hemlingford quite a quarter of a century ago. But the survey which Mr. Jerome Harrison had proposed, and which they were prepared to carry out, was something of an altogether different nature. He proposed "That a County Photo-Survey Council be created for the purpose of organizing a complete photographic survey of Warwickshire, such Council to consist of elected representatives from the various photographic societies in the county, in the proportion of five per cent. of the members of each society, together with two representatives from each of the scientific, literary, and artistic societies in the county; that the Council shall have power to elect co-optative members, and shall appoint public trustees for taking charge of the records obtained."

The motion was seconded by Mr. W. JEROME HARRISON, F.G.S., who said that he heartily welcomed the presence on the survey of the scientific and artistic workers whom he saw present. They could lend great aid in drawing up bits of noteworthy objects—each in their respective line—to be photographed. He trusted that Mr. Ragnall, whose *Flora of Warwickshire* was on the eve of publication, would at once supply them, for example, with a list of famous trees within the county. Mr. Jethro Cossins, the eminent architect, had promised help with the churches. It would be part of their first work to obtain information as to the thousands of valuable negatives which were already in existence.

Mr. W. BUNCHER hoped the Council would take into early consideration the question of publication of a selection of the results obtained. He thought that a thousand subscribers to such a work could be obtained with ease.

Mr. F. W. DEW promised hearty co-operation in the work, and alluded to the great alterations which had been made within the last few years in the churches of Coventry. He had many valuable negatives of those churches before their restoration.

The motion was carried unanimously and with enthusiasm.

The CHAIRMAN proposed, Mr. S. G. MASON seconded, and it was carried unanimously, "That the first co-operative members should be appointed at that meeting; that they should retire at the end of the current year, when the Council shall proceed to elect other members to fill the vacancies, the retiring members to be eligible for re-election." A number of names of eminent persons residing in the county were mentioned, and Mr. Stone undertook to communicate with them.

The last resolution, which was put from the chair, seconded by Mr. JETHRO COSSINS, and carried unanimously, was "That the photographic and other societies of the county be requested to at once elect their representatives, and that the first meeting of the new Council be called for June 12."

The meeting, which had been an extremely encouraging and even enthusiastic one, then broke up.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 2	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 2	North London	Myddelton Hall, Islington, N.
,, 2	Hemsworth	
,, 3	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 3	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 3	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 4	Coventry and Midland	The Dispensary, Coventry.
,, 4	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 4	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 5	Leeds	Leeds Mechanics' Institute.
,, 5	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
,, 5	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 6	Sheffield Camera Club	Whiteley's Institute, New Surrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

MAY 27.—Technical meeting.—Mr. G. L. Addenbrooke in the chair.

Mr. T. SEBASTIAN DAVIS, in opening the discussion on *Stereoscopic Matters*, showed first a shutter for simultaneous exposure of the two lenses of a stereoscopic camera. The shutter was made of wood and in the form of an ordinary drop shutter, but turned to work horizontally. The openings opposite the lenses were square, and those in the sliding board were longer than those in the fixed portion. This arrangement made it possible to use the shutter for time exposures without its being necessary to adjust the position to a nicety. The distance at which the centres of the pictures should be mounted was, he thought, of more importance than would seem to have been thought by the makers of some slides, who had in certain cases separated them by as much as three inches. The distance of the human eyes varied from two and a quarter to two and seven-eight inches, and if two and five-eight inches was taken as a full average that distance should not be exceeded when mounting the pictures, otherwise they would not unite without difficulty in the stereoscope. Then the size generally adopted was not, he thought, the best for landscape work. He proposed to use the full limit of size for the length of the pictures, namely, two and three-quarter inches, but to cut down the height to two and a quarter inches. This he considered a more artistic proportion than either the square

form or than such a proportion as was used in the 12×10 size, which, he thought, would be better replaced by 12×9. One reason he thought why amateurs had so much abandoned stereoscopic photography was that the angle of view was so much contracted. He would extend this angle in a horizontal direction by the use of a short-focus lens. The surface of albumen paper, too, he considered too coarse for small work such as they were discussing, and glass transparencies he did not think suited for all subjects. A very fine, smooth surface was what was wanted.

Mr. ARNOLD SPILLER said that chloro-gelatine paper was eminently suited to the requirements of the case. The paper was surfaced with a fine enamel before being coated, and it gave better detail in the shadow than albumen paper.

Mr. FRIESE GREENE'S impression was that celluloid films were better than paper.

Mr. ATKINSON showed a stereoscope with achromatic lenses; also a print on gelatino-chloride paper, which gave very fine detail without showing paper grain.

Mr. VALENTINE BLANCHARD saw an objection to the proportion recommended by Mr. Davis in that the foreground would be so much cut off, and it was just the presence of some near object in the foreground that made the rest of the picture retire so strikingly in the stereoscope. This fact had been fully realised by Mr. Wilson, of Aberdeen, who used to place his camera frequently at a height of only about two feet from the ground, by which means bits of near foreground were introduced that gave great value to the rest.

Mr. W. E. DEBENHAM said that there was no necessity to be exact as to the distance at which the photographs were mounted if the lenses of the stereoscope were made laterally adjustable. They ought to be so mounted if only to suit the different distances of the eyes, but with lenses suitably adjusted and of sufficiently long focus to view the pictures at a greater distance there would be no difficulty in uniting two pictures of, say, half or whole-plate dimensions or more.

Mr. T. SAMUELS inquired whether it was not more correct in principle to use a one-lens camera in which the axis of the lens was directed to the centre of each picture than to use a binocular camera.

Several members replied that they could not see the advantage.

Mr. SAMUELS inquired whether short-focussed lenses did not give better stereoscopic effect than those of long focus.

Mr. W. ENGLAND said that when photographing statuary he had sometimes used lenses of twenty-inch focus with good effect. He also showed some stereoscopic views of large size, and a special stereoscope for seeing them.

Mr. LEON WARNERKE showed a block for surface printing produced by a Russian gentleman. The plate was zinc, coated with copper before etching, and was found to be very durable; as many as five thousand impressions could be taken from it. He also showed some strips of gelatine film which had not been coated with emulsion, and which had a darkening of the edge such as was familiar to most photographers as showing in plates that had been kept for any length of time. The darkened portion might in the daytime be seen to have a certain metallic lustre. We might infer, he said, that the darkened border seen on kept plates was not due to silver, but to the gelatine itself.

Mr. CHAPMAN JONES had always found the darkened edges to come out clear as far as the developed image was concerned.

Mr. SPILLER remarked that it seemed to him that the film shown by Mr. Warnerke, and which was intended only as a support to the emulsion, was not comparable to the film of emulsion plates. In the former case there was a large quantity of carbolic acid present.

The CHAIRMAN inquired whether the stain showed by Mr. Warnerke went through the film.

Mr. WARNERKE replied that it went through the whole of the substance of the gelatine.

It was then pointed out that that was unlike the stain on the margin of ordinary plates, which could generally be rubbed off.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

MAY 22,—Mr. A. Cowan in the chair.

Some samples of a new French sensitised paper prepared with chloride of iridium were distributed to the members.

Mr. J. TRAILL TAYLOR read a paper on *Ethics of Photography and Photographers* [see page 342].

In the discussion which followed, Mr. P. EVERETT said that a photographer when taking the portrait of a sitter undertook to take the kind of thing that the sitter required, and if the sitter wished to be flattered or represented different from what he really was, it was the duty of the photographer to comply with that desire. He took it as a somewhat parallel case that a counsel when requested to give an opinion on a legal matter should and would, if a request were made that the opinion should be a favourable one, give such opinion accordingly.

Mr. W. E. DEBENHAM did not agree with this proposition. He thought that a counsel would refuse to give an opinion which was to be favourable or not according to the desire and instructions of the client. How it was possible to obtain favourable opinions on both sides of a case was by the placing before the counsel only such facts as would call forth the opinion desired. As to the paper they had just heard, there was, too, one point on which he differed from the author; it was with regard to the implication that an amateur had no right to sell his productions if he chose to do so, and at whatever price he liked. He had a great objection to that trades-union spirit which insisted upon prohibiting work of all but members of a certain body. If a man chose to supply copies of his work to his friends, either at the actual cost or at any other price he pleased, he had a perfect right to do so. Certain breaches of ethical law practised by some photographers, such as the exhibition as specimens of purchased photographs of a very different quality from those which they produced themselves, and of calling pictures permanent that were not so, or by the name of some other process than that by which they were actually produced, were to be most strongly reprehended.

Mr. J. S. TEAPE knew of an instance of a photographer who had gone to the scene of a fire and taken several splendid 12×10 negatives of the ruins, and, as a matter of convenience, had asked a neighbouring photographer to allow him to leave his things with him till the next day. The photographer had taken advantage of this to make copies from the negatives and got them printed and on sale before those by the original maker of the negatives were issued.

Mr. TAYLOR said that such a proceeding was a simple robbery, and might bring the perpetrator within reach of the law.

Mr. DRAGE inquired whether Mr. Taylor would condemn combination pictures.

Mr. TAYLOR would not do so unless the combination was done with some dishonest intention.

Mr. T. E. FRESHWATER commented upon the attractive character which was sometimes given to photographs of house property by such a proceeding as photographing a brook in front of the house and using a short-focus lens, the arrangement being such as to represent an imposing-looking lake.

The CHAIRMAN said that there was a great diversity in the appearance of photographs of buildings and their surroundings according to what it was desired to show. He knew of a case of disputed obstruction of light where the same photographer had been employed both by plaintiff and defendant, and each view supported the contention of the party at whose order it had been made.

Mr. DEBENHAM said with regard to the question as to what distancing was allowable when taking stereoscopic negatives, he quite agreed that the greater distancing was an extension of the powers of the spectator, and was quite necessary for some purposes, and allowable unless there was a profession or understanding that no such extension had taken place. The effect of greater distancing might be looked at in two ways. It represented objects as they would be seen by a being who was of such stature that his eyes were separated a distance equal to that of the cameras, or it represented objects as we should see them if modelled on a smaller scale and brought proportionally nearer. The telescope and microscope were not the only instruments that illustrated the extension of the powers of human vision. There was an instrument called the telesteroscope, of which he had constructed one many years since, by the aid of which the solidity of distant structures could be realised as well as that of near ones in the ordinary way. The view was just the same as that obtained by distancing the cameras.

Mr. TAYLOR and Mr. DEBENHAM then illustrated by description and diagram different forms of telesteroscopes, and the meeting terminated.

CAMERA CLUB.

MAY 22,—Sir George R. Prescott in the chair.

Mr. E. R. SHIPTON read a paper entitled *Cycle Photography; Some Recent Developments, including an Ideal Cycle.*

Previous to the address the Hon. Secretary handed round a Watkins's exposure meter, a compact instrument devised to indicate exposure to be given under varying circumstances; also one of Messrs. Fallowfield's "perfect sheaths" (Miall's patent) for holding plates.

Sir George Prescott exhibited one of Lawrence's hand cameras, in which by a simple movement the plates are brought into position and removed.

Mr. SHIPTON commenced his address by summarising his previous lecture on the subject of *The Wheel and Camera*, pointing out the use of the cycle in this connexion for bringing the photographer into contact more easily with beautiful scenery. He then proceeded to describe his own cycle, specially devised for photographers' work. This included some ingenious and effective carriers, upon which Mr. Shipton had carried a hundredweight of luggage safely, also a spring frame, and particularly the new inflated tyre, by which, as Mr. Shipton expressed it, the rider carried his own road with him and laid it as he proceeded. These tyres, he considered, in addition to the luxury of smooth going, added speed to the extent of two miles per hour.

HOLBORN CAMERA CLUB.

MAY 23.—About two hundred slides by Messrs. Dear, Plumbridge, Baker, Chang, and Bayston were shown.

Next Friday members are requested to bring up results of their Whitsuntide wanderings with the camera.

PHOTOGRAPHIC SOCIETY OF IRELAND.

MAY 22.—This Society concluded the winter session by a public lantern exhibition. As the Society rooms are too small for the purpose, kind permission was obtained from the Council of the Royal College of Science to use the large lecture theatre. There was a large attendance and an audience which was evidently well satisfied with the work which was brought under their notice. During the evening two hundred and twenty slides were shown. A large number of the slides were made from negatives used in hand cameras, those causing most amusement having reference to street life in Dublin, particularly in some of the slums of the city.

SOCIETY FOR THE PROMOTION OF PHOTOGRAPHY IN BERLIN.

MAY 2,—Dr. H. W. Vogel in the chair.

The proceedings commenced with the election of new members.

The CHAIRMAN then proceeded to discuss the formation of the familiar mirror-like fog occasionally formed when hydroquinone is employed as a developer. The phenomenon in question is usually observed when the plates are under-exposed and the development too rapid. The presence of impurities such as hyposulphite of soda also assists its formation, as also does conducting the operations of development and fixing in the same vessel.

The ensuing discussion brought to light the fact that Messrs. Baltin and Quidde had also made similar observations.

Herr VOGEL, jun., stated that he had developed fifteen plates consecutively in the same developer, but only the last three showed signs of fog, which fact seemed to show that developers which had been used up gave rise to it. Herr Vogel remarked, in addition, that he makes a practice of not keeping his

developers made up longer than a week, as after that time the phenomenon in question is likely to take place.

Herr Quidde's experience in the matter was exactly the reverse of this, for he found that it was usually the freshly mixed developer that gave rise to fogging, which grew less and less as the developer got older. He consequently always lets his freshly mixed developer stand twenty-four hours before using.

Herr Bacon's experience was, he said, of a similar nature.

Herr Jahr recommended that all developers should be kept made up as short a time as possible, as they all, but especially eikonogen, lose efficiency. He further remarked that he constantly found pyro to give the best results, more especially in the form of the pills recently introduced in England; and he also pointed out that hydroquinone behaves differently with plates of different brands.

Herr E. Vogel observed that the eikonogen developer in separate solutions keeps to most as well as pyro—that is to say, when an addition of sulphite of soda is made to the solution; one must, however, be careful not to put too much as much present is then much retarded. A developer made up in this way was found by Herr Vogel to keep for three months without the slightest alteration.

Herr Hasnas recommended keeping the developer under oil, and drawing off with a siphon.

The proceedings were terminated about midnight by the application of a meal of punch to the interior economy of the members present.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—AN APPEAL

To the Editor.

Sir,—Will you kindly afford me space to appeal to your readers on behalf of the P. B. A.? At the annual meeting the functions of the Association were so largely extended, by enabling the Committee to deal with any well-authenticated cases of distress brought to their notice, that we are anticipating a considerable increase in the number of calls on our limited funds. In fact, the grants already made this year largely exceed the average. Under the new rules contributions of former subscribers to the funds to the extent of 250*l.* have been set aside as a nucleus around which to form an annuity fund, and this sum cannot be drawn upon for the purpose of granting temporary relief. I wish to impress on your readers the fact that this is the only charity which exists with the object of relieving persons connected with photography who are in necessitous circumstances arising from misfortune, and many who have been reduced to this necessity, including more than one name once distinguished in the profession, could testify with gratitude to welcome aid received from the P. B. A. in the time of need. The minimum subscription has been fixed at 2*s.* 6*d.*, and I appeal to the benevolence of your readers to induce them, if I can, to subscribe to the funds according to their ability with the confident assurance that the Committee will deal with any money entrusted to them with discretion and economy.

Subscriptions and donations will be thankfully acknowledged, and a copy of the rules forwarded, by the Honorary Secretary, Mr. H. J. Beasley, 65 & 66, Chancery-lane, W.C.

Thanking you for your kind support in the past,—I am, yours, &c.,

May 26, 1890. William Bedford, *Chairman of Committee.*

EIKONOGEN.

To the Editor.

Sir,—Since the introduction of eikonogen I have used it constantly, nearly as much as my own pet developer, and have found the results most satisfactory. The formula I use is the one in combination with caustic potash, as given in Messrs. Marion's printed list of formulæ, diluting it with water as necessary, according to exposure. I have found that for photographing the moon by my 9½ inch Newtonian equatorial the exposure can be reduced four times if eikonogen and caustic potash are used to develop. A "wrinkle" which I have never seen in print may be of use to others. If it is impossible to keep white light out of the developing room, or if necessary to develop by gas or other such light, about one and a half grains of rosine added to the developer will prevent all danger. For some years I have at times developed the most rapid plates by this means with an ordinary gas light nearly full on, and no stain, and no fog has ever been found on these plates. Of course, care is required before the solution is on the plate.—I am, yours, &c.,

J. Cockburn, F.R.S.E., F.R.A.S.

Greycrook, St. Boswells, May 27, 1890.

P.S. I am experimenting on an entirely new developer, and if satisfactory I shall send you results.

ALUM IN A MOUNTANT.

To the Editor.

Sir,—I have been making up some of the mountant recommended by Mr. Armstrong in your issue of May 16. It seems to be a good one but it contains *alum*. Now as this substance is always acid (at least, I think so), would it not be harmful to silver prints mounted with such an acid-mounting medium? Would not the formula be almost as good if the alum were omitted? If you will kindly give me your opinion on this matter in your next issue, I shall be much obliged.—I am, yours, &c.,

J. J. H.

[Alum has long been looked upon as a dangerous addition to paste for mounting photographs. Ed.]

PROPOSAL FOR A UNION OF PHOTOGRAPHIC WORKMEN.

Invitation to the Organizing Council.

To the Editor.

Sir,—You have, doubtless, seen the articles and correspondence in the trade press a few months since on a "British Photographic Union." I do not intend to trouble you with a recapitulation of the arguments therein adduced in favour of such union, a full exposition appearing on page 560 of The British Journal Photographic Almanac for 1890, but the main objects may be explained before I make an appeal to you to help me in attaining them—not with money, but by extending your countenance and interest to the scheme.

The desire of the advocates of the plan is to unite the workmen in every branch of the photographic trade, and of all degrees of skill under an organisation, into which they would pay subscriptions at rates according to their relative rank as workmen in the trade. A fund would thus be established which would be used for the following purposes: *a*. Ensuring the competence of every applicant for membership by practical and theoretical examinations or other means. *b*. Establishing a labour register, by means of which employers would be supplied with guaranteed qualified labour, and the qualified members be provided with employment at a fair day's wage for a fair day's work. *c*. Payment of "benefit" to members out of work through unreasonable anger of employers, or in consequence of defending a just privilege or custom of workmen, or resisting unjustifiable encroachment—but not if through insolence, laziness, or bad conduct. The primary result would be—that employers would be relieved of the necessity for expensive and annoying trials of incompetent workmen in the studio; the "duffer" would become a parnah, and the qualified workman would be provided with, at least, a slight protection from the apprentice hunter and the sweater.

In all probability the Council would have to devote all its energies for the first year or two to enrolment, and raising the fund necessary to meet the initial expenses of a workman's protective association, there being some premium extended to those joining during that time. A few representatives of the art, the trade, and the trade press, have joined the Organizing Council, which will meet in London in July, 1890, to discuss the advisability of forming the union. If they decide to form it, they will there and then decide on its form of management and rules. No donation of any kind will be solicited from those who form the Council. No person aiding in the formation and enrolment work of the union up to the time of its becoming a solvent and workable body will receive remuneration of any kind, save, perhaps, some officer elected for the purpose of travelling to trade centres, and forming branches. As for myself, I desire to be entirely disconnected with the money work of the union. Officers will enter into cash guarantees, and elaborate systems of protection from fraud will be advanced for discussion. I will answer any questions on the subject with pleasure. I hope to gain your approval of the proposal which is attracting the attention and support of the workmen generally, of many employers, and of many who have at heart the best interests of the art, and a keen desire to raise the level of competence of the employés.—I am, yours, &c.,

Arthur G. Field.

EXHIBITION MATTERS.

To the Editor.

Sir,—A few weeks ago Mr. Lyd Sawyer wrote you *re* the awards at the Newcastle Exhibition, I had hoped to see others take the matter up and endeavour to bring about a more satisfactory state of things than at present obtained at the majority of our exhibitions. I certainly think that a system something like that followed in "Cycling" would be best. I should suggest, for instance, the formation of a "National Photographic Union," this association to have its head office in London and local secretaries in the various large towns, that all exhibitions be held under the National Photographic Union Rules (which rules, of course, would have to be formulated in an enlightened manner); that the National Photographic Union select a staff of competent judges who would be at the service of any affiliated society at a special rate of payment; that members of the National Photographic Union or affiliated societies compete only at exhibitions held under such rules, or be fined, suspended, or ejected, and that finally any dispute or flagrant case of misjudging be promptly brought before a committee of the National Photographic Union, who should be a final court of appeal in such matters.

During a great portion of 1889, and early in the present year, it was almost impossible to take up a photographic journal without seeing as plainly as possible an announcement to the effect that a certain well-known firm of dry-plate makers purposed holding an exhibition of photographs taken on their plates, and that 150*l.* would be awarded in the form of gold, silver, and bronze medals, and certificates, and so on; a careful perusal of the prospectus proves that there were *no stipulations* (except in one minor case) as to the decision *being left to the judges, or that the*

awards would, under certain conditions, be withheld. It was, therefore, a surprise to find in due course, after all the trouble of preparation, that in numerous cases the promised prizes had not been awarded at all! I feel most particularly sore on this matter, as I was a competitor (?), that *four* out of the six pictures which I sent had (on a large scale) previously, and on more than one occasion, *taken first honours in open competitions*, and consequently must have owned some merit.

A remonstrance to the firm in question only brings forth the reply that "they gave the judges full power and cannot interfere." Now I argue that this has "nothing to do with the case at all;" on the strength of this firm's prospectus certain exhibitors competed for the prizes which were distinctly offered, as the auctioneers say, "without reserve," and so long as the picture lasted out, so the prizes should have been given.

Personally I have been as successful at exhibitions as I have any right to expect, *particularly so*, considering that *ab ovo* the work is all my own; and that seventy hours per week are devoted to my own business which is of a totally different character. I don't remember anything that has ruffled me so much as this. I have competed successfully and unsuccessfully against the cream of English professional photographers, and have taken my success modestly, and my defeats without discouragement, but there are so many insulting and unsatisfactory elements about this last *fiasco* that I have felt strongly inclined to throw the whole thing up.

I shall be glad if you will find space for this complaint from a

DISGUSTED EXHIBITOR.

P. S.—I may add that the facts are not disputed in any way. The prizes were offered without reserve; the exhibitors fulfilled their part of the contract, why should not the firm in question perform theirs?

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

I will exchange a twelve-inch single condenser in wood frame for a cabinet portrait lens.—Address, J. BIDDLE, 97, Medlock-street, Manchester.

Quarter-plate detective camera wanted in exchange for a breechloading Remington carbine with fittings and sword bayonet, all in perfect order.—Address, W. E. HENRY, Alvaston, Derby.

Will exchange Derogy half-plate patent portrait lens, with two extra lenses for landscape and enlarging, for 10×8 wide-angle or portable symmetrical by good maker.—Address, F. L., 13, Union-street, Coventry.

Smith's patent light "Simplissimus" camera, 10×8, quite new, all movements, conical bellows, long extension, one double slide; exchange for 10×8 square bellows camera, all movements, one double slide.—Address, W. HARE, Photographer, Sutton, Surrey.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

J. BARNARD (St. Albans).—Accept congratulations.

KAKABEKKA asks: "Did the Copyright Act come into force prior to July 1, 1864?"—Yes.

A. Y. Z.—The marks on the negatives are due to the dark slides admitting light. This has gained access through the rabbet of the shutter.

NEMO.—In this country it is not necessary that a print be marked as being copyright. It is the law in other countries that this should be done, but not so here.

J. E. HICKS.—We agree with you that the work does not deserve the praise that has been bestowed upon it by many; but it is not a subject that we can discuss in these columns.

S. E. SIMS.—You can have no better varnish than one having shellac as a base. Sandarac is a more brittle resin, and a varnish made with it will not bear the rough usage that will one made from lac.

SUBALTERN.—We have had no experience with the apparatus ourselves, but we have little doubt it is worth the money charged for it. Of course you must not expect a high-class apparatus at the price.

GROUP.—We advise you to secure a good and sharp negative of the group on a 12×10 plate, then from that have an enlarged negative made the size you require; that is, supposing you cannot make the enlargement yourself.

INQUIRY.—Primarily it proceeds from the gelatine. Green fog may usually be avoided by using the ferrous-oxalate developer in place of pyrogallic acid.

S. LEVER complains that with highly albumenised paper his prints curl up so tightly in drying that the albumen cracks when they are opened. If the prints be dried between blotting paper and retained flat until they are mounted this trouble will be avoided.

COPYRIGHT.—The copyright in a photograph exists during the lifetime of the author and for seven years after his death. Printed forms for registration can be had at Stationers' Hall at 1*d.* each. The fee for registration is 1*s.*, which, with the form, must be delivered personally.

S. L. O.—The two specimens enclosed would have been much better had the faces been turned away from the light instead of towards it. The light may be softened by screens of tissue paper. A slanting mirror at the roof, overhead of the sitter, will give the requisite top light. It should be of corrugated glass.

ONE IN TROUBLE.—After fixing and thoroughly washing, place the negative in a saturated solution of bichloride of mercury, by which it will be slightly bleached; then wash well and transfer it to a dish containing a very dilute solution of ammonia, say one to six or eight. In this the negative will take a dark colour.

J. E. BAKER.—If the paper retains the ink so tenaciously that it cannot be sponged off from the parts not acted upon by light with warm water, it would appear that the gelatine was insoluble, or that the printing was carried too far. Try again with less exposure. Of course you are aware that for photo-lithography a very strong negative, with absolutely clear lines, is essential.

A. HADLEY.—You may stop out the sun with tissue paper or thin muslin blinds. The best method of doing this is to strain the fabric, whatever it is, on light wooden frames, which can easily be removed when the sun is not shining. Are you sure that your next-door neighbour can prevent you building so as to obtain a north light? We advise you to consult a local surveyor on this point.

VOX.—Guttapercha is not a good material for vessels which are to contain silver solution for any great length of time. This was found to be the case in the wet collodion days, when commercial guttapercha was a much purer article than it is now. A bath left for a time in a guttapercha vessel was found to become much deteriorated. However, the *pure* material is said to have no injurious action.

WOOLSTON.—Both the enlargements are very much under-exposed. By giving double or three times the exposure a better result will be obtained. The fault in the copies of the painting is injudicious lighting, coupled with under-exposure. Light the picture so that when viewed from the lens it can be seen to the best advantage. An improved result might be obtained by using a suitable coloured screen.

RATHMELL writes: "Will you kindly inform me whether the dry-point finish of which you speak is air-brush work, and is the finish on the negative or positive? I have seen some bromide pictures finished by means of the air brush which exactly resembled fine engravings. Further particulars of the work would be much esteemed."—The finishing is not by the air brush, and is effected on the print, not on the negative.

MAXWELL.—To render paper negatives transparent, place the negative on an iron plate which is heated by a Bunsen burner, or other means, sufficiently to melt wax. Now take a lump of the wax and rub it well into the paper. When the paper is saturated place it between two or three sheets of blotting-paper, and iron with a hot laundry iron to remove the superfluous wax. In place of beeswax, paraffin wax may be employed.

W. RATCLIFFE.—1. The lens referred to was not patented as a lantern objective, but as a portrait lens. It was patented in 1866, and has now lapsed.—2. Opinions differ; we have never tried one.—3. Long out of print.—4. The best subject on which to ascertain the presence of the flare spot is one in which anything dark—a mass of trees, for example—is made to fill up rather more than one-half the ground glass and a bright sky the remainder.

E. H. R. says he wishes to photograph some flowers of the cabinet size, but the only lens he possesses is a *carte* portrait lens. He asks if there is any method by which he can temporarily lengthen its focus so as to make it cover the larger size.—The best plan will be to use the front lens only with a tolerably small stop. This ought to cover the cabinet size well. The back lens must be removed and the front screwed in its place with the convex surface next the focussing screen, the stop being placed in front. A single lens for this class of work is quite as good as a compound one.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, June 4 *Photo-mechanical Processes.*

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THE BRITISH

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MIXING GELATINE EMULSIONS.

The article on the above subject, from the pen of Mr. W. K. Burton, in our last issue will be specially interesting of course to plate makers, or to those of them at least who have been hitherto unaware of the effects obtained by mixing emulsions of different quality. But we believe, nay, we know, there still remain a comparatively few amateurs of the type of ten years ago who still continue to manufacture at any rate a portion of their plates, and to such the information derived from Mr. Burton's article will be specially valuable.

So little is nowadays written on the practical portion of emulsion making, and on the theories directly involved, that much that was tolerably familiar to the workers of a past decade is now almost forgotten, and we may, therefore, not inappropriately glance back at some of the facts previously known in connection with this subject.

We will take as the text Mr. Burton's recorded experiments of the mixture in about equal proportions of two emulsions, differing very materially both in sensitiveness and in quality of image. The resulting mixture was found to possess the good qualities of both its components, without any apparent counterbalancing defect, and this Mr. Burton accounts for by supposing that the high degree of sensitiveness possessed by the one emulsion is not affected by the mixture, while the particles of silver reduced from it act as nuclei, round which the slower but denser emulsion deposits in turn the metal that would have remained unaffected by the unaided action of light.

This carries us back to the first published experiments of an analogous nature in which the same principle is involved, and from which precisely the same deductions were made. Some twelve or thirteen years ago Captain Abney announced to the photographic world that if two collodion emulsion films—the one thin and extremely rapid, the other dense and slow—were superimposed upon the same glass plate, and properly isolated by an intervening layer of albumen, gelatine, or similar material, the compound film would, upon exposure for a period short enough to impress the quicker emulsion only, give on development an image possessing all the detail that would have been obtained with that emulsion alone, accompanied by the vigour and density that a longer exposure would have given with the slower preparation.

This experiment, which we repeated and verified at the time, is precisely on all fours, both in principle and result, with Mr. Burton's mixed emulsion, though on looking into the details the circumstances are even more remarkable. It will be noticed, in the first place, that in Captain Abney's experiment the particles of rapid and of slow silver bromide respectively were not in intimate contact as in Mr. Burton's emulsion, but bound up each in its own envelope, so to say, of collodion, and the two kinds still further insulated by the intervention of a film of albumen or gelatine. But it was found that if the two emulsion films were separated—a task requiring some care and skill—by dissolving the intervening layer, each carried its own image, which partook respectively of the qualities, or nearly so, given by the two emulsions independently. In other words, while each emulsion retained its own original properties, the slower one by contact *during development* with the quicker had had its rapidity vastly enhanced.

In accounting for this result, Captain Abney took the same view as Mr. Burton now does, namely, that while the quicker emulsion retained its initial sensitiveness intact, the electro-chemical action set up on development passed to the other film, and, quite independent of exposure, caused their reduction in the same form (as regards density) as would have been the case if a full exposure had been given.

Passing on to gelatine emulsions, it is difficult at this period to unearth the very numerous and important items of information—some published, some not—that were current during the years when "gelatine" formed almost the sole topic in the photographic journals. Much of this information and many of the most curious facts were elicited in a conversational manner at the meetings of the Photographic Club and other societies, and though now perhaps forgotten by the many, go far to form that "experience" which renders the modern commercial plate so conspicuously superior in rapidity, quality, and uniformity to its forerunner of ten years ago.

The mixing of emulsions was indeed strongly advocated by more than one authority of the day as a means not only of "averaging" the general result, or securing greater uniformity of sensitiveness, but also for correcting and eliminating such faults as those belonging to the two emulsions referred to by Mr. Burton. As an example of the effect of such mixing, even in an indiscriminate way, we may mention an experience of our own. In the early part of the year 1880 or 1881, in clearing our shelves for the season, a large number of small quantities of experimental emulsion were mixed together preparatory to extracting the valuable metal therefrom. These were of all kinds—good, indifferent, and, no doubt, some bad—and represented almost every possible variation of formulæ. Though many of them had been standing for months in the "jelly" state, the alcohol they all contained had carried most of them safely through the coldest portion of the year, though one or two had become liquid.

However, the total bulk, reaching nearly a gallon, formed a firm jelly, and out of curiosity a few plates were coated to try the result, when to our surprise the images proved faultless,

and the sensitiveness not at all bad for that period. The only fault was a tendency to rottenness of film, which was not to be wondered at; and despite our "fortifying" the emulsion with fresh gelatine with a view of utilising it, the advent of warmer weather permanently liquefied it.

This, of course, proves nothing beyond the fact that very curious mixtures can be successfully made; but another experiment tends to show what may not be successfully done. A quantity of unusually rapid emulsion had been made, which, though it gave good printable negatives, showed a considerable veil in the shadows from "chemical fog." In order to work this off we tried mixing it with a slower and perfectly clean emulsion, but though we reduced the proportion of the defective preparation as low as 1 : 20, the grey fog remained as strong as in the original. In this instance it seemed as if the particles of silver forming the fog served as nuclei round which other healthier particles became abnormally reduced.

Upon the introduction of iodide and chloride into gelatine emulsions, it soon became fully recognised that a vast difference occurred in the characteristics of an emulsion, according to the method of its preparation. For instance, if the mixed haloids were added to the gelatine before sensitising, the resulting emulsion would be very different in character from one containing precisely the same constituents, but made by mixing two emulsions in which the haloids had been matured separately, and this was especially the case where iodide of silver was concerned.

Properly combined with the bromide and silver in the first stage of emulsification, iodide of silver is not in the least degree inimical to sensitiveness; indeed, it has been said that iodide is absolutely essential to a good plate of highest rapidity. But if a plain iodide emulsion be mixed with a plain bromide one of fair or good rapidity, the effect is invariably to lower the sensitiveness of the latter, though it is possible that the physical qualities may be improved.

With regard to the increased range of gradation produced as mentioned by Mr. Burton we have not at present to deal, as we have had no experience of a sufficiently definite character in that direction; but we can quite comprehend that such an advantage might be gained by suitable measures—as, for instance, by mixing a highly sensitive bromide emulsion with a moderately rapid one containing bromo-iodide formed in the ordinary way. The last-named preparation is remarkable for its wide range of gradation when not made too rapid, and this method might be successfully adopted to add to the rapidity without losing the range.

INFLUENCE OF MOISTURE IN CERTAIN PROCESSES.

There is one very important point in connexion with several photographic processes, which, if it received more attention, would often save a deal of trouble and frequently avoid considerable waste both of time and material. We allude to hygroscopic conditions.

Every one familiar with the platinotype process is, of course, aware of the necessity of protecting the paper from damp, even when printing; while with the Pizzighelli printing-out platinum paper, although it has to be kept dry during storage, the presence of a certain amount of moisture at the time of using is essential; in fact, success in the working of this process is largely dependent upon the condition of the paper as regards moisture.

Perhaps of all processes none are really so dependent upon the presence, or absence, of moisture as those based upon the action of light on bichromated colloid substances. For example, the "powder" or "dusting-on" process is dependent entirely upon the hygroscopic condition of the film, and the principal difficulty in working the process in this country is due to the ever varying amount of moisture in our atmosphere.

In carbon printing, many of the difficulties experienced in working the process arise from proper attention not being paid to the state of the tissue with reference to the moisture it contains. This may be readily understood when it is considered that the extremes, both of dampness and of dryness, yield the same result—insensitiveness to light. While the tissue is wet it is, practically, unaffected by light. It may be sensitised as well as developed in open daylight quite as well as in the dark room. But it must not be imagined that the dryer it is made the more sensitive it will become, for such is not the case. It is just the reverse. For if the tissue be made *absolutely* dry, it is, to all intents and purposes, quite as insensitive as it is when wet; hence it will be seen that the degree of sensitiveness is governed by the amount of moisture in the gelatinous film. While it is wet, as we have just said, it is quite insensitive, but as it dries it gains in sensibility, though only up to a certain point, for if the drying be carried beyond this, the sensitiveness begins to decrease again, and if the tissue be thoroughly desiccated, it becomes practically insensitive to the light's action.

Again, after printing, in the carbon process, a continuing action goes on, and the print gets darker; but the rate at which it does so depends entirely upon the dampness or the dryness of the film. If the film is moist, or it is exposed to a humid atmosphere, the action is rapid; but if, on the other hand, the tissue is really dry, the action is absolutely *nil*. Furthermore, the keeping qualities of sensitive carbon tissue are largely dependent upon its dryness. The dryer it is made the longer will it keep, though in this condition it is not in its best condition for use, either as regards rapidity in printing or quality of results. Had these properties been better understood than they apparently were in the early days of carbon printing, there is little doubt but that the process would have come into more general use for every-day work than it has. What has just been said with reference to the carbon process applies, more or less, to all processes of bichromated gelatine.

In silver printing, moisture plays a far more important part than many persons imagine, and not a few amateurs' difficulties in toning, and the mealiness in prints—particularly on the ready-sensitised paper—may be directly traced to the state of the paper at the time of printing. It will often be noticed, if the paper be abnormally dry when it is printed—and it frequently is at this season of the year—that it is next to impossible to obtain rich tones, whatever bath may be employed.

Here is an experiment which we would recommend every one to try who is troubled with mealiness in toning and a lack of brilliancy in their prints. Take a piece of sensitive paper and divide it into two portions. Put one piece, together with the pads and back of the printing frame, in a damp cellar for a few hours, or until the pads have had time to absorb a certain amount of moisture and the paper to become quite limp, and then make a print upon it. Next make the pads of the frame and the other piece of paper "bone dry" before a fire. Then make a print upon it, from the same negative, and under the same conditions of light, and it will be found that there is a marked difference between the colour of the two impressions at this stage. Now continue the experiment by washing and toning the prints side by side. It will then be found that the print

made on the moist paper tones much the quicker of the two, and that it will take a good rich tone, while the other one tones with difficulty, and, with the majority of papers, the action of the gold bath cannot be carried beyond the red stage without producing mealiness.

Those who experience a difficulty in obtaining good tones, or are troubled with mealiness, should try the effect of a little moisture in the sensitive paper and the pads at the time of printing. Of course, by moisture is not meant what would be described as dampness, such as would entail even the slightest risk of injury to the negative, but simply the avoidance of abnormal or "bone" dryness.

It may be mentioned that during the summer months we hear far more of toning difficulties than we do in winter. This is easily accounted for from the fact that by continued use in hot weather the printing frames and pads become exceedingly dry, and consequently greedily absorb whatever moisture there may be in the sensitive paper. In the winter, on the contrary, they themselves become damp, and thus convey moisture to the paper if it should happen to be unduly dry often to such an extent as to cause an expansion of it while printing, and consequently a blurring of the image.

In the pages of the *Chemical News** there has recently been given a very complete account of a new method for determining the amount of chlorine present in a mixture of alkaline chloride and iodide. The subject is one of very real interest to photographers, but as it is of a more technical character than can be well utilised for our pages, we merely summarise the process, referring our readers to the original source for details. The method consists in expelling the iodine by boiling the solution of the haloid salts with the addition of ferric sulphate (made by oxidising the ferrous salt with nitric acid, or by using iron alum). When the issuing vapour is free from iodine the chlorine is thrown down by excess of nitrate of silver, dried, and weighed. The method is stated to be both exact and expeditious.

Considerable interest has attached to photo-electric experiments, such as the production of an image of a coin through which an electric current had been passed while it was resting upon a sensitive plate, and many theories have been proposed to explain the action; but those who had the privilege of attending the Royal Society's *conversazione* had an opportunity of seeing experiments of analogous character pointing to a purely physical origin of the phenomenon. Mr. W. B. Croft showed "Breath Figures," *i.e.*, figures produced by the unequal deposition of moisture from the breath when polished surfaces upon which objects in low relief had been placed were breathed upon. Thus, upon a freshly split piece of mica a coin was lightly pressed, upon breathing on the mica a breath figure of the detail of the coin is seen. Similarly was an image produced after a sheet of printed paper had been placed for ten hours between sheets of glass.

Some of the most attractive exhibits at the *soirée* were photographic—astronomical and otherwise. Mr. Boys' photographs of the oscillating electric spark, and of falling drops of water, and again of the shadows of water jets, drew many observers.

The astronomical photographs that have most interested astronomers lately are those exhibited by Admiral Mouchez at the meeting of the Paris Academy of Sciences. They consisted of photographs of the moon, forty centimetres in diameter, taken by the Brothers Henry at the Paris Observatory. The telescope employed had an aperture of ·32 metres—about one foot—and is the one intended for use in the map of the heavens arranged for by the International Committee. These photographs were enlarged directly, and for this reason, it is believed, are superior to those hitherto obtained in this country or the United States. The special objectives used—designed by the Messrs. Henry—

* Vol. lxi., Nos. 1589, 1591, 1592.

are known to be of great excellence, but it is less to that fact than the method of direct enlargement that the superiority of the photographs is ascribed.

We recently alluded to the effects of the vibration caused by the passage of railway trains upon the making of exact observations in buildings near a line of rails, many direct experiments in connexion with which have been made and their details published. Another Commission has been appointed to investigate the same question, this time in Paris. The occasion is the proposed laying a line of rail at a distance of about one hundred and fifty metres from the Observatory.

For the highest class of photo-micrographic work, and where preparations have to be retained under observation for long periods of time, the use of a fine adjustment that is stable, exact, and likely to be lasting, is an important desideratum. At a recent meeting of the Royal Microscopical Society an instrument which possessed these characteristics in a high degree was exhibited, and Mr. Mayall gave a description of its construction. It was more of the character of the "jewelled" works in a watch; the whole of the contact surfaces by which the fine adjustment was actuated consisted of polished steel and agate, the intention being to reduce the picture as much as was consistent with steadiness of motion. The chief drawback to this improved form was its great cost, which made it probable that its use would be confined to the purposes indicated by us.

Many of the scientific papers contain a description of a newly designed cheap hydrogen lamp. Many of our readers are familiar with the Dobereiner lamp, the cost of which was rarely much less than a guinea; this new lamp, which can be made by almost any one, costs a few pence only. It is made out of a pickle bottle, through the cork of which runs a tube attached to a salad oil bottle with the bottom cut off and replaced by wire gauze, this bottle being first supplied with a little scrap zinc. The pickle jar is half filled with dilute sulphuric acid, which quickly causes the evolution of hydrogen gas, which escapes through a glass jet attached by a rubber tube to the tube passing through the cork. A piece of wire twisted round the jar neck and bent upwards carries a small piece of spongy platinum, the nature of which is to become red hot and ignite a stream of hydrogen gas impinging upon it. When the gas has become alight, and the flame is wanted no further, a pinchcock is applied to the indiarubber tube, and the exit of gas is arrested till it is next wanted. The pressure of the gas in the inner bottle forces the acid from the zinc, and the evolution of gas then ceases, to be started again whenever the entrance to the lighting jet is unobstructed. This action of lighting the gas that the platinum possesses continues for a practically indefinite period.

INTENSITY WITH EIKONOGEN.

In my article a fortnight ago I alluded to the difficulty experienced by many in attaining density when using eikonogen, and showed one method by which it may be overcome, though it is quite possible that that means may not be efficacious under all circumstances and with every kind of plate. So far as my own experience is concerned, however, I have not found it fail, though I have applied it to several different makes of plate under very varying conditions of light and subject.

There are doubtless many other plans by which thin negatives may be avoided, one of which consists in increasing the strength of the eikonogen solution, but this, on the score of economy, if on no other, does not recommend itself. It is true that by repeatedly using the same solution the extra cost of the stronger solution is overcome, but the same power of repeated use exists in the case of the solution of ordinary strength, so that what might be a saving is turned into a loss.

The full advantages of the strong solution may, however, be utilised without incurring any increased expense by adopting the plan advocated some few years ago of developing by means of separate solutions; indeed, I am inclined to think that this method may lead to a very decided economy. It consists in immersing the plate, first, in a plain

solution of eikonogen, or whatever other developing agent may be employed, the action being completed by means of a plain solution of alkali or alkali and bromide, as circumstances may require.

It is clear that if this plan be adopted the solution of eikonogen may be used over and over again, so long as it lasts, without undergoing any such alteration as occurs when the mixed solution is applied to an exposed plate; and also that it will keep for a much longer time unchanged than when the eikonogen and alkali are combined. All that happens on the immersion of a plate is that a portion of the solution is absorbed, and this suffices for the development of that particular film without in any way affecting the remaining bulk of solution. So much being understood, and also that but an infinitesimally small proportion of the pyro or eikonogen applied to the plate in the ordinary way is actually used up in forming the image, it is easy to see that a considerable economy may be effected, whatever the strength of solution, and that a concentrated developer may be applied to the plate without unnecessary loss of material.

The details of the method, as adopted successfully with pyro, consisted in the preparation of a solution of that substance of the strength of from four to six grains to the ounce, together with a suitable proportion of sulphite of soda to keep it clear. For obvious reasons, the employment of preservatives consisting of or containing free acid is not permissible in this case; indeed, I prefer to make the solution of pyro fresh each time of using, without sulphite, and to employ the latter in combination with the alkali in order to prevent discolouration within the film by the combination of the two elements of the developer.

An immersion of from one to two minutes in this solution allows the film to absorb a sufficient quantity to carry it through the next operation; the length of immersion will, of course, depend mainly upon the nature of the gelatine of which the film is composed, and to some extent on the strength of the solution, but there is no difficulty in settling that. The plate is then transferred to another dish containing the alkali, when development proceeds in precisely the same manner as when the whole of the constituents of the developer are applied at once. The results thus obtained are said by those who have carefully tried the plan to be in every way equal to those produced in the ordinary way, and in some instances superior, especially in the case of plates that have had a very short exposure and require forcing. Under such circumstances there is less stain as well as less veil than would occur under ordinary development.

Substituting eikonogen for pyro, there is little alteration to be made in the *modus operandi*. If a keeping solution of eikongen containing sulphite be used, the development will be much slower, and I fancy, though I cannot absolutely verify the statement, that a slightly increased exposure is necessary. But the plain solution of eikonogen so rapidly discolours that it is not pleasant to use, though as far as any actual disadvantage from staining is concerned, I do not think there is any.

The actual solution I have employed with the best results is the stock solution I use in ordinary development, and which, under those circumstances, I mix in equal parts with the solution of alkali. This contains ten grains of eikonogen and half a drachm of sulphite of soda in each ounce, but I think the latter might, with advantage, be reduced to twenty grains. With some plates, perhaps, this solution might prove too strong, while probably others may require it stronger; I mention ten grains as the strength that has proved adequate in my own trials.

A freshly made plain solution (without sulphite) was tried against the above, and, as regards density or quality, I could detect no difference between the results; but, as I have already said, the development was much longer in the presence of sulphite than without it, and there was perhaps a little less force in the finer details.

An immersion of one minute in the eikonogen solution will prove ample with a soft, easily swelling film, but with a harder one it will be better to give two; indeed, in all cases it is as well to err in the direction of over than of under doing it. The film can absorb only a certain quantity, and a prolonged soaking can do no more injury than perhaps waste a little material; whereas to commence development with an insufficiency of the active agent may mean the utter loss of the negative.

The strength of alkali I have used has varied from twenty to thirty grains to the ounce of ordinary washing soda, and so far as result is concerned, even upon the same plates, I can trace little, if any, difference. With the carbonate no bromide is absolutely necessary, though a very little seems to help to give brilliancy to the image. If very "plucky" negatives are wanted, then it is advisable to increase the quantity, but this must not be done to such an extent as to greatly prolong the time of development. If this occur, the eikonogen contained in the film will be soaked out into the soda solution, and the result will be the same as development in an *extremely weak solution*.

I have not tried caustic alkalies in this way, but judging by their behaviour with eikonogen in the usual manner of application, I do not see any advantage in their employment, but the reverse. As Mr. W. K. Burton says last week, they set up a strong tendency to "frilling" without, as in the case of hydroquinone, any counterbalancing advantage. If, however, the alkali be employed in the caustic state, it must invariably be accompanied by bromide from the very outset.

Employing the carbonates, however, the bromide is optional in what I may term a normal development, but it forms an invaluable, if not the only means of controlling the action as it proceeds, and of arresting it when complete. The image appears very quickly on the application of the alkali, and the half shadows come up to full density almost immediately they appear. The film being impregnated with unexhausted eikonogen, it is important to check the developing action the moment it has reached the proper point, or perhaps a little earlier, for it is impossible to arrest it instantly, and to do this a strong addition of bromide just before development seems complete, and proves very useful, as it lets down the action gradually.

In a case of decided over-exposure, where it is impossible to check development in time, or before it is complete, the only way to prevent its going any further is to have at hand a dish containing very dilute acetic or citric acid, into which to plunge the plate instantly the developer is rinsed off. Under ordinary conditions, however, no necessity will be found for such expedients; my own acquaintance with a case of serious over-exposure was made in consequence of having omitted to insert the *f*-16 stop on one occasion, and *then* I had not the acid bath ready.

Setting side by side negatives developed in the ordinary way, and those by the two-solution method, the latter will be found in every case more vigorous when the solutions employed are of the same relative strength as those I have given above. Naturally, a greater degree of density may be anticipated from increasing the strength of eikonogen up to a certain point, but for practical purposes there seems little need to go beyond that I have given.

I have tried the same method with hydroquinone, but, unfortunately, the peculiar idiosyncrasies of that developer are thereby still further intensified. For reproductions of line work, I can imagine no finer method of development than hydroquinone used "in separate solutions."

W. B. Bolton.

CITY SUMMER PHOTOGRAPHIC EXHIBITION.

Photography has now entered into another domain, and this no less than the centre of the great city of London, where in one of the palatial homes of its famous companies a welcome has been extended, which, whilst conferring upon its guests the splendour of magnificent surroundings, also reflects upon the donors the proud consciousness of having aided the progress of one of the greatest scientific investigations of the nineteenth century.

In the Hall of the Drapers' Company, with its wondrous staircase, where beautifully contrived reflections convey the idea of grandeur without cessation, a fitting resting-place has been allotted to the results of both the scientific and artistic sides of photography, which, starting from its recent alliance with the London Chamber of Commerce, has assumed the business proclivities of a vast commercial community, and which, emanating from the enterprise of a few courageous business men, has eventually risen to a great institution.

As might have been anticipated, the largest amount of support has arisen from London, where the possibilities of such an enterprise would be expected to be accepted; but at the same time there are provincial exhibitors who have assisted in the enterprise. It now remains to be seen whether the merchants and other great sections of

this imperial city will avail themselves of the opportunity thus afforded for making an acquaintance with the means and the ends arrived at through the agency of photography.

The exhibition opened on Friday night, May 30, with a *soirée*, when Sir Albert K. Rollit, LL.D., M.P., Chairman of the Council of the Chamber of Commerce (who was supported by representatives of the photographic trades section of the chamber), made some very pertinent remarks respecting the nature and prospects of the occasion which had arisen out of the introduction of photography to city life.

A large assembly of representative visitors then flowed into the hall to inspect the pictorial and scientific display, and the evening was diversified with vocal and instrumental music.

Mr. Payne Jennings exhibits a very choice collection of views, which, being printed in platinum, assist most materially the subjects selected, where distances are rendered in their proper relation of light and dark portions. Messrs. Cameron and Smith, a few portraits very carefully rendered, showing some originality in design. Mr. Friese Greene shows some vignetted portraits, which are very good in treatment. Mr. Arthur Weston, a series of portraits carefully executed, but some of the shadows are somewhat dark, and this is not so favourable to ladies. Waterlow & Sons exhibit some very carefully executed specimens of the Woodburn and collotype processes, together with some photo-zinco engravings, which are all exceedingly good examples of mechanical photographic printing. Frith & Co. show a series of landscape and architectural scenes, which, if they had been more separated from each other, would have ensured a closer attention. Elliot & Fry, some most effective work, very carefully treated; there is great refinement in the execution,—we particularly notice a head of Cardinal Manning, which looks like a copy from some artistic chalk drawing; also a very successful head of another difficult subject, that of the Right Hon. G. J. Goschen. Marion & Co. exhibit some enlarged work carefully finished, and two carbon enlargements on opal, which, being coloured in a light and gay style, are pretty, but to some extent have got rid of the naturalness which photography is capable of. Mr. R. Slingsby shows a series of groups taken by flash light, clearly evidencing the onward progress of photography which, under these conditions will rapidly grow and receive an impetus from such specimens as these. The Photo Etching Company exhibit some most effective work by their process, which seems destined to supersede engraving by hand. Mr. Fred Downer, amongst other work, shows a series of photographs of Professor Herkomer, R.A., as *Filippo*; these are very good in pose, but being taken against a very light background, although effective, are somewhat hard in outline. Mr. John Lewis, specimens of a new printing process. The Agent-General for New Zealand sends some views of caves in New Zealand taken with magnesium light by Mr. Limerton. Mr. Collier (Birmingham), some large work consisting of figures and general subjects. Window & Grove exhibit very good portrait work, evincing a refinement in treatment differing essentially from many others. Morgan & Kidd show enlarged work on argentic gelatine-bromide paper, being very good specimens of various subjects; the surface of their paper gives an admirable ground for finishing with much effect. West & Sons some of their well-known photographs of sailing vessels in rapid motion, taken on 24 × 18 plates. F. Thurston has some enlarged studies of scenery with figures and animals, one a misty morning being exceedingly well manipulated.

The London Stereoscopic Company show a large series of prints produced by their photo-mezzotype process, also a series of portraits well executed, evincing a most careful and advanced usage of photographic materials. W. & D. Downey exhibit a series of their well-known, careful, and good work, also some exceedingly effective specimens of large direct portraits, 24 × 18, very carefully manipulated, and also very refined in treatment. W. & H. Fry (Brighton) exhibit a variety of large work, 24 × 18, in portraiture, interiors, and views of the Brighton sea-side, the latter being especially good; also a series of "At Home" portraits, which are very effective, and look natural from being lighted from the side rather than from the top. The Autotype Company show a large quantity of their usual high-class work, being principally copies from paintings and old engravings. Their examples of autogravure photography are exceedingly fine, and their collotype work is, as usual, of a very high order. They also show some of their well-known carbon enlargements, and a dozen photographs of fans, which are very realistic in treatment. Altogether this display is a good illustration of advanced photographic reproduction of artistic work. Mr. H. Vander Weyde exhibits but a few frames, containing rather large work, one of the Princess of Wales being very effective, especially in the treatment of the drapery. There are also two of the three figures exhibited in Pall Mall East last year, entitled the *Adoration of a Doll*. Mayall & Co. show some very effective work of various sizes, all showing an attempt to individualise each study. Bedford, Lemere, & Co. have sent some interiors which fully sustain the high reputation they have gained for this class of work. Mr. J. Thompson exhibits a very good study of the famous African traveller, Stanley, and a selection of general portraits, where evidence is afforded of the most careful treatment of each subject. Mr. R. Faulkner exhibits some of his portraits of children, which, besides being perfectly natural, at the same time have had infused into them some very careful artistic treatment. Mr. H. Flather exhibits specimens of his new process for finishing photographic work, which he designates "dry point work," the result being a surface which removes it entirely apart from known photographic productions, also artistic skill must govern the work, which in these specimens is made very evident. Mr. J. Hubert has some few photographs where composition in figure subjects has been successfully carried out, despite the realism of the various scenes. Mr. Debenham (Ryde) shows some examples of very good manipulative work. Mr. H. S. Mendelssohn has a small series of studies, where each subject has been well considered before being photographed. Mr. Friese Greene has also here some studies which evince a thoughtful attempt to realise individuality. Doulton & Co. exhibit some of the photographs taken by F. W. Edwards of the clever and interesting series of bas-reliefs by C. Timworth. There are some large photographs of Canadian scenery which serve to convey some idea of the natural wonders of the western hemisphere. These have been sent for exhibition by the Canadian agency in London.

The display of apparatus is very large, and forms almost the chief attractiveness of the whole exhibition. The following together have sent specimens of every kind of apparatus:—Marion & Co.; W. Rooke; Perken, Son, & Rayment; Oscar Schölzig; Alexander Clarkson; Swift & Son; Morley & Cooper; R. & J. Beck; G. Houghton & Sons; Sands & Hunter; W. F. Slater; W. Wray; The Stereoscopic Company; Watson & Sons; J. Thomson; G. A. Rudowsky; Mawson & Swan; F. W. Hart; J. H. Dallmeyer; Pearson & Denham; A. S. L. Abraham; H. Park; W. G. Tyler; J. Desiré England; G. Smith; J. R. Gotz; John Lewis; E. G. Platt; W. Crouch & Co.; Ross & Co.

The apparatus, it is scarcely necessary to observe, is in every respect the best of the class, and is worthy of the manufacturers and exhibitors.

MOTTLING.

The fault of mottling on gelatine dry plates has from time to time exercised the minds of photographers, both professional and amateur. The effect has had various causes assigned for it, one or several of which may be correct. The puzzle is, Why does not similar treatment produce similar effects uniformly? That it does not there is ample evidence to prove. Can the fault be produced at will? and, if it can, what conditions must exist for its production? The causes assigned have been as follows:—1st, Paper laid next the film in packing; 2nd, imperfect fixation; 3rd, allowing the plates to be face upwards undisturbed for some time in the alum bath after fixing; 4th, insufficient agitation in any of the baths; 5th, imperfect mixing of the developing solutions; 6th, and lastly, the developer poured over the plate and left quiescent.

As far as my personal experience goes, the fault has only shown itself on plates that have had very rapid exposures, and I believe this is generally the case. Very prolonged development seems then a primary condition; whether necessitated by rapid exposures, weakness of light, or slowness of the plates, it comes to the same thing, the development being a long time about; and the probability is that the process becoming tedious there is more likelihood of the developer being insufficiently moved about than when, as in the case of properly exposed plates, the process is completed in a few minutes.

Now, as to the appearance of mottling, it sometimes occurs as an even honeycomb pattern over the whole surface—small light and dark patches connected with fine lines or small patches of greater intensity

on an even ground, or patches of irregular intensity on some part of the plate or displayed in broken circles. With regard to the first cause, paper placed between the plates will sometimes cause imperfections; but the mottling to which I particularly allude occurs to plates that have not been in contact with anything at all except at the edges, so this cause is out of court. With regard to No. 2, imperfect fixation generally causes a patchiness rather than a mottling, and can be seen on removal from the hyposulphate bath and remedied. The mottling is undoubtedly induced during development, and although the different reasons suggested may produce irregularity in the films, according to circumstances, we must look to development as the primary cause. This being so, the suggestion arises, Why should not all very long developments, where the solution is not kept in motion, produce the same effect? We hear of a certain class of pictures that requires hours to develop; the developer is poured over the plates, and with occasional agitation left to act without any bad results. There must, therefore, be some particular combination of circumstances that are necessary to produce it. What are they? Does the strength or form of the developer influence the matter, and why does it appear at one time and not at another under apparently similar conditions? Two plates may be developed side by side with the same lot of developer, having presumably received the same exposure—one will be mottled and the other free.

With regard to the mottling that takes the form of more or less broken concentric circles, we attribute it to the developer being poured on in one spot. With the wet collodion process, pouring on at one spot removed the silver and left a transparent patch. This was easily understood without much mental exercise. The image was practically built up with silver *added*, and pouring on the developer in one spot simply washed it away. But this is not the case with dry plates. The haloid is already, *in situ*, kept in its place by a tenacious medium; the developer adds no more, merely reducing the salt in the place it originally occupies. If in development the solution is in sufficient quantity, and applied dexterously to cover the plate without forming bubbles and remain, say, an eighth of an inch over the whole surface after being poured on, it is somewhat difficult to say how irregular development can occur, and not only that, but why it occurs.

It may be suggested that the developer becomes muddy, and a sediment forms when the solution is not rocked, but mottling takes place when the developer remains bright and free from deposit of any kind, but as far as I know it has occurred when owing to the time occupied the plate has been left unmoved for a few minutes together. The necessity, or rather the advantage, of oscillating tables has been recognised for a long time as tending to prevent irregular development. Mottling is undoubtedly irregular development, and the use of a rocking table might prevent it, but as thousands of photographers are not provided with such an appliance, and excellent work can be made on a firm support, it would be to their advantage to know the peculiar combination of causes that exist when mottling spoils their work. Some time ago this matter was subject for discussion at the Photographic Club; various reasons were suggested for it. Mr. J. B. B. Wellington, a *facile princeps* in photographic work, thought the cause was imperfect mixture of the components of the developing solutions. Such might cause the fault, but with the negative that was under criticism at the time, the plate had been flooded with the pyro solution, which was poured off the negative into a measure containing the alkali. One would think the mixture was sufficiently intimate in this case to prevent anything of the sort. Anyway, even were this the correct explanation, very frequently less careful mixing of the developer takes place without the slightest damage to the negative, and it is only now and again the defect is produced, and that when everything has been working smoothly and satisfactorily. If the cause of an effect is known, such effect ought to be produced at will, and be the most convincing possible argument.

I think a satisfactory explanation is required, not merely dealing in generalities, but a definite and explanatory reason why this effect occurs. It does not seem to be peculiar to any make of plate, and is quite invisible until after the negative is fixed, when it is too late to make any alteration, even were it possible at another stage of the process to do so. I have not much doubt in my own mind that by keeping the developer in motion continuously the fault might be avoided, for the reason I have not happened to see it on plates so developed. Then, again, I have only occasionally seen it when the plates have not been kept in motion. It seems to me a subject worth inquiring into, and I feel sure that many besides myself would like to know what peculiar combination of causes induces the complaint, and whether constant agitation of the developer during its action will invariably prevent it.

E. Dunmore.

REVERSED NEGATIVES ON GELATINE PLATES.

The instability of the gelatine film, even in dilute solution of nitric acid, interposes a fatal obstacle to the practicability of the plan of taking a negative from a negative at one operation similar to that pursued when collodion was the vehicular body employed. This proneness of the former description of film to rot and shred under the action of the silver solvent is one that does not seem to have formed, recently at any rate, the subject of remedial experiment, and I therefore submit the following notes of some attempts to devise a method of prevention, having the ulterior object of reaching the goal indicated by the above headline with a fair amount of confidence in their novelty and the hope at least of their usefulness.

I am afraid that it has hitherto been taken for granted, rather than proved to be the case, that it was impossible by any means, when using the solvent of silver at anything like its proper degree of strength, to remove the image from a negative "cleanly" and without damage to the film. Further, I think I remember to have read of dilute nitric acid being regarded as a solvent of gelatine; but this is of course as pure a misconception as the former assumption is gratuitous, for gratuitous I venture to term it in the absence of detailed experimental disproof.

It is surprising, nevertheless, to what extent some gelatine films will resist the characteristic rotting and tearing action of the acid, even when it is used in so high a degree of strength as dilution with its own volume of water. I have at different times tried various proportions in order to watch its effect upon the metallic image. At the strength mentioned I once succeeded in reducing a negative of such excessive density of deposit, that it was useless to try and print through it, down to a wan, pale, yellow apparition of its original self that would not have paid for the most careful intensification. Beyond this stage of extreme reduction it was impossible to proceed without provoking the film to cockle and leave the glass in ribbons. Except total conversion of the deposit into haloid and removal thereof by hypo I know of no reducer so potent in its action as the aqueous acid has proved in my hands. I should, however, not like to recommend its adoption for that purpose, for other reasons besides its inherent disadvantages. The plates I work with are noted for their capability of "standing" anything, but there are several brands on the market that are not well served by caustic alkalies, warm afternoons, &c., however well protected from the worst effects of both, and which it would be imprudent to treat with H, NO_3, 1·420, in a higher degree of dilution than one to a hundred. Gelatine is as variable, as uncertain, as the weather and the ladies; were it not so we could all start the commercial manufacture of dry plates with light hearts.

A developed but unfixed positive on a gelatine plate consists of a picture in metallic silver upon a bed of unaltered haloid. If the image could be removed, the parts most completely reduced by light and development should be clear glass, and those where both light and developer had only partly acted should show a proportionate thickness of sensitive bromide, so that if the film, after washing and an exposure to the unscreened light of the dark-room lantern, be treated with the developing solution, a negative with the positions of left and right reversed should result. I think it was Mr. Farnall of the Foreign Office, who, in the autumn of last year, asked if any one could say how this was to be done, without, however, eliciting the information he sought.

Now, since the natural solvent of the positive which we desire to remove attacks the vehicle and tears it, silver and all, from the glass, the question arises whether, before applying the acid, it is not possible to treat the film with some reagent that will give it, not the property of insolubility in dilute nitric acid, which it does not lack, but that of being able to resist the disintegrating action, which I will term rotting and shredding. In order to effect this last object I do not think we need look farther for a suitable substance than a useful auxiliary of old standing in photography, I mean tannin.

Tannin—I quote from Sutton and Dawson's *Dictionary*, an excellent work that might with advantage be brought up to date and republished (but, then, how many things have happened since 1867!)—Tannin combines energetically with gelatine, and forms an insoluble precipitate when added to solutions of isinglass or glue. When oxidised it is converted into gallic acid and CO_2. A concentrated solution is precipitated by nitric acid. Tilden, in the last edition of Watts', says: "The tannic acids (tannins) precipitate a solution of gelatine, and unite with animal membranes, hence their use in the manufacture of leather." Again, "Tannic acid (tannin) throws down, even from very dilute solutions of gelatine, a tough, yellowish precipitate, consisting of a compound of the two bodies." To skim the cream from these illustrations of the cardinal effects of tannin upon gelatine, it would seem as if they are such as would be

likely to be useful to us in our present difficulty. To coin a word, it would appear to be able to "leatherise" a film, and so invest it with added means of resistance to strong acids.

I determined to ascertain whether the foregoing anticipations of the property in question were well grounded, and so made up a solution of tannin of the strength of twenty grains to the ounce, in which I allowed a couple of fairly dense and well-cleared negatives—not recently developed, but old and dried ones—to remain for the space of half an hour. At the end of that time I subjected them to a good washing. I had expected the clear edges of the gelatine to take a brown stain, and was agreeably disappointed. When the negatives were dry, I flooded them with nitric acid, 1·420, diluted with one and a half its own volume of water. As I surmised would be the case, the film did not evince the least sign of cockling, leaving the glass, or tearing; they behaved, in fact, just as if acting stronger than water was upon them, while in about three minutes the metallic images had dissolved entirely away, leaving the clear film behind in a state of negativity, and of such a consistency, that after a washing and a good soaking it was as firm and strong as a film ordinarily is after development. The gelatine had yellowed just as it will under alkaline pyro, and the solution containing the dissolved silver was of the same colour, but perfectly clear, and despite the use of ordinary tap water without any precipitate, although I remarked that at the moment when the acid began to dissolve the image, chloride was formed, which, however, appeared in its own turn to be dissolved. Possibly the combined tannic and nitric acids acted as solvent of Ag Cl at the moment of its formation.

Theoretically, if an ordinary negative image may be dissolved away in the manner described, the plan should answer with the developed silver positive, although here we call in an entirely new set of conditions to confer considerable severity upon the test. However, for the moment, we will place the theoretical aspects of the matter on one side. I developed a positive in gelatino-bromide, obtained by exposure in contact, with alkaline pyro, and after well washing the plate placed it for a quarter—not half—of an hour in a twenty-grain solution of tannin. I diminished the time of immersion purposely. After another washing and soaking, I applied the nitric acid, made up with exactly its own bulk of water. The film, which I suppose was at the maximum after about a quarter and several washings, had lost much of this comparatively great strength without in the least re-cockling, the image was easily dissolved out, and the solution and the film were dealt with in the manner before described.

I am convinced from repeated trials that by the plan I have described, the chief difficulty in the way of getting reversed negatives on gelatine plates may be easily overcome. The brown stain that remains on the film might, I imagine, be got rid of as easily as we clear pyro-developed negatives, or experiment might point out a way of preventing it. Anyhow, what are minor drawbacks appear, the dissolution of the metallic positive, while the gelatine film is left uninjured, is the chief desideratum, and that, as I have said, may be attained. To be sure, after the nitric acid has apparently done its work, the precipitation of the developer to what appears to be the unaltered bromide left in, by revealing a positive image, illustrate the persistency of the impression; but a fresh immersion in the acid will provide a remedy. Indeed, I should think that anybody following this method of reversing a negative would make a point of carrying on development and dissolution until the positive impression was entirely destroyed.

It is rather more than two years ago (vol. xxxv, p. 161, *et seq.*) that the editor gave us a series of articles on reversing negatives on emulsion plates, which most admirably dealt with the special features of exposure and development involved in the production of such pictures. To these I would refer any one who may be inclined to follow me in the nitric acid method with gelatine, and needs posting up in the particular procedure desirable, nothing that I could say on the subject would differ in substance from the editorial directions, while the latter are, if I may be allowed to say so, very full, clear, and explicit. I am, however, tempted to quote the dictum of the writer that, "though in principle the process is so simple, and, as carried out by a practised hand, so apparently easy, it is seldom that those who make but occasional use of the method succeed in obtaining perfect success, owing to the extreme nicety required in the accurate adjustment of exposure and development, and the difficulty of judging the precise point to which to carry the latter." Slow plates, a full exposure, and a developer well under control, probably summarises the first essentials to success.

There must be in existence enormous numbers of negatives regarded as useless, destined never to be printed from, and cast aside to "eat their heads off" as worthless lumber. At the present price of silver it would probably pay many a photographer, amateur and professional, to recover the metal from a few hundred spoilt or useless negatives by so simple a plan as dissolving it out of the films as that which the tannin and nitric acid method appears to me to be.

THOMAS BEDDING.

EXHIBITION AT HEXHAM OF PHOTOGRAPHS BY J. P. GIBSON.

PERHAPS the most remarkable "one man" exhibition ever held is now on view in the Town Hall of the quaint old market town of Hexham (commonly known as "the heart of all England.")

The show consists of over four hundred photographs of Northumbrian scenery and antiquities, ranging from whole plate to 15 × 12, mostly in the platinum toning process, which in Mr. Gibson's hands lends itself most admirably to artistic effect.

Mr. Gibson is an ardent antiquarian, whilst as a landscape photographer he has stood in the front rank for many years. This being said, it seems unnecessary to state that the standard of the exhibition is high, and that the work shows evidences of thought and tender care throughout. The *technique*, as might be expected from such a careful worker, is thoroughly good, except in a few of the architectural subjects, in which the effect of the (harmless (?) necessary wide-angle lens is somewhat unpleasantly manifest.

While some of the subjects possess only a local and archæological interest they are treated in the same careful, artistic manner as his well-known landscapes.

Entering the Town Hall, we find photographs illustrating Northumbrian architecture from pre-historic down to modern times, instantaneous street scenes, views of bleak moorlands, and of the sylvan and romantic scenery of the Tyne and its tributaries, which Mr. Gibson has made peculiarly his own. With so many pictures on view by such an acknowledged master in our art, it would be difficult to attempt a lengthened detailed criticism, but we propose to single out a few for special comment. The 15 × 12 first claim our attention, and a long way ahead stands No. 269, *Autumn Haze*, a charming view on the South Tyne, with the distance beautifully softened by perfectly rendered haze. Another feature of this picture is a choice bit of foreground of reeds and rocks, with figure judiciously introduced.

Coming next is No. 267, *Under the Haycock, fast asleep*, in which the foliage in the middle distance is exceptionally fine, and the figures from which the picture takes its title are placed naturally, and without any straining after effect.

In No. 268, *September*, we have a reach on the South Tyne (beautifully treated), a piece of pure landscape art with gleams of sunshine playing over the water at the bend of the stream, and a gnarled old oak standing out in bold relief.

Coming to the whole-plate series the task of selection becomes much more difficult. Our own feeling is that No. 82, *At Ladle Wells*, is the choicest and most artistic *pure* landscape in the whole exhibition. It represents with startling realism a desolate, barren moorland; rushes and burnt heather make up the foreground, two trees, bare and bleak as the surrounding heather, stand out weirdly against the wintry sky, the whole forming the finest, and withal simplest, picture we have ever seen. No. 36, *By the Brooklet*, is of its kind a gem, which shows how a simple subject may be aided by artistic feeling in placing figures as aids to the composition.

In No. 65, *Out for a Holiday*, an otherwise fine work is slightly marred by too much white road, which exercises a somewhat disturbing effect.

In No. 69, *The Beautiful River*, the subject does not belie the title. A splendidly balanced picture, with much artistic foreground.

No. 159, *The Wind that stirs the Mere*, is another scene of loneliness, a small Northumbrian lake. Here, again, the materials are simple. A crag, and a sunlit expanse of water broken up into ripples by the wind, with the foreground and sky—two of Mr. Gibson's strong points—alike admirably treated; so treated, indeed, as to *make* the picture.

Space does not admit of further individual notice, although many pictures merit it. In this category may be included No. 39, *Old Ridly Bridge*; 55, *Coatley Burnfoot*; 57, *The lonely Moor*; 76, *Hindley Burn*; 99, *Tickling the Trout*; 342, *Waiting*; and 222, *The Thief's Syke*. This last is a vigorous subject vigorously treated—larch trees against the sky with a finely broken up foreground.

The architectural subjects, as subjects, do not call for special comment, but locally, of course, are very interesting. The salient feature of the series is the fact that by proper handling, the careful study of lighting and judicious selection of clouds, what in many cases would have been ordinary photographs are transformed into works of art.

Summing up the effect produced upon our minds by this splendid and

unique show is one of unmixed pleasure and admiration of the thoughtful adaptation of means towards ends displayed in many of the works here shown.

We suggest that the Camera Club authorities will endeavour, at an early date, to secure some of the gems of this collection for one of their "one man" exhibitions.

ECLIPSE PHOTOGRAPHY.

Probably in no department of science, certainly in no branch of astronomical science, has photography been of such use as in the study of solar eclipses. It is only when the sun is obscured by the moon that we are able to see and properly photograph the corona or luminous atmosphere round the sun. This solar corona, as has been said by Young, "is visible only about eight days n a century in the aggregate, and then only over narrow strips of the earth's surface, and but from one to five minutes at a time by any one observer." Very little of the eight days, however, can be utilised; indeed, as has been pointed out by Miss Clerke in her admirable *History of Astronomy during the Nineteenth Century*, the corona has only been observed by scientific men during forty-five minutes in as many years. Opportunities of observing an eclipse occur therefore at such comparatively long intervals, the phenomena to be observed are so varied and extensive, and the time during which the observations must be made is so very limited, that any permanent records of the phenomena, such as photography enables us to obtain, cannot fail to be of the greatest value. The most careful drawings of the same eclipse by different observers at the same station are so very dissimilar that it is generally unsafe to base any conclusion on them, whereas in photographs we have truthful records of the actual phenomena without personal equation of any kind, and with the additional advantage that there is more detail in the photograph than it is possible to insert in any drawing made during an eclipse, or even at leisure after the three or four minutes' observation of such an indefinite and irregular object as the corona. The history of the increase of our knowledge of the corona is practically the history of the improvement of our photographic methods of attacking the phenomena of an eclipse.

The first occasion on which photography was used at an eclipse of the sun was on July 8, 1842, when Professor Majocchi, at Milan, attempted to obtain Daguerreotype pictures of the corona. His account of the attempt informs us that "a few minutes before and after totality an iodised plate was exposed in a camera to the light of the thin crescent, and a distinct image was obtained; but another plate exposed to the light of the corona for two minutes during totality did not show the slightest trace of photographic action. No photographic alteration was caused by the light of the corona condensed by a lens for two minutes, during totality, on a sheet of paper prepared with bromide of silver." No details are given of the apertures of the lenses employed, or of their focal lengths. At the outset, therefore, astronomers were met with failure, but the failure at Milan did not deter Dr. A. H. Busch and Herr Berkowski from a similar attempt at Konigsberg on July 28, 1851. The telescope used on this occasion had an aperture of 2·4 inches, and a focal length of 30 inches. Commencing immediately after the beginning of totality, a plate was exposed for 84 seconds in the focus of the telescope, and on development an image of the corona was obtained. A second plate exposed for from 40 to 45 seconds was fogged by the sudden breaking out of the sunlight. The picture thus obtained—the first photograph of the corona and prominences—is known as the Konigsberg Daguerreotype, and is still preserved at the Strasburg Observatory. It was lent by Professor Winnecke for the exhibition of scientific instruments at South Kensington in 1876. On it the prominences, and the lower portion of the corona extending about one-fourth of a solar diameter from the moon's limb, are distinctly shown, the encroaching of the prominences on the dark disc of the moon, owing to irradiation, being particularly evident.

Daguerreotype was again used for the annular eclipse of May 26, 1854, by Mr. Campbell and Professor Loomis at New York; by Dr. Bartlett and Victor Prevost, who obtained nineteen photographs, at West Point; and by Professor Stephen Alexander and Mr. E. H. Old at Ogdensburg.

Liais in 1858 obtained photographs of the partial phases, using wet plates. On one of these the moon can be seen projected on the corona before totality. With the introduction of the collodion process more sensitive plates were obtained, and a great advance was anticipated. At the total eclipse of 1860, July 18, Mr. Warren de la Rue, at Rivabellosa, in Spain, used wet plates. His instrument was one specially devised by himself for photographing the sun's disc for sun spots, and is known as the Kew heliograph. It is an ordinary equatorial mounting with driving clock, carrying a photographic object glass, 3·4 inches clear aperture, and 50 inches focal length. The primary image is ·466 of an inch in diameter, but before the image falls on the plate it is enlarged by an ordinary Huyghenian eyepiece to 3·8 inches diameter. The exposing apparatus for the ordinary sun photographs is an instantaneous shutter; this, of course, had to be abandoned for the eclipse photographs. Two plates were exposed during totality, the exposure being 60 seconds in each case, but only slight traces of the corona were obtained. At the same eclipse Father Secchi and Professor Monserat, working at Desierto de las Palmas, obtained good photographs of the corona, using an object glass of ·15 metre diameter, and 2·5 metres focus, the primary image being 23 millimetres in diameter. The plates were placed in the primary focus, and according to Secchi, "all the phases of the phenomena are represented on the photographs." The original negatives obtained at Desierto de las Palmas of this eclipse have unfortunately been lost.

The next attempt at photographing the corona was on August 18, 1868, this being remarkable as the first attempt to use a reflector for the purpose. Colonel Tennant and Sergeant Phillips at Guntoor used a 9-inch silver-on-glass mirror, by With, of 6 feet focal length, mounted equatorially by Browning on the Newtonian plan.

Unfortunately the weather was unfavourable, but plates were exposed through light clouds, the longest exposure being 10 seconds. The photographs obtained show the prominences sharply defined, but only slight traces of the corona are visible. Mr. Sutton at Mautawali Kiki, and Drs. G. Fritsch, H. Vogel, and W. Zenger, at Aden, were, from atmospheric and other causes, unsuccessful with refractors.

At the eclipse of August 7, 1869, many attempts were made to photograph the corona. In all cases where the image was enlarged before it fell on the plate, slight traces of the corona were obtained; while Professor Winlock and Mr. J. A. Whipple, at Shelbyville, with a 5½-inch lens of 7½ feet focal length, obtained seven pictures taken in the primary focus, one with 40 seconds' exposure, showing more detail than had previously been photographed.

At this eclipse, Messrs. Hoover photographed the corona with a lens of 12 inches focus, and Professor Stephen Alexander also obtained photographs at Ottumwa, some of which give good ideas of the coronal structure.

At the 1870 eclipse, December 22, a 4-inch Dallmeyer lens (rapid rectilinear), stopped down to three inches aperture, and with focal length of thirty inches, was used by Mr. Brothers at Syracuse. Wet plates were used, and the photographs were taken through light clouds, the best of the pictures having had eight seconds' exposure. Details in the corona are very well shown in these photographs. In discussing his results, Mr. Brothers says, "The photographs taken . . . . prove that the light of the corona is very actinic, and that several photographs of this beautiful phenomenon can be taken during the time of totality." He further adds, "That it is impossible to obtain satisfactory photographs of the corona either with reflecting or refracting telescopes as ordinarily used is, I think, now conclusively proved."

Professor Winlock at Jerez, during the same eclipse, obtained two good photographs with ordinary telescopes; while Lord Lindsay, at Maria Louis Observatory, with a 12-inch mirror of 6 feet focus, obtained plates so much fogged as to be useless.

On December 21, 1871, splendid photographs were obtained at Baikul by Mr. Davis (Lord Lindsay's observer), and by Colonel Tennant, J. B. Hennessey, Esq., and Captain Waterhouse, at Dodabetta. In each case Dallmeyer 4-inch rapid rectilinear lenses of thirty-three inches focus were used, the exposures varying from five to forty seconds. Herr Dietsch, in Java, also obtained two good photographs with a "lens of short focus," with exposures of half and one-third second. Captain Hogg, at Jaffna, also got fair results with cameras 16 inches and 23 inches long. At the eclipse of April 6, 1875, Dr. Schuster, in Siam, got good photographs, although small, with an ordinary camera.

The eclipse of 1878 marked another departure in photography. Dr. Draper used wet plates, and got much detail in 165 seconds. Mr. Ranyard used Mawson & Swan's extra sensitive dry plates, with a 13-inch lens of 6 feet 2 inches focus, and obtained photographs extending 6′ (one-fifth of a sun's diameter) from the limb with exposures of one and three seconds. Professor Harkness, the director of the American operations, arranged two cameras, with 6-inch Dallmeyer lenses of 37·9-inch focus, and Mr. J. A. Rogers and Mr. Clark with these, using specially prepared dry plates made by Mr. Rogers, obtained two good series of photographs. In the report on the eclipse operations published from the United States Naval Observatory, Mr. J. A. Rogers not only discusses the value of photographs as compared with drawings, but enters fully into all the details of eclipse photography, concluding by strongly advocating the adoption of dry plates. Mr. O. L. Peers during this eclipse obtained a wet plate photograph showing greater extension of the corona than any of the dry plate ones, but there seems some doubt about the apparatus he used.

He used either a 2½-inch or 3½-inch Voigtländer portrait lens, and exposed either for twelve or for twenty-three seconds. Mr. Peers says he used a 2½-inch lens, and twelve seconds' exposure, while Voigtlander declares he makes only 3½-inch lenses of the focus 1 : 8 Mr. Peers used, and on examination of the photograph it is found that the trail of the moon on the plate indicates an exposure of twenty three seconds. After the 1878 eclipse dry plates were universally adopted by eclipse observers.

The photographic arrangements of the expedition to Sohag, in Egypt, for the eclipse on May 17, 1882, were made by Captain Abney, the chief objects of the expedition being to photograph the spectra of the corona and prominences. Arrangements were also made by Captain Abney for corona photographs with a 4 inch lens of sixty inches focus belonging to him. The spectrum photographs taken show as many as thirty lines in the prominences, while the photographs of the corona obtained by Dr. Schuster with exposures of from three to thirty-two seconds show great extension of the corona with the most exquisite detail. These plates are also remarkable for the discovery of a comet in the photographs, although the comet was not seen by the observers. Captain Abney and Mr. J. Norman Lockyer were responsible for the methods of photographic attack adopted by the English observers, Messrs. Lawrance and Woods, at the Caroline Islands, on May 6, 1883. The spectroscopic results and the corona photographs taken with the 4 inch lens of Captain Abney, previously used in 1882, were most successful. Janssen on this occasion used two objectives, one 6 inch and one 8 inch diameter, and using long exposures, photographed the corona extending two diameters from the sun, this being much further than it could be traced with a telescope.

Photography was again used on September 8, 1885, at the total eclipse in New Zealand.

At the eclipse of August 28, 1886, visible at Granada, Captain Darwin used a chronograph as devised by Dr. Huggins, consisting of a mirror inclined in a tube in such a manner as to enable photographs to be taken in the primary focus without the intervention of a flat. Good results were obtained. Dr. Schuster and Mr. Maunder used 4 inch lenses of 60 inches focus, and obtained good results. Their spectrum photographs were also successful. Professor Pickering, of Harvard, used a heliostat and a photo-heliograph of 38 feet focus, suspended horizontally, but no results were obtained with this apparatus, although he was partially successful with his other instruments.

Very few photographs were obtained of the eclipse of August 19, 1887, in Russia, owing to the unfavourable weather. The English observers intended to use similar instruments to those employed in 1886, but the weather did not permit.

The eclipse of January 1, 1889, was very successfully photographed by the American observers, the largest aperture used being thirteen inches. On some of the plates used during this eclipse the standard intensity scale recommended by Captain Abney several years ago was fixed, and for the first time definite conclusions as to the brightness of the corona were obtained.

The expedition sent out by the Royal Astronomical Society for the eclipse of December 22, 1889, were each fitted with a 4 inch photographic lens, belonging to Captain Abney, mounted on the usual equatorial plan, and intended to continue the series so well begun by Dr. Schuster in 1882, and also with a 20 inch mirror of 45 inches focus, specially constructed and mounted for eclipse work, and designed to photograph the outer portions of the corona too faint for ordinary instruments. The plates for use with the 4-inch lenses were specially prepared by Captain Abney, and on each of them he had placed a scale of standard intensity squares for measuring the brightness of the corona. Small squares on each of the plates were exposed to a standard light for various times; these squares were then covered with a strip of black paper, and the plates taken out to the Eclipse Station and exposed on the corona. When the plates were developed the image of the corona and the squares were, of course, developed to the same extent, the squares thus serving as standards for absolutely measuring the photographic intensity of the light of the corona. The density of the deposit in any part of the picture of the corona can be compared with the density of the most similar of the squares on the same plate by Captain Abney's photometer, and as this photometer depends upon the method of limiting apertures, it gives absolute readings.

The African expedition was entirely unsuccessful, owing to clouds, but the expedition to Salut Isles, under charge of the late Father Perry, obtained successful photographs, which are at present under examination. From them Captain Abney will be able to measure the absolute photographic intensity of the light of the corona.

An American expedition was sent to Cayenne with instruments used on January 1, 1889, and obtained successful photographs, while an American expedition to South-west Africa was unsuccessful, for the reason already given. This expedition, under the direction of Professor David P. Todd was located at Cape Ledo, about half a mile from the English Eclipse Station.

Several new departures in eclipse photography were introduced. Chief amongst these was the remarkable apparatus by means of which no less than twenty-three objectives and two mirrors were accurately pointed at the sun and caused to follow it by one large clock. A large duplex polar axis (the old English form as used for the 12·5 inch refractor at Greenwich) was mounted on solidly constructed stone piers and very carefully adjusted. This axis is constructed of 6-inch wrought-iron tubing, the total weight being about 2000 lbs. In it the cameras were fixed by set screws, the optic axes of the instruments being adjusted parallel to each other, and at an angle equal to the South polar distance of the sun at the time of totality. The carefully regulated and very powerful clockwork attached to the instrument caused the polar axis to rotate, and thus the whole battery of instruments followed the sun. Each lens was fitted with a pneumatic shutter regulated to give the required exposures in each case. The cameras themselves were enclosed in a dark room, the lenses only being exposed to the sun, so that dark slides were not required, the plates being held on open rotating frames, these frames being rotated at the proper time by pneumatic arrangements. When the cameras were once pointed and the clock driving properly, all the operations of exposure and changing of plates were performed without personal superintendence by means of the pneumatic apparatus, and a chronograph attached to the valve system of this apparatus recorded the exact time at which each exposure was begun and ended.

It is to be regretted that this ingenious and elaborate apparatus did not have a satisfactory trial, owing to the dense clouds; but Professor Todd assures us that he was thoroughly satisfied with the success of the pneumatic movements during the three minutes ten seconds he brought it into operation at the time of totality.

It is not improbable that (in spite of the great strength and weight of the axis and the solidity of the supporting piers) with this plan of fixing a large number of cameras and spectroscopes on one polar axis, the constant opening and shutting of shutters, and the changing of the plates, may produce so much shake that none of the long exposure photographs will be satisfactory. This, of course, can only be ascertained by the use of the instrument on the corona, and several years must elapse before the trial can be made.

Another unusual instrument was a photo-heliograph of five inches aperture and forty feet focus, mounted on a combination of the equatorial stand and tripod.

The long tube was made of iron, coiled spirally and strongly riveted, the necessary rigidity being attained by strong wires extending from end to end, and tightly stretched by a disc in the middle of the tube. Close to one end of the tube the polar axis was attached by a universal joint; the other end of the tube being supported by two rods, one on the east and one on the west side, these rods being also attached by universal joints. By means of these rods the proper inclination was given to the tube. The east rod was the declination rod, and was capable of sliding along the polar axis. The west rod was for giving motion in right ascension, being terminated at the free end in the form of a piston of a sand clock fixed in an inclined position. The rate at which the sand escaped from the cylinder could be accurately regulated, so that the rate of descent of the piston was completely under control, and was, of course, such as would cause the instrument to follow the sun.

This instrument was erected at Cape Ledo close to a hill of such inclination that the sun could be followed during the whole of the eclipse, while the long tube could be manipulated with greater advantage than would have been possible if the instrument had been erected on level ground. The hot air rising from the heated hill probably affected the definition in the photographs, but under the circumstances that could scarcely be avoided.

This form of mounting certainly solved the question of the possibility of using long-focus lenses mounted as direct photo-heliographs, but the apparatus is certainly unwieldy, and was only got into the fit state that it was on the eclipse day by the very great care and patience of Professor Bigelow. As it was intended principally to photograph the partial phases of the eclipse with this instrument, instantaneous exposures were arranged for, but Professor Bigelow succeeded so well in the adjustment of the instrument and the regulation of the sand clock, that he would have tried to obtain photographs of the lower corona with it had the weather permitted.

The photographic apparatus on this instrument has a very ingeniously constructed revolving plate holder, carrying round plates of twenty-two inches diameter. The exposing apparatus and the apparatus for rotating the plate between the exposures were moved by pneumatic arrangements, exposures being made at intervals of six seconds, the exact time of each

being recorded on a chronograph. As no dark slides were used, it was necessary to enclose the whole of the photographic apparatus in a dark room. One hundred and ten exposures were made with this telescope during the partial phases of the eclipse, all the photographs taken having to be obtained through clouds.

In several expeditions previous to this, where more than one kind of observation has been required, two or more objectives have been mounted on the same stand and driven by the same clock; but this plan is always open to the objection that any accidental disturbance in the manipulation of one of the pieces of apparatus will most probably spoil the results for both. With the American plan of many objectives on one heavy axis, and a pneumatic apparatus to manage all the actual operations of exposures and changing of plates, this objection of possible accidental disturbance is to some extent overcome; but the shake of the many operations taking place on the one axis introduces another risk. Besides this, the apparatus is very heavy, and exceedingly difficult to transport and erect, even in a civilised country.

Such is a very summarised account of the instruments hitherto employed, and it seems to me that the time has now come when much can be gained by the employment of fixed instruments and a moving large plane mirror. This idea of using a heliostat is, of course, not new, for it has been used several times on a small scale, and for special purposes. There is nothing beyond the difficulty of making a plane mirror sufficiently large for the work to prevent the adoption of this method in the future; and this difficulty now has ceased, as it is only a matter of time and labour to make plane mirrors of sufficient size. With a large plane mirror, twenty inches or upwards in size, mounted on a heliostat mounting, and so arranged as to reflect sunlight into a series of instruments rigidly supported in a horizontal position, the difficulties of eclipse observers will be very considerably lessened. The one driving clock will keep the pencil of light constantly in the same direction, and this can be used partly for photographing the corona, partly for spectroscopic work, partly for polaroscopic observations, and so on for any other purposes, the whole of the instruments being fixed in the best possible positions for the observers. Practically, with a large flat mounted in the manner indicated, we can fix any portion of the sky we require to observe, and to it we can point as many instruments as we can crowd into the pencil, each instrument being quite independent of the others. The length of focus of an objective would not introduce any difficulties on this plan, for the length of the tube is of little importance when it can be fixed in an horizontal position. The observers at the Eclipse Station only have one astronomical adjustment to make, *i.e.*, that of the position of the heliostat, and only one driving clock to regulate. This clock, since it has only to move the weight of the plane mirror and its mounting, can be more accurately made and regulated than is possible with a clock when it has to carry the weight of the tube and heavy axis of an ordinary telescope. The positions of the observers are more easy and natural during the precious seconds of totality; or, if personal superintendence is to be abolished in favour of the American pneumatic apparatus, this suggested arrangement of the instrument is better fitted for the pneumatic attachments than the old plan is. The whole of the photographic apparatus can be fixed up in a dark hut or under a dark tent with far less trouble and risk of stray light than is possible with the old manner of mounting.

The cost of a good heliostat mounting is about the same as that of a good telescope, and with one heliostat we can do the work of at least half a dozen of the usual instruments.

A. A. Common, F.R.S., and A. Taylor, A.R.S.M.

Discussion.

Mr. Taylor said the usual plan adopted to photograph the corona of the sun was quite different to that used in America. The usual plan is to take three or four telescopes to photograph it. Professor Todd strongly advocates the plan of taking a large polar axis, made of six-inch iron tubes, and mounted accurately on very solid supports. The form of polar axis is the English form, with two bars to the axis joined at the ends. Between the iron tubes Professor Todd fixed his instruments. In his work he made use of twenty-five objectives, and to each of these objectives he attached a pneumatic shutter. This pneumatic shutter was worked by a large American organ bellows, so that when they are working, the whole of the object can be uncovered at one time, and no objective can be uncovered separately. The organ bellows was fixed, and there was a rong row of pipes. As soon as the paper came over the pipe, the pneumatic shutter was opened, and was kept open while the whole of this length of paper was passing over the pipe. As soon as you come to the end of those holes the pneumatic shutter was shut, and the operation of changing a plate could be made. The exposure then was entirely pneumatic, and none of the bodies had to be touched during the exposure. He had a lot of rotating forms on which he could put three or five plates. Then, by pneumatic shutters, he could arrange them so that when the plate was exposed the rotating form was rotating just to bring a fresh plate in front of the lenses, and then the lens was opened, and as soon as he had got his instrument adjusted he had to work some bellows, and while the paper was running over the tubes slowly the whole of the operation of exposing the plates was done by the pneumatic arrangement. The objection to using this form was that you had the twenty-five shutters working, and the whole of the shutters working at the same time might produce shaking and spoil the photographs. Professor Todd in his experiment adopted a lens of five inches, a portraiture lens, and to mount this was a great difficulty. He had a long tube made of spiral-coiled iron, and this tube was strung by a series of wires stretched from end to end. This tube had a five-inch lens inside it. Then about three or four feet from one end of the tube he affixed a polar axis. The difficulty in getting the focus of the sun is that the sun is apparently revolving round the earth, and you have to make your instrument, as it were, follow the sun. This tube was fixed up, and the rate of declination of fall was regulated by a sand clock, and the angle of inclination of polar axis did not vary. By a sand clock the instrument was able to move to the westward at the same rate as the sun appeared to move. At the end of the tube he fixed a camera, in which the plates rotated by a pneumatic arrangement. The plan that was adopted was certainly effective, and the sand clock was regulated with the utmost care, and the operator had such confidence in the rate that he would expose for thirty seconds. We have not, however, had an opportunity of seeing these photographs of the corona.

Mr. Lawrence: I used a heliostat with fairly good results in one observation.

Capt. Abney: In concluding this discussion I should mention that the heliostat principle had been tried in the Caroline Islands, and it has produced one of the best photographs taken. The reason that it was not followed up was because the heliostat was in use by some one else. We are highly fortunate in having Mr. Common at this Conference. He is not only a scientific man, but a practical man. The photographs taken by Mr. Common's mirror are something marvellous, and had I not seen the results I should have been very careful in believing them. But Mr. Common works with his own hands and tests his mirrors with his own eyes. Everybody knows perfectly well the perfection of his mirrors. He jauntily talks about producing a twenty-inch flat mirror, but if he says he is going to produce it he will, because he spares neither time nor expense in these matters. I ask you to return your hearty thanks for the trouble he has taken in preparing his paper.

EMULSIONS.

A Communication to the Photographic Society of Philadelphia.

The accompanying formulæ for the preparation of a gelatine emulsion for photographic purposes are the result of several years of constant study and experimentation on the part of the writer, and it is believed that if the details of the process are strictly carried out, with but an ordinary degree of ability, plates fully equal to the best brands in the market can be easily and uniformly prepared.

Ammonio-nitrate Emulsion.

No. 1.	Boiled water	1 ounce.
	Iodide ammonium	5 grains.
No. 2.	Chloride ammonium	20 grains.
	Water	4 drachms.
	Acid, nitric, a drop or two to render the solution acid.	
No. 3.	Nitrate silver	60 grains.
	Water	4 drachms.

To the nitrate of silver dissolved in the water (No. 3) add, drop by drop, the solution of iodide ammonium (No. 1), until the precipitate of iodide of silver formed ceases to dissolve in the solution. Then pour in the solution of chloride of ammonium (No. 2), wash the chloride silver formed with three separate waters, draining each time; then add some pieces of broken glass to the moist mass, and then sixteen grains of Nelson's No. 2 gelatine, and dissolve with gentle heat (temperature 90°–100°). Shake well, and add the following solution:—Water, four drachms; bromide potassium, forty-three grains; liquor ammonia, half a drachm. Pour this solution at one time into the bottle containing the melted gelatine and chloride of silver. Cork the bottle to retain the ammonia. Keep at a temperature of 90° for fifteen or twenty minutes. Test the emulsion by a drop on glass, looking through by transmitted light from a match to see if all reddish colour is gone. When this has disappeared, and the emulsion viewed by transmitted light is greyish blue or green in colour, the heating has proceeded far enough; and then 120 grains of Heinrich's gelatine (previously softened in water and melted at a temperature higher than 90°) is added to the emulsion. This is to be well shaken, and then allowed to cool by gelatinising it slowly upon the sides of the bottle. Let stand six hours. Remelt at a temperature of 100°, gelatinising again upon the bottle. Allow to stand six hours, and melt once more. It is now ready to be mixed with the boiled acid emulsion (see following formula). Or, if the ammonio-nitrate formula is alone to be used, the

melted emulsion as just made is to be poured into a dish and allowed to cool and set; when cold placed on a clean cloth (mesh one-eightieth of an inch), squeezed through, the finely divided mass well washed, drained, and pressed under weight to expel excess of water, remelted, filtered through white silk, and then coated on glass. The final amount should not be more than three ounces. If more, then the gelatine has absorbed too much water in washing; to avoid this, press longer. In preparing this emulsion it has been found that the presence of the bromide, with here and free ammonia, favours the acid and alkaline emulsions. When the plates are coated they can be immediately passed through a small opening into an adjoining room, kept at a uniform temperature of 50°, with free circulation of air, and dried either on racks or on nails on the wall, free of dust.

Glass.—This should be previously cleaned by soaking it in a mixture of equal parts of nitric acid and water, well washed, dried on racks, polished with cuttle-fish bone and water, using a piece of well-washed flannel. The edges are finished with a weak solution of soda, so as to remove any trace of acid or grease. The plates after being dried, should be edged with a fine solution of gum tragacanth, by means of a small camel-hair brush tied to a stick, thin stick, with the end of the stick projecting a short distance so as to act as a guide for the brush. The plates should then be stored in the hot room until wanted.

Filtering.—If this is done in the hot room it can be accomplished by passing the melted emulsion through absorbent cotton, otherwise a hot-water jacket should be used for the filtering funnel, and the emulsion passed through well washed white silk or cotton. WILLIAM BELL.

THE HISTORY OF CHROMIUM AND ITS SALTS AND THEIR BEHAVIOUR IN PHOTOGRAPHY.

CHROMATES.

The normal chromates are yellow, the acid chromates are red.

The chromates of the alkalies, those of calcium, magnesium, nickel, copper, zinc, and cobalt are soluble in water. The chromates of barium, zinc, cadmium, lead, mercury, silver, and most of the basic chromates are insoluble. The neutral chromates give yellow precipitates with the salts of lead, zinc, and bismuth, and red with the salts of mercury, and reddish brown with those of silver.

It is easy to transform the alkaline chromates into dichromates. They are decomposed by hydrochloric acid as explained above, and reduced to sesquioxide by sulphurous dioxide, hydrogen sulphide, and many organic substances, as sugar, alcohol.

Potassium chromate, $K_2O.CrO_3$ = K_2CrO_4. This salt is made by calcining chrome iron ore with potassium carbonate in a reverberatory furnace. It is soluble in two parts of water at 15·5 degrees C.; by evaporation the solution deposits yellow rhomboidal crystals.

Potassium dichromate, $K_2O.2CrO_3$ = $K_2Cr_2O_7$, is prepared by treating a concentrated solution of the normal salt with a small quantity of sulphuric acid:—

$$2K_2O.CrO_3 + H_2SO_4 = K_2O.2CrO_3 + K_2SO_4 + H_2O.$$

It is not altered in the air. At a high temperature it loses half of its oxygen and is converted into normal chromate and chromic oxide.

It crystallises without water of crystallisation in dark red orange prisms, insoluble in alcohol, and soluble in ten parts of cold water, to which it imparts a strong acid reaction.

Its action on organic substances under the luminous influence is similar to that of chromic acid, being decomposed with formation of chromous chromate, thus:—

$$2(K_2O.2CrO_3) = 3(K_2O.CrO_3) + CrO.Cr_2O_3 + O_3.$$

Potassium dichromate serves for the preparation of the other salts of chromium. In the arts it is employed as an oxidising agent for bleaching ivory, feathers, &c. **However, for certain goods—feathers, for example—it has been superseded by hydrogen dioxide rendered alkaline by a small quantity of ammonia.**

Ammonium dichromate, $(NH_4)_2.Cr_2O_7$, is analogous to the potassic salt. It is more easily reduced by light.

Concentrated sulphuric acid and nitric acid added to a solution of the potassium or ammonium dichromate set free chromic acid.

Hydrochloric acid moderately heated forms a chloro-chromate:—

$$K_2Cr_2O_7 + 2HCl = K_2Cr_2O_5Cl_2 + H_2O.$$

In small quantities hydrogen sulphide forms a chromate and chromic hydrate, some sulphur is deposited:—

$$2K_2Cr_2O_7 + 3H_2S = 2K_2CrO_4 + Cr_2(OH)6 + S_3.$$

In large quantities chromic hydrate and potassic sulph-hydrate are formed:—

$$2K_2Cr_2O_7 + 7H_2S = Cr_2(OH)6 + 4KHS + 2H_2O + S_3.$$

Next to the silver salts the above dichromates are the most useful salts employed in photography. Photo-lithography, photo-etching, and certain photo-engraving processes are based on the insolubility of gum arabic, albumen, or gelatine containing dichromates, after exposure to light or on the more or less permeability of the latter organic substance. These changes in the physical properties of the substances were first attributed to their oxidation by the oxygen absorbed during the reductio of the chromic salt; but from the fact that oxidation generally tends to destroy organic matters or to increase their solubility during the preliminary changes occurring in their chemical constitution, it is more likely, as shown by Mr. J. W. Swan, that it is due to a combination of the substance with the products of the deoxidation of the potassic dichromate. Moreover, Dr. Eder, in his researches on the action of chromic acid on organic matters, has ascertained that the photo-image after exposure consists of chromous chromate, $CrO.Cr_2O_3$, and this sustains the theory of Mr. Swan. However, it should be observed that the photo-image, by prolonged immersion in water, consists of chromic oxide only, and therefore that the insolubility must be the result of the presence of this oxide. It is well known that ferric oxide acts in a similar manner; thus, a gelatine film imbued with chromic acid, then treated with ferrous sulphate, becomes insoluble in warm water from formation of ferric hydrate *:—

$$4H_2CrO_4 + 6FeSO_4 + 2Cr_2(SO_4)_3 = 3Fe^2O_4 + 4H_2O + O_4.$$

On the same actions are based the carbon and dusting processes. In the former process the chromic oxide acting as a mordant permits the obtaining of various colours, as with dyes, alizarine, purpurine, coralline, indigo, logwood, &c. (Perrot.†

The dichromates are also employed to print from negatives without silver salts; thus a sheet of paper—superficially sized with starch or gelatine—is floated on a strong solution of potassic or ammonic dichromate, dried, exposed to light, and for half an hour washed in rain water, three times renewed, to completely eliminate the dichromate not altered; when the print is floated on a solution of ferrous sulphate this is changed to ferric oxide, the latter forming coloured precipitates with reagents. Tannic acid with ammonium carbonate gives a black bordering on violet ‡:—

$$Fe_2O_3 + C_{14}H_{10}O_9 + C_{14}H_4Fe_2O_9 + 3H_2O.$$

Lead chromate, $PbCrO_4$, is the yellow precipitate formed by mixing a solution of normal potassic chromate with a solution of lead nitrate. If the dichromate is employed the product is canary-yellow.

Lead chromate constitutes the chrome yellow of painters. It dissolves in the alkalies and in hot concentrated hydrochloric or sulphuric acid. It is transformed into an orange-red basic chromate by boiling with lime water.

A basic red chromate, $(PbO)_2CrO_4$, is formed by passing a current of carbon dioxide through a solution of lead oxide and lead chromate in potassa:—

$$PbO + PbO.CrO_3 + 2KOH + CO_2 = (PbO)_2CrO_4 + K_2CO_3 + OH_2.$$

All these compounds are employed in calico printing, glass and porcelain painting, in dyeing, &c.

Lead chromate is easily fixed on textiles by alternately dipping the material into a solution of lead nitrate, then into a solution of potassic chromate. The red orange colour is obtained by dipping the dyed material into boiling lime water.

Uranium chromate is yellow-brown. It is obtained by precipitating uranous chloride by potassium chromate. It consists of several chromates of uranium.

Copper dichromate, $CuO.2CrO_3 = CuCr_2O_7$, is obtained as a green mass by evaporating a solution of this salt obtained by mixing a solution of cupric sulphate with one of potassic dichromate:—

$$CuSO_4 + K_2Cr_2O_7 = CuCr_2O_7 + K_2SO_4.$$

Under the action of light, and necessarily in presence of an organic substance, it is transformed into copper chromite:—

$$CuO.2CrO_3 = CuO.Cr_2O_3 + O_3.$$

Mr. C. J. Burnett's cuprotype is an application of this photo-chemica

* See the memoir of Dr. J. M. Eder, "Les reactions de l'acide chromiques et des chromates sur les substances organiques dans leurs rapports avec la chromo-photographie." Vienne, 1878. Translated in THE BRITISH JOURNAL OF PHOTOGRAPHY, vols. xxv. and xxvi., and in *Liesegang's Photographic Bulletin*, vols. x. and xi.

† Consult "Upon Weakening, Intensifying, and Toning Carbon Tissues," by Carl von Stefanowsky.—THE BRITISH JOURNAL OF PHOTOGRAPHY, vol. xxiv., pp. 225 and 237.

‡ J. Sella's process. *La Lumiere*, 1857.

action. The paper, prepared with a solution of copper dichromate with gelatine or grape sugar, or both, is exposed, washed in rain water—any water containing neither lime nor iron—then developed with potassic ferrocyanide. The image is purple red, from formation of cupric ferrocyanide, and can be toned black by treating it, after the potassic ferrocyanide has been washed out, with a solution of ferrous sulphate, or tannin, gallic acid, or pyrogallol with an alkaline carbonate.

CHROMIC SULPHATE $Cr_2(SO_4)_3$.

Sulphate of Sesquioxide of Chromium.

When chromic oxide is dissolved in its own weight of concentrated sulphuric acid at a temperature of about 32° C., a solution of an emerald green colour is obtained, which deposits green crystals of the compound in question, soluble in 1·2 parts of water:—

$$Cr_2O_3 + 3H_2SO_4 = Cr_2(SO_4)_3 + 3H_2O.$$

Besides this salt there are violet and red sulphates. All have the same constitution, differing only in their degree of hydration, and some of their properties. Thus the violet sulphate is insoluble in alcohol, and the red sulphate insoluble in water.

Potassic chromium sulphate (chrome alum):—$K_2SO_4.Cr_2(SO_4)_3$, $24H_2O$. It can be prepared by mixing three parts of a saturated solution of potassic dichromate with one part of concentrated sulphuric acid and passing into the mixture a current of sulphur dioxide, which unites with half of the oxygen of chromic acid, and thus reduces it to chromic oxide, the oxide combining with sulphuric acid; thus:—

$$K_2O.2CrO_2 + H_2SO_4 + 3SO_2 = K_2SO_4.Cr_2(SO_4)_3 + H_2O.$$

This double salt crystallises in octahedra, which are purple by transmitted light and dark green by reflection. They are soluble in alcohol and slightly soluble in water, which is tinged green.

Chrome alum precipitates gelatine from its solution and renders it insoluble in warm water. The commercial salt usually contains sulphuric acid in excess, which is eliminated by washing the powdered salt with alcohol when it is wanted for use in sensitive photo-gelatine preparations.

REACTIONS.

Chromous Salts.—These salts are very oxidisable and absorb oxygen from the air, being converted into chromic salts. The chloride, the acetate, and the double potassic salt, $K_2Cr^{II}(SO_4)_2$, are the only ones known. With reagents they give rise to the following actions:—

Potassa produces a brown precipitate, Cr_3O_4, with evolution of hydrogen.

Aqueous ammonia produces a green precipitate turning green in the air.

Ammonia with ammonium chloride produces a blue precipitate turning red in the air.

Potassium ferrocyanide produces a greenish yellow precipitate.

Potassium chromate produces a brown precipitate.

The alkaline sulphides produce a black precipitate.

Cupric chloride is reduced to cuprous chloride, and by excess to cupric oxide.

Mercuric chloride is reduced to mercurous chloride (calomel).

Silver salts are reduced to the metallic state.

Gold terchloride is reduced to metal with evolution of hydrogen.

Chromic salts.—Potassa and soda produce a green precipitate soluble in excess.

Aqueous ammonia in the solution of green salts produces a greenish precipitate soluble in excess. In the solution of violet salts the precipitate dissolves and the solution turns green in the air.

Alkaline carbonates produce a green precipitate soluble in excess.

Hydrogen sulphide—no precipitate.

Ammonium sulph-hydrate produces a precipitate of chromic oxide, and hydrogen is evolved.

Nut-galls solution produces a brown precipitate.

The alkaline chromates, with acetic acid, produce the following precipitates:—

Barium salts	*Pale yellow.*
Lead salts	*Bright yellow.*
Mercurous salts	*Bright red.*
Silver salts	*Red brown.*
Uraninm salts	*Yellow brown*, turning red by adding potassa.

—*Anthony's Bulletin.* P. C. DUCHOCHOIS.

Photographer's Son (to an amateur whom he meets hurrying along with a packet of extra-rapid half-plates :—Hullo, Dick, been buying plates?

Amateur.—No; I am just going to the glazier's to get these cut down to quarter-plates.

Photographer's Son.—But the glazier has no dark room.

Amateur.—Oh, that doesn't matter at all. He will just put on a pair of *red spectacles!*

THE SALTING AND EXCITING OF DRAWING AND OTHER COMMERCIAL PAPERS.

[A Paper read at the Camera Club and published in their Journal.]

THE subject on which I have elected to address you this night promises to be no light task; it is a dead horse I have to thrash, an old mummy that I am seeking to revivify. Five-and-twenty years ago this paper would have been useless, for at that date it was the common practice of every worker to prepare his own printing papers. But nowadays the art is lost, and it is the cheapest paper, with the rottonest albumen and the silver reduced to the least possible denominator, that rules the roost. Is this progress? I fear not. Are our prints more permanent thereby? Look at any old collection of prints, the album of the Photographic Club for 1855 for example, and then compare these with your own productions of last year, and let your own conscience give you the answer.

Cutting competition has produced its jerry builders in photography, and it is the cheapest rubbish that finds the readiest sale.

Amateurs may perhaps claim exemption from the charge of niggardliness, but, on the other hand, laziness, or the desire to produce some results at the least possible trouble, has brought about the same failing. The average amateur, who is ready to enthuse over or pay twice as much for his plates if he is assured that they carry their developers on their backs, is not the person who will take the trouble to prepare his printing paper, selecting its quality, surface, and preparation with the same loving care and thought that a painter spends on preparing his palette or selecting his brushes. For him it is the article that requires the least preparation; "stick it into a printing frame and let it automatically print and tone itself, don't cher know," that is his motto and ultima Thule of photographic progress.

And yet, surely, the production of our positives is worth a little care; they are the publication, so to speak, of our efforts, and appeal to the whole seeing world. They take us out of the mysteries of the dark room with its strange jargon and slang, incomprehensible to all save the initiated, they translate our negatives with their reversed lights and shades, like some mystic cryptogram of the old alchemists, into the vivid truthfulness of pictures not yet endowed with the glories of colour, but still capable of rivalling in their simple monotone the less true reproductions of the artist in black and white.

In appealing to the members of the Camera Club to revive the beautiful but lost art of silver printing, I believe I may find an audience who really take some pride in their work, and to whom trouble is a pleasure if it only brings them success.

And it is only to such workers that my words this evening are addressed, hoping that the record of my own labours in this direction may help to smooth the little rugosities that they may meet with, and explain failures, to discover the causes of which would take an isolated worker much time. Wisdom, like money, increases by circulation, and it is only by the ready and complete interchange of our individual experiences that we arrive at perfection. There is, I venture to affirm, hardly any great photographic advance whose commencement cannot be traced down to the result of an accident. With these few words of apology—for I shall have more failures to recount than successes to show—I will now commence the practical portion of my paper.

The preparation of paper for the reception of the silver image may be compared, in the power it affords one of shaping its behaviour to meet desired ends, to the scientific development of a dry plate, and therefore I am afraid that those photographic ghouls whose chief delight is the collection of intricate formulæ will be somewhat disappointed. Quantities of some sort I shall, of course, give, but they are at best but indications of the mean, from which intelligence will guide the way to the best results. When we remember that in a silver print there are at least three elements, each largely influencing the results, which results are again entirely varied by the character of the negative or the quality of the light, it must be at once evident that no hard-and-fast rule can be laid down. I mention these facts to attempt in some way to explain the great discordance that will be seen to exist in the various salting and exciting formulæ that are to be found in our text-books and journals.

Amongst the vast variety of papers, fabrics, and stuffs, I find it almost impossible to point out what can be best used for receiving the photographic image; practically nearly any sort of paper that is made from pure rags will be found suitable, the purer the paper the better the results. The examples I shall show to-night are chiefly on various brands of Whatman's heavy drawing paper, especially that variety known as *rough*. I have also used several of the hand-made Dutch papers, which are very suitable for some sorts of work. Messrs. Reeves & Son have to-day sent me up samples of Arnold's unbleached drawing papers. I have not as yet been able to try them, but, judging from their appearance and the

care exercised in their manufacture, they being quite free from chlorine, and therefore the anti-chlor hypo. I should say that they would be exactly the sort of paper one requires. It is manufactured in three varieties—the rough, not, and H.P.

The salt that is most generally used for printing is undoubtedly the chloride of silver. This salt is usually formed by adding a soluble chloride to a solution of nitrate of silver; chloride of silver is then formed, and a soluble nitrate of the base used is left in the liquid. Now let us form a little chloride of silver, wash it to free it from the soluble nitrates, and expose it to light on a slip of glass. We shall find that it will assume a greyish blue colour with a fair rapidity. If we now treat this discoloured salt with hyposulphite of soda, we shall find that it loses nearly all its colour, and is all but completely dissolved away. But now let us add a little organic matter, such as beer or gelatine or arrowroot, to the washed chloride, and again expose. We shall now find that the substance will darken, but, instead of turning of a purple colour, it will now assume a reddish tone, which is, if anything, heightened on the application of hypo, and not in any way destroyed.

We therefore make our first note, and that is, some organic substance should be added to the chloride of silver to form an image that will resist fixation.

Now, paper in itself contains an organic substance in the size, which is added to the cellulose to give it strength and firmness. The kind of size that is used in the preparation of different papers varies very much; foreign papers are prepared with resins, French papers often with arrowroot, whilst English makers use the common sorts of gelatine obtained by boiling hides and hoofs, the product being subsequently hardened by alum. All these different substances, combining with the silver, form chemical compounds acted on by light, but each giving under its influence differently coloured subsalts. For instance, starch or resin tends to give purplish tones, whilst gelatine and albumen give red or yellowish-red tones. Moreover, the quantity of size present varies very much, according to the make of the paper. Blotting papers are practically unsized, whereas some of the glazed varieties of surface paper are all size. But, as a general rule, most papers require a fresh addition of size to give them good printing qualities, the quantity to be added depending naturally on the quality of the paper used.

The sizing of the paper plays, moreover, another *rôle*, and that is, it tends to keep the light sensitive compound on the surface of the paper. It is quite clear that the visible image must be on the surface of the paper, because it is only the mere surface layer of colouration that is seen by reflected light, and therefore for this reason alone we should do well to add as much size as we conveniently can to our papers, short of giving the objectionable gloss or glaze that so characterises the common albumenised papers.

I find that a rough, porous paper, like Whatman's heavy rough-surface drawing papers, will take about twelve grains of gelatine to the ounce of solution without showing. This quantity should, however, be halved if one of the H.P. variety of this maker's papers be employed, and some hard bank posts and cartridges require still less. The worker must himself vary these quantities to suit the variety of paper he is using, remembering that the sizing fulfils two *rôles*—it serves to form an organic silver salt insoluble in hypo, and, secondly, to retain the same on the surface of the paper. The generality of papers that one is likely to use for printing already contain a fair amount of size in their composition, and therefore the sizing and salting baths are applied at the same time in one operation. But should the paper be found to be very porous, say plate paper, it may be necessary to give it a preliminary sizing, which should be done by immersing the sheets of paper bodily in a three per cent. bath of gelatine, or a two per cent. bath of arrowroot; to this, in warm weather, a little alum may be added, say the same quantity, to harden the size and stop up all the pores of the paper. The paper should be dipped twice, allowing it to nearly dry between each operation, the paper being hung up to dry the reverse way after the second operation. This is to equalise the coating, as otherwise the lower end would be richer in gelatine than the upper end, for the heavy liquid naturally gravitates downwards.

The quality of gelatine used is not very important, providing that it be free from colour, the ordinary edible variety being perfectly suitable. The quantity required should be put into clean water to soak and swell. When this has taken place, which can be easily told by its appearance, it losing its horny character and becoming semi-transparent, the water should be poured off and hot added. It should then be heated till the gelatine all dissolves, being well stirred during this operation, and in this state it is ready for use. The paper may be at once dipped in the warm gelatine; in fact, this is advisable, as if the solution is nearly cold, and is just on the point of becoming a jelly again, the cold paper will cause it to dry in gelatinous streaks, instead of forming an even coating. For this reason it is advisable, in cold weather, to dry the paper in front of a fire or in a warm room, so that the excess of size may freely drop off.

If arrowroot be used, the preparation is slightly different; the arrowroot should be first mixed into a stiff paste with cold water, and then hot water added with constant stirring, and the whole brought up to the boil. The arrowroot will then lose its milky appearance and become clear and glutinous. In this state it is ready for use.

Although I give directions for the preliminary sizing of paper, in case the want of it my arise, still, as a matter of fact, nine out of ten samples of paper will not require it at all, and the sizing that they require to keep the image on the surface may be applied at the same time as the soluble chloride with which they are salted.

The object of the addition of this chloride is to form, by double decomposition with the nitrate of silver, silver chloride on the surface of the paper. We will resort to experiment again to ascertain the effect of this salting. We will now take two slips of paper, and soak the one in barium chloride and the other in nitrate of silver, when they are dry we will treat the salted one with silver nitrate, and the nitrated one with barium chloride. We shall then form on each of them silver chloride, but with the following differerence—the one that was salted first will have silver in excess, that is to say, that after all the barium chloride has been formed into silver chloride there will still remain on its surface a certain amount of silver nitrate unaltered. Whereas, on the second slip, the opposite will obtain, that is to say, unconverted barium chloride will be in excess. Now let us expose these two strips of paper. We shall find that the second strip with the excess of chloride will begin to darken slightly before the other; but the one with nitrate in excess will soon begin, and once begun, will rapidly catch up the first, and whilst the first slip never attains beyond a slight purplish discolouration, the other one will darken, through red, reddish purple, almost, under some conditions, to black. We at once learn, then, that the nitrate of silver must be in excess, and this is the reason why the chloride or salting mixture, as it is called, is applied to the paper before it is excited in the nitrate of silver bath.

LYONEL CLARK.

(*To be continued.*)

Foreign Notes and News.

IT appears that there is a photographer in the State of Buffalo who has adopted an original method—if anything of the kind can count as original across the Atlantic—of pushing his business. Every morning he consults the newspapers to discover if any accidents, explosions, collisions, &c., have taken place. He at once betakes himself to the scene of the disaster and proceeds to photograph the place. It is said that he always succeeds in selling plenty of the views to the *friends* of the injured parties!

BALTIS gives the following receipt for obtaining specially clear negatives. Medium plates that have not been too long exposed are developed with hydroquinone, to which a one to two per cent. solution of caustic potash has been added. The hydroquinone developer is composed of equal portions of the following:—

SOLUTION I.

Hydroquinone	10 grammes.
Sodium sulphite	40 ,,
Water	400 c.c.

SOLUTION II.

Potash	40 grammes.
Water	400 c.c.

The fixing takes place in an acid fixing bath. To avoid frilling, a bath of common salt may be used before the fixing takes place.

ANOTHER of the many competitions with regard to things photographic, in promoting which our German contemporaries appear to take so much pleasure, has just been arranged for by the *Deutsche Photographen Zeitung*. The essays for which prizes are on this occasion offered comprise the following five subjects:—(1) The preparation of chloride of silver-gelatine emulsion. (2) The preparation of micro-photographs. (3) The best methods of selecting lenses for instantaneous work. (4) The causes of solarisation, and the best means of obviating it. (5) The reasons for the scant popularity enjoyed by stereoscopic views, and the best means of improving their sale.

THIS is a fairly wide choice of subject-matter, but as the length of each paper is to be from about six to twelve sides of the *Deutsche Photographen*

Zeitung, and as the prize offered for each is only a matter of twenty marks (1*l.*), we can hardly expect that the very highest talent is likely to take part in our contemporary's competition. One is inclined to wonder at what rate ordinary contributors are remunerated when 2*s.* per page is awarded to "prize" papers.

Among the many new photographic societies that are constantly coming into existence, we have to chronicle the formation of another in Amsterdam, under the presidency of M. Wilhelm Ivens, of Nimwegen. It is unnecessary to state that we wish the new undertaking every success.

The *Wochenblatt* devotes some space to an account of the recently floated Automatic Photograph Company. After pointing out that to bring in even five per cent. of the expected profit, 30,000 persons daily would have to submit themselves to operation, it states without further ado that "in Germany not a soul would spend a halfpenny on such a humbug." This may be true, perhaps; but will they spend many halfpence here?

Liesegang has recently been making experiments with reference to the best composition of combined toning and fixing baths. He recommends the following:—

Fixing soda	1000 grammes.
Alum	400 ,,
Nitrate of lead	10 ,,
Boiling water	2 litres.

After two days have elapsed two more litres of boiling water are added and filtered. Eight hundred grammes of ammonium sulphocyanide are then dissolved in six litres of water, the two solutions mixed, and 50–100 c.c. of chloride of gold solution (one per cent.) added. Acidulation with tartaric acid hastens the toning process considerably, but, unfortunately, causes the whites to suffer. If the gold chloride be replaced by potassium-platino-chloride a good platinum fixing bath may be obtained. The addition of acetate, phosphate, or benzoate of soda weakens the action, but gives warmer tones.

The hardening of chloride of silver gelatine by means of gelatine is not, according to the same authority, to be recommended, aristo paper so treated becoming quite brown after a few days.

Like other non-technical papers the *Petit Journal* occasionally speculates on the credulity of its readers by the publication of a quasi-scientific farrago of absurdities. It has recently been treating its readers to a description of this nature of a supposed new invention entitled the "Photoscope." This marvellous instrument, according to the account, is capable of transmitting the image of a person, including all changes of posture and expression, to any desired distance. The apparatus is stated to be modelled on the telephone, the vibrating disc of the latter being replaced by a gelatine plate, in connexion with which are some peculiarly wound wires of "the rare metal" selenium, which transforms the luminous vibrations into electricity, and so transmits them to a second apparatus, where they are reconverted into light!

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8193.—"Improvement in Photography." W. S. Wardle.—*Dated May* 27, 1890.

No. 8210.—"Improvements in Photographic Camera Stands." H. R. Yeo and F. J. Piper.—*Dated May* 27, 1890.

No. 8214.—"New or Improved Means for Developing Photographic Films in Actinic Light." M. A. Wier.—*Dated May* 27, 1890.

No. 8372.—"Improvements in the Manner of Changing the Plates and Bringing them into the Proper Position for Exposure in Hand or Detective Cameras." H. R. Dines.—*Dated May* 30, 1890.

No. 8391.—"Improvements in Photographic Apparatus." T. Hudson.—*Dated May* 30, 1890.

No. 8446.—"Improvements in Hand or Detective Photographic Cameras." J. Pitt and W. Hudson.—*Dated May* 31, 1890.

1889.

SPECIFICATIONS PUBLISHED.

No. 10,131.—"Photographs." Greene and Evans.—Price 8*d.*

1890.

No. 5046.—"Photographic Camera." Luce.—Price 6*d.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 9	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 10	Great Britain	5A, Pall Mall East.
,, 10	Derby	Society's Rooms, Derwent-bldings.
,, 10	Bradford	50, Godwin-street.
,, 10	Manchester Amateur	Manchester Athenæum.
,, 10	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 11	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 12	Birkenhead	Hamilton Rooms, Birkenhead.
,, 12	Manchester Photo. Society	36, George-street.
,, 12	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

May 30,—Mr. T. E. Freshwater in the chair.

A letter from Mr. F. York was read, with an enclosure from Mr. C. Pancoast, of the United States, in which the latter expressed himself to the effect that the explanation offered at a former meeting of the Association of the cause of the incrustation which had occurred on the cover glasses of some of his lantern slides was the correct one. Supporting that explanation (which was that the incrustation was due to the effect of moisture upon a glass containing excess of alkali), he found that in cases where he had used old negative glass the incrustation had not taken place, but that the defect had shown itself when glass known as "French crystal" was employed.

Mr. C. H. Cooke showed some plates illustrating isochromatic effects. They had been exposed on a group of flowers—yellow and purple pansies. One was an ordinary plate without treatment, and in this the yellow came very dark. A second plate had been bathed with a solution of erythrosine in the proportion of one-eighth of a grain to twenty ounces. Another plate was similarly treated, but with the addition of ammonia as directed by Tailfer and Clayton. The two latter plates showed strong orthochromatic effects, but that produced without ammonia was generally preferred, although some members considered the orthochromatic effect to be rather more powerful in the ammonia plate.

Mr. W. E. Debenham said that any demonstration showing that ammonia was not essential to success, as it was stated to be in the Tailfer and Clayton patent, was satisfactory, as those who might be deterred from using erythrosine and ammonia in consequence of that patent could work very well with erythrosine without the ammonia.

Mr. P. Everett said that Mr. Gotz had some very interesting specimens of orthochromatic work with and without yellow screens. He also showed a screen of yellow glass as supplied by Mr. Gotz, very thin, and ground and polished parallel.

Mr. W. Bedford said that he had found the addition of ammonia advantageous with some kinds of erythrosine, but not with the best samples. If chloride were used in an emulsion, eosine of inferior quality might be employed. Iodide had, he thought, no influence one way or the other.

Mr. J. S. Teape showed a print on the iridium paper, samples of which had been distributed at the previous meeting. The prints had gone so very light in the toning that in the one shown the whites were before toning as dark as the coat was afterwards.

Mr. Debenham inquired how long before use the toning bath had been mixed.

Mr. Teape replied about ten minutes.

Mr. Debenham said that the bath evidently required longer time to ripen. Generally speaking salted paper silver prints (which these appeared to be) toned more readily than albumen paper, and an older bath could be used for them.

Mr. Everett said that the iridium paper printed so much more quickly than silver paper—in about half the time.

Mr. Debenham replied that unless a strict comparative test were made such statements as to speed of printing could not be considered as final. It had been the custom amongst the producers of sensitised and other papers to claim greater rapidity of printing for each particular kind.

Mr. F. A. Bridge remembered to have had a paper for which it was claimed that it printed in one-third the time of ordinary albumen paper; he had found, however, that it was no quicker, but, if anything, slower.

The next outing was announced for Saturday, June 14, at Epping Forest. Meet at Hall End at from three to half-past three.

HACKNEY PHOTOGRAPHIC SOCIETY.

May 29,—Dr. Roland Smith in the chair.

Mr. E. J. Wall sent a paper on *Photographic Chemistry*. He regretted he could not attend through domestic bereavement. Mr. Wall gave an interesting account of the manufacture of the present dry plates, illustrating the methods by which degrees of sensitiveness are obtained. He mentioned every process used at the present day, and touched upon the chemicals employed in each.

At the close a short discussion took place.

Several books were presented to the library of the Society, and an album was promised by Mr. John Reynolds.

Mr. Dean exhibited a 1*s.* stereoscope made by Pumphrey.

The second excursion of the season will take place to-morrow, the 7th inst., to Wanstead.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The fifth ordinary meeting of the twenty-seventh session was held on Thursday evening last, May 29, at the Association's Club Rooms, 3, Lord-street. Mr. Paul Lange presided, and there was a crowded attendance of members.

The following gentlemen were elected members:—Messrs. R. Robinson, F. Hope Jones, Edgar Storey, R. L. Rawlins, H. Bebbington, and James Nelson, jun.

Mr. William Tomkinson reported on the enjoyable and successful excursion to Barton on May 3, when about forty members took part in photographing this picturesque Cheshire village, and one hundred and sixty-three pictures were taken.

Messrs. J. W. Turner & Co. explained their patent Simplissimus hand camera, which attracted much attention.

Mr. J. Macdonald Bell also exhibited a number of photographic novelties, including a patent plate rocker wound up and set going with a clockwork arrangement.

Mr. John Noakes handed round two beautiful 15 × 12 mounted prints in platinotype and Obernetter matt surface; subject, *Making Cock Hay*.

The President announced the next excursion, which would be to Bennett and Crockford on Saturday, June 7; also the next practical demonstration which is to take place at the Association Club Rooms on Wednesday, June 11, the subject to be treated being: *The Intensification and Reduction of Negatives*; demonstrator, Mr. J. L. MacKail. After this the series will be discontinued until September, when it will recommence with *Lantern Slide Making*.

The Eastman Company's representative, Mr. H. M. Sweet, then exhibited and explained their Kodak (No. 4) 5 × 4 camera, and promised to come to the next meeting, on June 13 and give a practical demonstration with their films.

The evening concluded with the exhibition of the Boston (U. S. A.) new set, entitled *The White Mountains of New Hampshire*, prepared by members of the Boston Camera Club, and loaned to the Liverpool Association in trust for exhibition to any Photographic Society in the United Kingdom on application to Mr. E. M. Tunstall, the Hon. Secretary of the Liverpool Association.

Mr. Paul Lange read the descriptive lecture which accompanies this set, mounted in type on large cards, with the photograph of each slide on the back, so that the lecturer is able to keep a check on the lanternist by referring to the back of his card.

The slides were beautifully shown by the aid of Messrs. Archer's new powerful oxy-hydrogen limelight lantern.

It may be interesting to notice that our American friends have had their slides made by the wet collodion process, and they are in consequence far superior to the former ones on *Boston*. Judging from the frequent applause with which the appearance of the slides on the screen was greeted, and the interest display ed in the arrangement of the typescript, there is a great field in store for our photographic friends to enjoy the sight of grand American scenery without the trouble of crossing the Atlantic.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE ETHICS OF PHOTOGRAPHY.

To the Editor.

Sir,—In the paper on this subject in last week's Journal Mr. Traill Taylor has omitted one point which I think should be mentioned.

It is this: Some professional photographers send to the colourist a portrait printed in silver, and have artistic work put upon it, for which they charge five, ten, or even twenty guineas. In a few years the photograph fades and leaves the picture a hideous, unsightly piece of daubing patchwork, instead of the beautiful thing it was when sent home. I speak from absolute knowledge of such having been done, and can send you a wreck of this class for examination if you choose.

This I consider a piece of downright dishonesty, as the photographer must have known that the pigments, for applying which such a heavy charge was made, must long outlast the fugitive photograph. I am, yours, &c.,

Rev. B. Johnson.

Glasgow, June 2, 1890.

[This we know used to be done at one time, but that was when the art was young, and no means of producing permanent prints were known. At present we believe that portrait photographers, alike in their customers' interest and for their own credit, put no expensive colouring on portraits that are not produced in permanent materials.—Ed.]

FORMATION OF A CLUB AT KIMBERLEY.

To the Editor.

Sir,—I am pleased to inform you that a camera club has been started out here, as per following extract from the *Diamond Fields' Advertiser*, which please insert in your next issue:—

"Kimberley Camera Club.

"A meeting of the principal amateur photographers was held last night at the Grosvenor Hotel, there being present Messrs. Macfarlane (in the chair), Tramble, Harrison, Chappell, Wallace, Aiblett, Harden, Pringle, Skead, Moriarty, Titmas, Bousfield, Gassen, and Rev. Ogle.

"The Chairman, in a few remarks, explained the object of the meeting, which was to form a club for the mutual improvement of members in photography. He had much pleasure in stating that eighteen members had already been enrolled.

"The following gentlemen were elected office bearers:—*President*: Rev. Ogle.—*Vice President*: Mr. M. Macfarlane.—*Hon. Secretary*: Mr. F. O. Wallace.—*Committee*: Messrs. F. Skead, T. Titmas, H. Moriarty, and J. T. Harrison.

"It was resolved that another meeting be held in a fortnight's time for the purpose of drawing up a set of rules.

"A vote of thanks to the Chairman terminated the business."

I am, yours, &c.,

F. O. Wallace, *Hon. Secretary, Kimberley Camera Club.*

Kimberley, May 10, 1890.

AN IMPROMPTU FOCUSSING SCREEN.

To the Editor.

Sir,—Every one knows the inconvenience of breaking a focussing screen when away on a tour, often perhaps in a remote spot where it may not easily be replaced.

A very simple way out of the difficulty is to take an ordinary dry plate of the same size as the broken screen, bring it out into the daylight, and fog it evenly; then place it in the developer until a pretty thick fog presents itself, then remove it, wash and fix in the usual way; you then have a fine, grainless screen equal to, if not superseding, ground glass. The whole of the above operation may be performed in daylight.—I am, yours, &c.,

William F. Foster.

Fisherton-street, Salisbury, June 2, 1890.

THE RECENT LAWSUIT.

To the Editor.

Sir,—As one who also carefully watched the trial of the case Vandyke *versus* Marion, and thus was enabled to form an opinion as to the cause of the streaks, &c., complained of, I would like to draw attention to one or two phases of the question, more especially as it is one of such great importance and interest to photographers generally.

I notice in an editorial paragraph of the Journal, May 23, that the whole and sole cause of fading and streaks can be entirely attributed to the "fixing" process to which the photographs were subjected. However much mucilage, phosphate, or other substance the young lady's saliva may contain, I am not prepared to say; but that this is the cause of the fading of photographs in general, or of those in dispute in particular, I should feel inclined to deny. According to the evidence given in the case, that for many years *previous* to this particular batch of mounts the same method of mounting and licking was in practice, yet the pictures, as shown by the proof books of the plaintiff, showed no signs of the streakiness complained of in any single instance.

It is an easy matter to advance a theory that saliva, or lactic acid, or any other substance will cause the defect, but such a theory, to hold good, should be at any rate consistent with the facts as brought forward. As an old photographer, totally unconnected with the case, I could come to no other conclusion than that the cause of the streakiness complained of was due to either hypo or other sulphur compound in the mount itself, and that starch, lactic acid, or saliva are not to be blamed, and I reason from the following premises:—

1. Whenever the photograph was isolated from the mount by being mounted upon another photograph, no case of fading or streakiness occurred.

2. Whenever the photograph was not so protected, but was mounted direct upon the card, the fault occurs in almost every instance.

3. The streaks follow the direction of the brush in spreading the paste. Everybody knows that a glutinous substance like starch, spread with a stiff brush, is not evenly distributed over the paper, but lays in streaks of more or less thickness. It follows, therefore, that if a deleterious, soluble substance is in the mount, solution more or less takes place by the wet starch in direct ratio to the amount of moisture present, and to time occupied in drying, and such substance by this means is brought into direct contact with the photograph itself.

4. The evidence of the professional analysts, Messrs. Davies and Thompson, showed the presence of such compound, presumably sulphite, by the fact that the mounts in dispute required a six times stronger solution of iodine to produce the characteristic blue reaction than did any other sample of cards that were tested.

5. Mr. Justice Lawrance in summing up strongly urged upon the jury the evidence produced, that neither before nor since the disputed consignment of cards, even upon Messrs. Marion's own make, did such fault occur.

From these facts I could come to no other conclusion but that neither starch, lactic acid, nor licking young ladies, were at all to blame.—I am, yours, &c.,

E. Banks.

Erratum.—In Mr. Cockburn's letter, on page 351, *for* "rosine" *read* "eosine."

North Middlesex Photographic Club.—On Monday next, June 9, Mr C. J. Clarke will give a lecture on *Photographic Optics*. Visitors invited.

The Photographic Club.—Subject for discussion, Wednesday, June 11, *Paintings as Art Examples to Photographers*; June 18, *Mounting and Finishing Photographs*.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, "Facile" or other detective camera; will exchange whole-plate camera, lens, and tripod.—Address, F. Day, Photographer, Monmouth.

Will exchange whole-plate bellows-body camera and ash sliding tripod, six feet high, for 10×12 wide-angle lens.—Address, J. L. Hart, Ashbourne.

Marshall's patent pneumatic drop shutter, half-plate, cost 25s., in perfect order, in exchange for interior background or studio accessory.—Address, W. Hare, Lind-road, Sutton, Surrey.

Wanted, a detective camera (Swinden & Earp preferred) in exchange for half-plate long-bellows camera and rapid rectilinear lens, Iris diaphragm, shutter, three double backs, and tripod, good condition, cost over 8*l.*—Address, W. Peck, 5, Enfield-terrace, Seacombe.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. Greenwood & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

T. Kippling.—Thanks.

W. J. Stillman.—Our inquiry has been totally unsuccessful.

W. G.—There is no method of making an alcoholic solution of indiarubber.

Geo. Gale.—Do not employ albumen for mounting prints; it is lacking in body, and, besides, it contains sulphur.

Old Prof.—The competition is doubtless unfair, but there does not appear to us to be any means by which it can be checked.

R. R. K.—The longitudinal marks on the prints are due to scratches on the burnishing bar. Remove the scratches by repolishing the bar.

Leno.—You must apply to the executors under the will for the debt. The widow may have nothing to do with the settlement of the accounts.

J. E. Gubbins.—The light in Holland is practically similar to that of this country. So, at any rate, says a friend who has often been there with a camera.

R. Blake.—If you have not registered the copyright in the picture you cannot proceed against the pirates. The proceeding does not redound to the credit of the firm.

Peter.—There is no English edition of the work. It is doubtful if it would prove a commercial success if it were translated into English now. More modern works have taken its place.

S. E. Hale.—We, of course, are not in the "secret" of the "preparation of the chemicals" for producing the ferrotype portraits automatically, therefore cannot inform you wherein it consists.

Holborn.—The vignetting of carbon prints on opal glass is often further softened, after the print is dried, by rubbing it down with an abrasive substance such as pumice powder, or with very fine glass paper.

W. V. Morris.—For stereoscopic work pure and simple there is no necessity for the plate being larger than 6×3½, but any size slightly over this will do. The lenses may be five or six inches focus, both for the camera and the stereoscope.

X. X. X.—Long soaking of prints in water is a great mistake. Prints ought to be as well washed in four or five hours, with attention, as they are with twenty-four hours' soaking. Such prints will be more brilliant and probably more permanent.

Tyro.—If you cannot succeed with Lancaster's apparatus you may depend upon the fault being with yourself and not with the camera or lens, especially the latter, which, after examination, we return to you as directed. We tried it, and would not desire a better instrument.

Bromide.—The yellow patches on the enlargement are caused by imperfect fixation. Either the pictures were allowed to stick together while in the fixing bath or the solution was too weak. It will be better to make a fresh enlargement at once than to attempt to remove the stains by any treatment now.

W. S. C. says: "I thinned some enamelling collodion which had become thick by use with methylated spirit, and now it dries dead like ground glass. Can you tell the reason?"—We can only surmise that the spirit contained a resin; in fact, was what is known as methylated finish. This would fully account for the appearance.

A. W. R.—Clean the corroded or oxidised oil from the working parts of the shutter with benzole and, when dry, lubricate again either with watchmakers' oil or pure almond oil. Much of the so-called olive oil is largely adulterated with cotton and other oils, which renders it totally unfit as a lubricant for delicate mechanism, as you have proved.

Missionary writes: "Can you favour me with hints as to photography in Central Africa? What precautions are necessary? What make of plates stands the climate best? What developer? Would celluloid films on roller slide, such as Kodak, stand the climate, as I fancy changing plates would be a difficulty while marching, and lightness of baggage an important consideration? Any information on this subject would be thankfully received."—Perhaps some reader who has had experience in the [illegible] will favour our correspondent with the desired information.

C. E. (Brighton.)—The lantern slides in question are all produced by the wet collodion process. By far the larger proportion of commercial slides are made by that process. Few professional slide makers employ gelatine plates. Unless you are *au fait* with the working of wet collodion you will obtain better results on the dry plates specially prepared for transparencies.

Amateur (Paignton).—The prints are to hand, and they are very nice pictures indeed. We doubt, however, if you will succeed in selling the negatives, not on account of their quality, but from the fact that the scenes depicted have no real interest. Pretty views of country lanes have very little commercial value amongst publishers. Messrs. Friths' address is Reigate, and Poulton & Sons', Lee.

Haysel.—A useful cement for attaching metal to wood is sold, although for another purpose, in the shops of dealers in leather under the name of Prout's glue. It seems to be a mixture of pitch, guttapercha, oil, and other substances, and sells at 1*d.* a stick. The metal should be made sufficiently warm to fuse the cement when applied to it. Do not allow it to get on your fingers, as it is very adhesive.

C. Palmer.—As you have unlimited space, we advise design No. 3; but instead of making the studio so square add five feet to the length and take three feet off the width. Sixteen feet will be wide enough for all purposes. The proportions at each end to be opaque will do quite well. Green or dark blue blinds will be best. At the sides curtains will be found more convenient than blinds working on rollers.

Poet.—From the appearance of the platinum print we judge that the paper had been exposed to moisture before it was printed. The platinotype process will yield quite as brilliant prints as bromide paper, if not more brilliant, provided the negative be vigorous; but if the negative be poor and flat then bromide paper will have the advantage. With the platinotype process a vigorous negative is essential.

G. Benyon says: "I have just had some carbon prints made by double transfer from my own negatives for colouring, but I cannot get the colour (water-colour) to take. The surface of the paper rejects it as if it were greasy. I have treated the pictures the same as I do albumen prints when they are repellant, but without success. Can you suggest anything?"—The difficulty is caused by some of the wax with which the transfer paper was treated adhering to the prints. If they are rubbed over with benzole the difficulty will be removed.

B. Hill.—A simple microscopic lens of very great magnifying power may be made by fusing the end of a thread of glass in a Bunsen flame until it assumes a spherical form; allow it to cool, and then place it in a piece of brass the thickness of a sixpence in which has been drilled a very small hole having a countersink of a size sufficient to contain the glass globule. A lens of this kind will *easily* resolve the dust from a moth's wing into beautiful feathers, and it makes a passable substitute for a proper microscope when such is difficult of access.

G. H. A. says: "1. I have got a three-gallon tin can fitted with a brass tap; could I keep hypo in it without injuring my plates for fixing purposes?—2. When enlarging I have to cover up my ruby window, as I am unable to see the enlarged photograph on the screen; would it affect the enlargement on bromide paper when exposed to daylight through the camera if at the same time the bromide paper was flooded with the ruby light from the window?"—In reply: 1. A tin vessel is not suitable for storing a solution of hyposulphite of soda in.—2. The ruby light will do no harm.

G. W. S. writes as follows: "On the 9th ult. I answered an advertisement, and sent my photograph (asked for), but received no reply. I again wrote the firm, referring them to my former letter, and saying if they were suited would they kindly return photographs. Still no notice was taken, so on Saturday last I wrote the enclosed letter, and this morning I received it back with the very 'curt' reply on other side. You, I think, will agree that employers are more able to afford stamps than assistants, and more especially ought they to return the photographs, when it is at their (employers') request that photographs are to be sent. At one time I used to send stamped envelopes for return, but I have found through experience that it does not ensure a reply any the more. It is not the value of the photographs so much as the inconvenience it puts one to, when wishing to forward them elsewhere. I send you the letter to show you the reply, in order that you may judge for yourself the *politesse* of the firm."—We quote the reply *verbatim*:—"You and others should send stamped addressed envelopes for return. We had over seventy applications and don't keep clerks." As our correspondent does not wish his name published we withhold the name and address of the firm who has acted so meanly. We have, however, made a note of it.

Photographic Society of Great Britain.—The last meeting of the Session will be held at 5A, Pall Mall East, on Tuesday, June 10, at eight p.m., when papers will be read on *The Estimation of the Efficacy of Plate Backing*, by Mr. W. E. Debenham; on *The Staining and Clearing of Gelatine Films*, by Mr. Chapman Jones, F.I.C., F.C.S.; and on *Photographing the Induction Spark*, by Sir H. Trueman Wood, M.A.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1571. Vol. XXXVII.—JUNE 13, 1890.

MOTTLINGS.

Mr. E. Dunmore last week struck a note which, singularly enough, had not before been heard, though it is one of great importance. It is, however, not difficult to divine the reason for the absence of any reference, or at least any full reference, to the class of markings he describes, which are by no means uncommon in the practice of modern photography. These appearances are as varied in their character as in their origin; in one worker's practice they may be seen at times more frequently than is at all comfortable, and at others they are absent for a considerable period. Some photographers never experience them, while others again can trace them in a more or less distinct form through the large proportion of their negatives. The reason of the irregularity of appearance and disappearance lies simply in the varying modes in which the plate is passed through its different stages of growth—from exposure in the camera to putting in the printing frame.

Let us first take a kind of mottling which most workers have experienced from time to time before discovering its cause, sometimes without ever discovering it; we refer to the appearance resembling the wave marks left by the receding tide upon a sandy shore, not perhaps quite so regular, but still sufficiently near this description to be recognised by all who have seen them. They are caused by permitting the plate to rest in the developing solution for too great a length of time without disturbing.

It is very difficult to imagine how such a cause could so act; but it is nevertheless true that unless a dish be moved to and fro at intervals the negative is bound to show mottlings. We have been credibly informed, though we have not ourselves tried the experiment, that the same effect is produced in a quiescent developer, even when the plate is developed film downwards. Photographers are always recommended to keep the developing dish moving (though we ourselves deprecate a perpetual see-saw), and hence, as a matter of habit, generally do so treat the dish containing the negative under treatment; but it must occasionally happen, even with careful workers, that a plate gets insufficient rocking, then the wave marks appear, and very frequently their cause is not discovered. We imagine that plate makers could tell a story of plates returned as imperfect by their customers on this very account. Another cause of mottling is to be found in the plan of adding an extra quantity of one or other of the constituents of the developer, especially alkali, to the dish during the progress of development without removing the plate first; indeed, we may say that even when the plate is removed mottling will ensue if a little time is not allowed to elapse before returning the plate to the liquid; we have seen many plates so spoiled.

These mottlings may, if present, be seen in most kinds of subjects: but it can well be imagined that in landscapes with trees, portraits with fancy backgrounds, and such kinds of pictures, where there is little unbroken smoothness of surface, mottlings may be present, and yet remain undetected, unless very strongly marked.

But at the point of having brought our negative to the completion of development, the chief danger is to be apprehended. In the processes of washing and fixing arise most of the mottlings least understood. Improper washing is the most prolific source of all. Two or three or more negatives are being developed at the same time, and perhaps will arrive at the density judged correct with sufficient interval between them for each to be well washed. Usually, then, no harm will happen; but let the plates all need washing at once. Often there is a single tap only in the dark room; a rinse under it is given to each, which is put up for a moment to drain, and then perhaps washed again, or put direct into the fixing. Markings, then, are almost certain to follow. There is, however, no need for haste or carelessness to ensure the presence of markings at this stage, for we have seen them crop up under the hands of the most experienced. But there is one golden fact which, if all would lay hold of, or, at any rate, bear always in mind at this stage, would enable any one to be always free of mottlings of this the most common type of all. It is that the developing action, and of course, *pari passu*, the intensifying action, may continue in a plate even, although it be completely immersed in water. It needs no argument then to show that unless the developer is removed quickly and evenly, mottlings are a necessity of the case. What, however, is the usual plan? A newly developed plate is put under a tap, the water left running upon it for an indefinite time, while, perhaps, the fixing solution is being put together. The stream of water quickly washes away the developer from the spot whereon it impinges, and less quickly in an uneven circle round it; consequence, circles of irregularly increasing density, with so much weaker a mark in the centre sometimes as to look like a stain.

It may be argued that when a rose is used, this objection cannot be urged. Far from the truth. We can point to dozens of negatives with numerous mottlings of a transparent character over the great part of their area, each mottling being to our knowledge caused by one of the numerous jets of the rose they were washed under. We are confident that we have here traced the vast majority of cases of mottling to their source. The same reasoning shows why streaks in the direction of the plate are seen; the plate is partially washed and put up to drain before fixing, and meanwhile intensifies in streaks. The stains may come to the plate during fixing from precisely

the same cause, when the developer is not quite removed beforehand. Finally, grooved troughs for holding solutions—fixing and other—have much to answer for. In large establishments they are almost a necessity, but unless great care is taken in waving the plate to and fro while first placing them in the trough, there is grave danger of mottles, both upright and wavy.

But if our readers troubled with mottlings will bear in mind always the golden knowledge we referred to, they will become a thing of the past.

IODIDE OF SILVER IN EMULSION.

A REMARK made in an article last week with regard to the effect of iodide on the sensitiveness of gelatine emulsions has elicited one or two inquiries, from which we are pleased to learn that there are still left amongst us a few amateurs who go to the trouble of preparing their own plates. In replying to our querists we do so publicly, in the hope and belief that what we have to say may be of use to others besides those who have personally addressed us.

We expressed the view that iodide of silver does not necessarily lower the sensitiveness of an emulsion if *properly* introduced, though we are quite willing to admit that it may, and frequently does, produce that effect; and what we are now asked to explain is, How is it to be used to the best advantage?

It is not necessary to revert in detail to the strong discussion that took place eight or nine years ago on the subject, but it may be mentioned in passing that very opposite opinions were expressed by some of the leading experimentalists of the period, and it is impossible to say that any definite conclusion was arrived at. Possibly the same opinions prevail now as then, and our present remarks must be, therefore, taken as expressing our own views.

It is well known that iodide of silver, though the most sensitive of the silver haloids under wet plate conditions, is but little amenable to alkaline development, or, in other words, is scarcely affected by the normal solutions applied to bromide films. This fact at once suggests the probability of a retarding action when iodide is introduced, but, as was hinted last week, much depends upon the method adopted. If a plain iodide of silver emulsion be made, and subsequently mixed with one of plain bromide, the effect is tantamount to the introduction into the latter of so much inert material, inasmuch as, being unaffected by the ordinary strength of developer, its only function is to dilute the actual working strength; in fact, in order to produce an image of equivalent printing density, it is necessary to give an exposure with such a bromo-iodide film proportionately longer than would be necessary with the simple bromide emulsion.

It may be added that though inert so far as development is concerned, the silver iodide formed in this manner retains its objectionable feature, namely, its slower solubility in the fixing bath, and all that can be claimed for such a preparation is that it may form a good slow plate for special purposes.

When, however, the iodide of silver is formed in the presence of and simultaneously with the bromide, the whole character of the emulsion appears to be changed, and there is every warrant to suppose, as has been suggested, though there is no absolute proof, that a definite compound is formed between the bromide and the iodide which possesses characteristics altogether distinct from those exhibited by the individual constituents.

There are various methods of performing the mixture, perhaps the one in most general use being to dissolve the soluble bromides and iodides together, and to add these to the gelatine before sensitising. This plan gives a far greater degree of sensitiveness than is obtained by mixing two separately made emulsions; but it has the disadvantage that unless great care be observed a large proportion of the iodide is precipitated in such a state of coarseness as to be of no practical use. A variation from this method consists in forming a plain bromide emulsion, and after the greater portion of the "cooking" or emulsification has taken place introducing the soluble iodide, which displaces its equivalent of bromine and forms iodide of silver in a finer state of division than by the first-mentioned method. At the same time, however, the same degree of sensitiveness is not attained, which may perhaps be ascribed to two separate causes. Not only is there not the same opportunity of the formation of the supposed double salt, but the emulsion must necessarily contain a far larger excess of soluble haloid.

The best method, in our own experience, not only for sensitiveness, but also for quality of the image, is to add the soluble iodide to the solution of silver that is to be employed in sensitising, the latter being, of course, in a highly concentrated condition. Owing to the solubility of silver iodide in strong solution of silver nitrate, it becomes partly emulsified under these conditions, and a finer state of division is promoted by adding a very small quantity of gelatine to the solution; at the same time, the excess of silver nitrate tends to increased sensitiveness in precisely the same manner as in the wet collodion process.

The soluble bromide having been dissolved with the gelatine (or such portion of it as is to be used during emulsification) in a separate vessel, the iodised silver solution is stirred in and the emulsion completed, and the result will be the highest combination of sensitiveness and quality.

It must be understood, however, that under any circumstances the proportion of iodide to bromide must be small.

THE programme of proceedings at the Photographic Convention in Chester, as given in outline in a letter from Mr. Briginshaw on another page, is attractive. There are quite a variety of papers for the evenings, and no lack of excursions during the day. The Mayor of Chester is to open the proceedings at a *conversazione* on the Monday evening (the 23rd inst.) of Convention week. By that time it is expected that the majority of the members will have arrived, which, if they leave their homes in the forenoon, can easily be effected. The securing of lodgings at reasonable rates, and without entailing difficulty of search, has been seen to by the local Committee. Those specially interested will doubtless send to the Hon. Secretary for a detailed programme.

THE City Photographic Exhibition is now a thing of the past. Notwithstanding that it was got up on a very short notice, its success has exceeded the most sanguine expectations of its promoters. It was a trade exhibition, but by far the larger proportion of the visitors were amateurs. There is nothing in this to be surprised at, seeing that there are proportionately more amateur photographers amongst "City men" than perhaps any other portion of the community. Generally they are *bonâ fide* amateurs—enthusiasts in their work, and do not send their plates to professionals to be developed and printed from, as is done by those so-called amateurs who only affect photography because it is fashionable just now.

THE locality for the exhibition was well chosen, as the City is readily accessible from everywhere. With City amateurs time is of

value, and when they see the thing they require they order at once. In a commercial sense, we are informed, the exhibitors are well satisfied with the result of the enterprise, especially those who made a feature of detective cameras, which apparently are in still larger demand. More orders, we are told, were placed for them than for any other kind of apparatus.

Owing to its great success there is every probability that the exhibition will be repeated next year, when it will doubtless prove more successful still; for we learn that several houses that held aloof from exhibiting now regret their action. The general opinion amongst traders appears to be that in future the exhibition should be held somewhat earlier in the year, and that it should be kept open for a little longer time—say a fortnight.

The exhibition was contiguous to the Stock Exchange, and probably there is a larger number of amateur photographers amongst the members of that body than any other, although it might be imagined that they could not find much time for the pursuit of the art. The fact remains, nevertheless. This is nothing new, however, as the Stock Exchange has always been associated with amateur photography. In the old North London Photographic Association, which ceased to exist some twenty years ago, a very large proportion of its members were members of the Stock Exchange. Many of these gentlemen, we are pleased to say, are still as enthusiastic in photography as ever.

Up to the present photographers have had little to complain of as regards light. A report from the Meteorological Department shows that the duration of actual sunshine this year has been in excess of any for the last nine years; not only has the light been of longer duration, but its actinic value has been considerably above the average. Beginners in photography should not imagine that as the year advances the light may apparently be more brilliant, and therefore a shorter exposure can be given. The light is now in about the zenith of its actinic power; indeed, may almost be said to have passed it. The most deceiving light to the novice is a clear, blue, cloudless sky. To him the light appears excellent, though the experienced worker knows that, under these conditions, a very long exposure is necessary in order to obtain satisfactory negatives.

Those who desire to assist meteorology will do well to keep their dark slides charged with plates, so as to be ready in case of an opportunity of securing photographs of lightning. The season for thunderstorms is now at hand, and sometimes, particularly at night, they approach so rapidly that there is no time for preparation. The photographs obtained on that memorable night a year or two back opened up several new points in connexion with the phenomena of lightning discharges. It may be many years before such a grand opportunity occurs again, but it will be well for those interested to be on the alert. It would certainly be advantageous to have the plates backed, so as to avoid halation. In most photographs of lightning, halation is very conspicuous, and this considerably detracts from the scientific value of the work.

Mounted carbon or Woodburytype prints should not be subjected to an unnecessarily high temperature in a dry atmosphere, owing to the contractibility of the gelatine of which the image is composed, as it produces cockling or buckling of the mounts. We were forcibly reminded of this fact a few days back, when passing a printseller's shop where a number of these pictures were exhibited in full sunshine. The heat had caused the prints to contract and buckle the mounts to such an extent as to quite spoil the appearance of the pictures. When this buckling is once produced it is exceedingly difficult to get the mounts flat again.

The contractile power of gelatine is really enormous. It is not to be wondered that it should draw even the thickest and best boards completely out of shape when it is considered that it is capable of tearing away the surface of a glass plate, as many collotypers know to their cost. If a collotype plate—which usually has a ground surface—be prepared with some samples of gelatine, and is then over-dried in a strong heat, the contraction of the latter is so strong that it will break up the glass itself; the gelatine splits off, but brings with it a thin layer of the glass. It is the ground surface that gives the great holding power to the gelatine; with plain glass the gelatine would simply peel off and leave the plate intact.

VARNISHING FILM NEGATIVES.

Two or three weeks back, in an editorial article on *The Protection of Film Negatives*, the difficulty is alluded to of varnishing negatives on a celluloid basis, or, rather, the statement is made that "they cannot be varnished in the ordinary way." Without wishing to strain any point in regard to the precise meaning of "ordinary way," I may say that during the past twelve months or more I have varnished very many celluloid and other film negatives without, to my knowledge, departing very far from the usual track, except, it might be, in the composition of the varnish, for my object was mainly to secure a thoroughly suitable preparation; but where any such departure did occur I was in the direction of increasing rather than of decreasing the difficulties involved.

From a purely mechanical point of view it is of course not quite so easy to coat a flexible film with varnish or any other liquid as a rigid surface like glass, since the film must be first attached to some firmer support to enable it to be properly handled, but the trouble thus necessitated may be practically ignored, especially with small sizes.

The next trouble mentioned is the fact that the solvents employed in negative varnishes are also solvents of celluloid. True; and at first sight, on reading this remark, I wondered how I had never made the discovery to my cost. However, it has to be taken into consideration that a stout protecting film of *gelatine* which is quite impervious to alcoholic or ethereal solutions intervenes between the celluloid support and the varnish when applied, and that consequently, if the latter be kept off the back of the celluloid, it may be as safely coated as a glass plate. How far the varnish would damage the negative for practical purposes if allowed to run over the back of the support it is impossible to say, but I may state that I have frequently applied collodion emulsion *direct* to *unprepared* celluloid without causing it to cockle or dissolve; in fact, with no further trouble than a slight sinking in of the developed image into the support.

As a matter of fact, a coating of ordinary negative varnish or of enamel collodion may be applied to the surface of a gelatine negative on celluloid with as much safety as to glass, so far at least as the solvent action of the application is concerned. The mechanical operation of coating has to be considered, and if pouring be difficult or inconvenient, recourse may be had to the brush.

After that, however, comes the necessity for warming the negative in order to prevent "chilling" the varnish; this treatment celluloid will certainly not stand without at least some amount of cockling. There are varnishes in the market intended for cold application, but they are usually such abominable preparations as compared with any good alcoholic varnish that they are better let alone, while any specially made solution in which chloroform is used becomes too expensive for general use.

Collodion, however, entirely gets over this part of the difficulty; it is applied cold, gives a perfectly transparent and structureless film, and exerts no greater solvent action than alcohol upon the celluloid, while as to its protective action it is possibly superior to any of the alcoholic varnishes as yet put forward.

While on the subject of varnishes for cold application, I do not think it beyond the bounds of possibility to have a purely spirit varnish that shall answer that description. I had some time ago the remnant of a quantity of spirit varnish that, when applied to glass or to a negative, set with a sort of frosted or ground-glass appearance, but which when quite dry became transparent without the application of heat. Again, I believe a pure lac varnish may be prepared that can be applied cold; at any rate, such is the case with articles of wood work, for I have frequently with small things that it is impossible to French polish applied a very thin plain solution of lac by means of a

soft brush, and two or three such applications following one another will give a surface as bright and hard almost as French polish.

Spirit varnishes may without the least difficulty be applied with the brush, but with collodion, especially if it contain the usual proportion of ether, the task is more difficult, owing to the extreme volatility of the preparation. This results in a very streaky or "lumpy" coating when moist, though when dry very little trace remains of the unevenness. This phase of the trouble of coating may be lessened by increasing the proportion of alcohol so as to render the mixture less volatile, but this also lessens the solubility of the pyroxyline and alters the nature of the collodion.

But if we want a "perfect" varnish for negatives, film or otherwise—as perfect, at least, as we can expect to attain—we must turn to celluloid itself, which forms a plain, spirituous solution that dries slowly and without heat. Some months ago, in consequence of a suggestion I saw in one of the American papers, I made such a varnish by simply dissolving the trimmings and cuttings of celluloid and spoilt celluloid negatives in common methylated spirit. The celluloid dissolves readily, and may be hastened by heat if needful. It is better to remove the gelatine film from spoilt negatives before dissolving, as although the gelatine is quite insoluble in the alcohol, it may become so intimately mixed in a fine state of division as to be past removal by filtration.

This varnish, if made of the right consistency, seems to me the perfection of a negative varnish, except that it does not set or dry so quickly as those in ordinary use, though there is not much to complain of on that score.

It forms a beautifully limped solution that flows smoothly and evenly, and sets and dries without the least trace of "structure." It possesses all the advantages of the best "cold application" spirit varnish, with the additional one of toughness and freedom from any tendency to crack; and the absence of any "tackiness" places it far ahead of any of the preparations in which the different gum-resins are dissolved, whether in spirit or benzole.

In the course of my experiments I found it not only difficult to keep up a supply of celluloid without purposely cutting up what was usable for more legitimate purposes, but I found on calculation that from an economical point of view that mode of manufacture was not a practical one. Guncotton, camphor, and methylated spirit are, however, cheap enough, so I set to work to compound a varnish out of these ingredients. Having a large number of samples of different sorts of pyroxyline and papyroxyline, "high" and "low" temperature, and of varying degrees of solubility, &c., I had plenty of opportunity of studying the different effects, but so far as the quality of the varnish was concerned I could find very little choice. Where any difference occurred it was in the time occupied in dissolving the cotton or paper, some samples being very slow, remaining some hours in a semi-gelatinous state, while others dissolved nearly as rapidly in the camphorated spirit as in ether and alcohol. In all cases, however, the addition of a very minute quantity of ether hastened matters without introducing any important alteration in the physical properties of the varnish. The various samples of papyroxyline were, as I should have expected, all more soluble, or at least more rapidly soluble, than the cotton samples.

I may mention it here, though for all practical purposes there is no reason to go further than methylated spirit, that wood naphtha, or methylic alcohol, forms a much more powerful solvent than ordinary alcohol; indeed, many samples of pyroxyline are perfectly soluble in wood naphtha without the aid of camphor. If any difficulty should be experienced, therefore, with particular kinds of pyroxyline, it may be useful to try wood naphtha, which, however, is about double the price of methylated spirit.

The following represents a good formula, though the proportion of pyroxyline may vary with different samples. That given is for a pretty soluble sample of papyroxyline, but the same proportion of pyroxyline would in all probability give too thick a result. In all cases it seems safe to let the relative proportions of pyroxyline and camphor stand at two to one.

Papyroxyline	300 grains.
Camphor	150 „
Methylated spirit	20 ounces.

Dissolve the camphor in the spirit, and afterwards add the papyroxyline. Shake at intervals until thoroughly dissolved, then filter or allow to stand until quite clear.

Before concluding, I may mention another method of varnishing which seems specially suited to film negatives, whether the basis be celluloid, vergara, or other insoluble gelatine material. I allude to the aqueous lac varnish made by dissolving shellac in aqueous borax solution. The advantages of this are that it soaks *into* the gelatine film instead of remaining only on the surface, it can be applied by simply dipping the negative either before or after drying, it requires no heat, it is quite impervious to moisture when once dry, and is very cheap. To make it, take—

Borax	1 ounce.
Bleached lac	5 ounces.
Water	1 pint.

Dissolve the borax by boiling, throw in the shellac broken in small pieces, and keep up the heat until it is dissolved. Set it on one side until any sediment has subsided, and decant. It will continue for some days to have a cloudy appearance, but will eventually become quite bright, when it must be again carefully decanted for use. The above will probably be too concentrated for some tastes; if so, it must be diluted with *distilled* or boiled rain water.

The best way of applying this is, to my mind, to allow the negative to dry first, then to plunge it for, say, a couple of minutes into the aqueous varnish, then pin up to dry. The gelatine film will then absorb the solution greedily, and become impregnated throughout its whole thickness.

It is recommended with some kinds of films to immerse them, before drying, in a final solution containing glycerine and alcohol. No doubt —though I have not tried it—these might be added with advantage to the aqueous varnish.

W. B. Bolton.

THE ART OF RETOUCHING.

Chapter X.—Treatment of the Neck, Hands, Drapery, &c.

It is not in every negative that the neck requires the assistance of the retoucher to make it acceptable. Gentlemen's heads seldom require very exhaustive treatment, although some will give a great deal of trouble at times before we have secured a satisfactory effect. In considering the neck, the line of shadow which may be said to form the outline of the lower jaw will be the first portion to demand our consideration. There is very much more expression and feeling in this shadow than will appear at the first glance. Whenever it may be but feebly defined, care must be taken not to further lessen it, but rather, by working upon the adjacent or surrounding parts, bestow upon it more distinctness of form. There are many cases in which the operator, no matter how skilful and thoughtful he is, may be unable to secure sufficient shade to do justice to his sitter except at the price of offensive shadow in some other parts of his picture. If, for example, the brows of the subject under treatment be very heavy, and, as is usual in such cases, throw the eyes into deep shade, the operator is obliged to relieve this natural defect by reflected lights whenever he cannot do so by direct lighting. Needless to say, this remedy must affect the outline of the lower jaw, even should the same be strongly marked, and how much more so must this be observable when it is more weakly defined! Under these and such conditions it must be our task to recover as much of the lost shadow and vigour as possible, and as is really necessary to the proper balance of the face.

In many gentlemen's portraits care must be bestowed on the throat as well as this line of the jaw, many of the markings in this locality being absolutely characteristic, and ofttimes possessing a great deal of the individuality of the sitter. They must only be *modified*, as their entire levelling away would be most ruinous. In retouching the neck of even the ordinary subject, as in all other portions of the face, roundness and softness should be the main qualities which we should ever struggle to secure.

The high lights must never be brought to the edge of the hair or whiskers and beard, but a gradual approach made towards these portions of more or less shadow by the preservation of all the half tone left in the negative by the operator. As I said before, but little, as a rule, is required in this direction when our sitters are gentlemen, except

where these defects of light may be the cause of such exaggerated shadows as will assuredly appear offensive to the eye.

In men's portraits, as a rule, the larynx will be found to throw too deep a shadow; this should be softened, as also such muscles as are too obviously demonstrated. In all these parts the various lights should in no cases be touched or strengthened, for such a treatment would only tend to bring the throat forward and thus falsify its natural position. If very abrupt or unseemly shadows should occur in the beard, whiskers, or moustache of any subject, they should be so touched as to be rendered less striking, and in more harmony with the surrounding parts. This may be accomplished by one or two judicious strokes of a soft, blunt pencil. With these remarks we can leave the male portraits with safety, and turn our entire attention to those of the ladies, which will give us considerably more trouble.

Ladies in court or evening dresses, with more or less low-necked bodices, often afford us a very large amount of trouble. All the markings, such as the shadows showing the formation of the various bones and muscles in the neck, and the shadows thrown by same, must be very carefully removed. By this must not be understood to recklessly work away and produce light where shade before existed, but simply to secure an even and subdued half tone which will be in harmony with lighting of the head generally. The general tone of neck should be always lower than that of the face in order to thoroughly preserve their relative positions. Indeed, it may be accepted, too, that ladies will never take exception to their necks and shoulders being rounded off and softened to the utmost extent that an artist's flattering pencil can accomplish.

The hands and arms in ladies' portraits, when they are shown, will also require to be worked upon in order to subdue the markings produced by the veins, which invariably appear much more prominent under the influence of *studio* lighting than they ever do in nature. In many cases these markings would, if left untouched, be absolutely *offensive* to the eye, as well as *untrue* to nature; for they would be scarcely, if at all, visible in nature, while in the plain photograph they might be most strongly depicted. The creases on the knuckles and dimples on the back of the hand may often require considerable softening, as they are generally greatly exaggerated, if not altogether out of all balance with the general tone of the rest of the hand. This result may not always be traceable to the lighting, but may be greatly influenced by the natural colour of the hand.

It is one of the primary rules in portraiture to give the greatest prominence to the face, therefore the hands should, when possible, be kept in a subdued and delicate half tone. This should be observed still more strictly in cases where the hands are not so very small or well posed.

In painting, the hand is accounted one of the most important points in the picture, and often tests to the highest the artist's skill to produce it satisfactorily. It is astounding, therefore, that many photographers should think rather lightly of it, and in many cases bestow but very scant attention upon it. It is also very seldom that retouchers make even a passing study of the hand, and those who do make but a slight study of it generally dispose of it in a slovenly or careless manner, by which it is not all improved, but in many instances rendered more defective and unsightly than it was originally. To those who wish to become perfect, however, I can promise that the most complete satisfaction will repay them for bestowing the most elaborate accuracy in its treatment. That such careful work as is really needed would pay *commercially* is not the point we have before us, but rather to consider what should be done in order to produce the best work and how to do it.

It may appear strange, but it is none the less true, but on the contrary is a very significant fact, that the best photographers—those who have gained a world-wide reputation as men of skill and judgment—have always bestowed as much attention and care on those points as to the rest of a picture. Hands and arms should always be so arranged in a portrait picture that they would not arrest the spectator's attention; in other words, they should always be subdued in tone and treatment, but they should *never* fail to receive their proper share of care and attention all the same.

Skilfully disposed, the hands and arms may form a very powerful auxiliary in the expression of pose. Indeed, lighted and retouched in such a manner as to give them the appearance of being easy, probable, and fleshy (not as though they were cut out of white paper), they will form a very essential part of the study of ladies' portraiture, adding to the picture by their beauty of proportion and graceful display of outline. It must be remembered that the *left* hand takes a more graceful bend at the wrist than the *right* one, but the license of art allows us to import (if possible) to the latter the superior grace and beauty belonging naturally to the left. As for the markings on the fingers, they will speak for themselves in each negative.

Should the pose of the arm produce a sharp angle at the elbow-joint, the same may be rounded off with considerable advantage to the picture. This should either be pencilled or cut away upon the film, as the negative may best lend itself. Sometimes the wrist-bone may protrude and spoil its general appearance; this, too, should be removed with similar care and judgment.

The hair is generally all right, but there are times when it may be worked upon with very considerable advantage. The lights and shades when too abrupt should be so worked upon as to blend them together. To effect this purpose, a *soft* and *blunt* pencil will prove the most satisfactory. Very great care should be taken when retouching the face not to carry the work right up to the edge of the hair, as by so doing a harsh, hard line may be formed which would ruin the appearance of the entire picture. It should ever be our desire to secure roundness and softness, and this can only be done by the combinations of soft outlines and brilliant centres, but never by violent contrasts.

In cases where the hair requires lightening in tone (photography rendering some shades of hair more darkly than others, and altogether contrary to what they appear in nature), have the negative matt varnished, and then either put a little ivory black or plumbago on the back of the negative and on such portions as you desire to come lighter in the prints. The lead resulting from the sharpening of the pencil on a pad may be applied with a stump on the matt varnish, and will be found the most efficacious means at our disposal for lightening any such portions of our negative as may appear to us to print too heavily or black. I have known negatives that, in their natural state, would render the faces positively black in the ordinary course of printing, which, by a judicious application of this plumbago upon the matt varnish, have been rendered capable of yielding very decent prints indeed. If the hair of any intended sitter be such as will photograph too darkly, a very satisfactory effect may be gained by powdering it at the time of sitting. Broad lights in the face may also be put in by this stumping on the matt varnish on the reverse side of the negative. By this means very often negatives which would produce prints very flat and altogether unpresentable pictures may be rendered capable of producing very passable results indeed.

The drapery, except when of very glossy and thin silk (which usually presents such a broken appearance as to almost defy further manipulation), may be greatly helped by a few judicious applications of the pencil. Light materials—such as drab, blue, and white—may, by the least manipulation possible, be made to look so brilliant, and to contain so much delicacy of half tone and detail, that the retoucher will be fully repaid by the result for whatever time he may have expended upon the working up of these portions of his negatives. In most cases all these lights are indicated in the negative, although not with sufficient strength to print. Such lights, therefore (especially in the larger size negatives), should be intensified by a few sharp and decisive touches applied to the back of the negative—already matt varnished—with a stump and plumbago. A knowledge of drawing will naturally be of considerable assistance in an endeavour to force up the details of any defective negative upon which we have to exercise our skill.

When the negative is prepared by the application of the *medium* and ready for retouching, a great number of these lights may be put in on the film side of the plate, using for the purpose a fine cork or moulded grey paper stump. Most lines running across the waist of a dress from right to left, such as creases in the bodice, &c., should be taken away, as they only spoil the shape of the dress, and thus cause the sitter to find fault with the otherwise acceptable picture. A few touches skilfully put upon lace will greatly enhance its value, and many such touches are best placed on the *back* of the negative by a soft pencil or a white crayon on the matt varnish.

These remarks will be found, in practice, to apply to *all* and *every*

"method" of retouching that may be adopted by a beginner, as in each of them the same ultimate result is sought after, and the same principles of art employed. REDMOND BARRETT.

FADING OF ALBUMENISED PAPER PRINTS, ETC.

IN these degenerate days of photography, I think fading of prints on albumenised paper is scarcely to be wondered at. The work done twenty years ago was far better (taking average work of that time) than the average work of to-day. In former days the character of the negative was totally different than those now produced, being far more intense—in some cases so intense that the details of half tone were apparently almost buried, and yet in the print the gradations came out most beautifully. In those days we were content with one or two prints per day from a negative; it was then a question of quality rather than quantity, the latter being of the present-day order. Not only was the negative different in quality, but the albumenised paper was different. Having had over thirty years' experience in photography, in my early connexion with the art-science I used to albumenise my own paper with success. Ammonium chloride used to be my favourite salt for salting the albumen, using in the ordinary way twelve grains of the chloride to each ounce of albumen, and by multiplying the number of grains by five gave the strength of the nitrate of silver exciting bath, viz., sixty grains, and very often as much as twenty grains of chloride were used and one-hundred-grain nitrate bath, and I have many examples which I printed in those days as fresh comparatively as when first printed. The best of to-day's prints would not stand as many months without showing signs of fading. With a dense negative of the old school the image struck more deeply into the paper, and was far more permanent, and in those days we used to hear a great deal about bronzing in the shadows; we never hear of that now, the fact being there is not sufficient silver used to approach the bronzing stage. In those days only chloride of silver, pure and simple, was used as a sensitive salt; but now, since the advent of gelatine negatives, citrate and other organic salts of silver have been introduced. The average negative of the present day is very thin; in fact, of not sufficient intensity to be able to give a permanent print. We often see the question asked in the press, "How can I get purple-black tones in my prints?" And if we could see the class of negative the parties produce that ask such questions, their difficulty of not getting them could soon be answered. When a passable result is obtained from a thin negative it is impossible for the print to be permanent. It must be borne in mind that in printing-out by contact the salt of silver has not been reduced to its metallic state, but only to a sub-salt, which is easily acted upon by atmospheric influences, &c. If a so-called faded print be taken and washed in moderately hot water, it will be found that the compound that formed the image, which was insoluble when the print was first made, is now soluble, and by dissolving out this soluble matter the yellowness of the print to a certain extent disappears, but the print has been considerably impoverished. I remember several law cases where parties have taken action against professional mounters who have undertaken to soak off and remount photographs, and have been charged with being the cause of the said photographs fading, and I think in some instances they gained the day. I was looking over some prints only a short time since that had only been printed about two years, and there was considerable evidence of their having faded since they were first made, no yellowing about them at all, but gone pale. These were unmounted photographs and printed on ready-sensitised paper.

I have seen many prints of the old school which have turned yellow, and yet retaining nearly all their full force and vigour, which were but very little effected by washing, *i.e.*, reduced. In former days there used to be two makes of paper in the market, viz., Rives and Saxe; the former was mostly sized with starch, and the latter with gelatine; and the latter was more prone to show the yellowing just mentioned more than the former. I have also noticed, apart from photography, that all cotton goods sized with gelatine mostly turn yellow by the action of the light, whereas starch-sized fabrics retain their whiteness. The other kind of yellowing is produced, no doubt, by traces of hyposulphite of soda being left in the print from imperfect washing, which being decomposed, and the sulphur acting upon the silver salt, causes the yellowing, which is, to a certain extent, soluble, as before mentioned. Then there are other markings which occur, apparently from the hyposulphite of soda acting unevenly, which at times do not show themselves for some week or two, in the form of lemon-coloured spots and streaks, and more especially after mounting, which is more or less effected by the mountant used. It is very rarely we see fading take place in a print where the silver has been entirely reduced to its metallic state, and I fully believe that a print by development, where perfect reduction has taken place, to be as permanent as either a platinum or carbon print, provided care has been taken to get rid of the iron salts where iron has been used as a reducing agent; if that is not ensured, the least trace of the iron left in the paper becomes oxidised and plainly visible. Of course the latter does not apply to carbon prints.

In silver printing, over twenty years since, Mr. John Spiller advocated the use of ammonia carbonate in the hyposulphite fixing bath, which I used for very many years with great advantage. I think it was about one ounce of ammonia carbonate to the pint of fixing bath. With the present day's system of printing I fear its addition to the bath would be a little two powerful for the image. It is an established fact that an unmounted print is less liable to fade than a mounted one, provided they are kept from the damp. Damp, in my opinion, is a far greater factor in fading than even a small trace of hyposulphite of soda being left in the print, as I have found by many experiments that little or no action sets in until damp puts in an appearance. I don't think we need look far after this why the permanency of a print is endangered after mounting.

The chief mountant that has been in vogue ever since photography has been invented has mostly been gelatine. Professional mounters, as a rule, use Scotch glue, and some the finer sorts, viz., gelatine, which is very hygroscopic, and which seizes damp from the atmosphere and sets up chemical action, hence decomposition and fading, and yet gelatine is persistently used for mounting. Starch is another favourite mountant, which I do not object to if pure; but I doubt very much if the starch as sold in the market is sufficiently pure for mounting photographic prints, many samples being coloured with some blue dye stuff for some purpose known only to the makers, possibly to improve its colour. Many samples of pure starch that I have seen are anything but white, and probably would not be suitable for laundry purposes. Far better than either of the foregoing as mountants is gum tragacanth; it is a little more difficult to use, but it does not so soon become sour. Dextrine is used by many, which soon changes. I have never found anything better than a good flour paste, made under the following conditions:—Best wheaten flour is taken in a cup or basin, according to quantity required, and worked up into a thin, smooth paste with water, and a few drops of strong ammonia added—quantity is not very material; it is then well boiled, and in boiling the free ammonia is drawn off. The object of the ammonia is to neutralise an acid that might be present. This is best made fresh *every* day, and care also being taken to wash out the brush each time with hot water. Photographs mounted with this take the damp far less than those mounted with gelatine. Another very important way to prevent the absorbtion of moisture when the picture has to be framed is to give the surface of the print a good coat of encaustic paste, even if prints are mounted with any gelatine compound the damp in no way can effect it, as it is rendered entirely waterproof. Gum arabic ought always to be avoided, on account of its so readily becoming acid. The mounting board is another important feature that must not be passed lightly over. I have known many photographers for rough mounting use ordinary cardboard, which is a vile material, the paste probably being sour that it was made with, and many other contaminations too numerous to mention. Where possible, I always avoid *plain* mounts, and use in their place enamelled, as for years my experience has been that a picture mounted on an enamelled card is less liable to fade than on plain mounts. Some twenty-five years since I used to do a very large quantity of stereoscopic slides, and I noticed I seldom had a case of fading on the enamelled mounts, whereas if I used an unenamelled mount fading invariably occurred. The enamelled mounts that I used were Marion's, which calls to mind the late law case against that firm in which some rather curious facts came to light; notably one, the young lady licking the photograph down. Some people's tongues may be all very clean in a way, but I don't think sufficiently clean to add to the permanency of a photograph by licking it down.

There is another point that I have never seen allusion made to in any way, and that is the use of the burnisher. In burnishing photographs (to give them the well-known tea-board effect) requires some kind of lubricator, or the photograph is inclined to drag, and I think the basis of this lubricator, as a rule, is soap, which is a combination of fatty matter and an alkali, the latter, as a rule, being slightly in excess. I have seen a lot of this streaking as alluded to in this law case caused in my opinion to nothing less than by the lubricator, and probably this might throw some light on the matter. I have examined many kinds of mounts for hypo, &c. In common mounts I have found traces, but not as a rule in mounts from a high-class manufacturer who thoroughly knows the requirements. In common mounts I have found all sorts of objectionable matter, such as alum, free acid, &c.

I never like using mounts with gilt edges, not even the so-called pure gold bevel-edged mounts, which contain more or less copper; metallic particles of any kind one need be suspicious of. Where bronze powder is used makes matters very much worse, the powder being generally bisulphide of tin or its compounds.

Wm. Brooks.

EARLY EXPERIMENTS, BY DR. PERCY AND MR. GEORGE SHAW, ON THE CHEMICAL PHENOMENA OF LIGHT.

[A Communication to the Photographic Society of Great Britain.]

As a past pupil of the late Dr. Percy, I have been permitted to read and make extracts from the photographic note-book of my old friend and much respected Professor, and I commence by acknowledging my obligations to the executors, who, through Mr. Hilary Bauerman, F.G.S., entrusted me with this very interesting record, and to Mr. George Shaw, of Birmingham, whose permission was freely given.

The account extends to twenty-three pages (quarto) in the note-book, and two extra pages fastened in, which are in the handwriting of our member, Mr. George Shaw, all the rest being in the clear manuscript of Dr. Percy, and illustrated by sketches of the apparatus used. The entries are arranged as a diary, commencing on the 28th October, 1844, and running on consecutively to some date beyond the 5th November. Then a break occurs, and there are occasional entries in later years—October, 1850, and May, 1853—with other suggestions for experiments, to which no specific date is attached. Further on the pages become a sort of general note-book, devoted to the entry of a variety of technical and metallurgical details, analytical processes, &c., with which Dr. Percy's subsequent career was so intimately associated. As showing the original intention, however, it should be stated that the cover of the book is endorsed "Light, October, 1844"—at a time when Percy was lecturer on Chemistry at the Queen's Hospital, Birmingham—and the first heading runs thus:—"Experimental Investigation concerning the Chemical Phenomena of Light. Record of Experiments, by G. S. and J. P., commenced on the evening of October 28th, 1844."

In some respects it was unfortunate that the work was begun so late in the year, for the weather on successive days was noted as "overcast and dull," "cloudy, with slight rain," "dull November day," &c., and only on the 31st October and 4th November did the exposures get the full advantage of sunshine. But, on the other hand, it should be stated that the bulk of the experiments were comparative, and sometimes the slower action of the light enabled more accurate observations to be taken in the earlier stages than would have been possible under brighter meteorological conditions.

The first set of experiments was made with pure chloride of silver, precipitated from the nitrate by a slight excess of hydrochloric acid, and well washed with distilled water, by decantation, in the dark. The product was dried in a porcelain dish over a sand bath, ground to powder, and divided out into several tubes, the object being to expose them all simultaneously under various conditions, such as dry and moist air, or with dry hydrogen or ether vapour in sealed tubes; and, in one case, with potassium enclosed, so as to absorb any chlorine that might be liberated, as well as most of the oxygen contained in the air. In other words, this last tube was exposed in an atmosphere mainly of nitrogen, with an ingredient capable of taking up any evolved chlorine; the potassium was not in contact with the silver chloride, but held back at one end behind a loose plug of asbestos. Details are given about the mode of drying the air, hydrogen, or other gas, and a sketch showing the disposition of the chloride of calcium and caustic potash tubes is appended. The sealed tubes prepared overnight were left in a perfectly dark place until the next morning. The results (recorded by J. P.) were as follows:—

"October 29th. At half-past ten they were exposed in the open air to light; the sun was visible through the clouds, but the day continued overcast and dull. Darkening of the chloride rapidly took place in every tube, but, so far as I could observe, not more rapidly in one than another. They were turned round several times during their exposure to light, which continued until 4.30 the same day. From the fact of every particle of chloride not having been brought equally under the influence of light, part of the salt remained white, so that there was a mixture of black and white particles in each tube—hence the difficulty of estimating in a perfectly correct and satisfactory manner the precise degree of darkening that had been effected in each. However, that in *a* (ordinary dry AgCl, in a corked test tube) seemed to have undergone the *least* change, while that in *b*, *d*, *e* (hydrogen, nitrogen, and ether vapour), appeared to have been nearly equally affected, if anything, that in *b* (hydrogen) had been *most* altered."

There is no specific report about the final condition of tube *c* (that containing the *moist* chloride in a sealed tube), but it is evident that in this clotted state of the white chloride the action of light at best must have been very partial. With regard to the influence of moisture, Dr. Percy goes on to say:—

"It must not be omitted that we cannot vouch for the strict correctness of the term *dry* chloride, employed in the preceding description, as we only dried it in a capsule over the sand bath, and did not ascertain whether every trace of moisture had been expelled; so that if moisture had any influence upon the chloride exposed to light, the preceding experiments become unsatisfactory."

A second series of tubes were got ready for exposure to light on the following day. As before, five in number, but somewhat differently constituted. The chloride of silver was dried for six hours in a hot-water oven, and rubbed to fine powder for Experiment 1, or dried in the same way upon slips of glass for Experiments 2, 3, 4. Then arranged as follows:—

No. 1.—Tube charged with dry AgCl in dry chlorine.

No. 2.—Dry AgCl in dry nitrogen (*i.e.*, with potassium at one end of the tube, and fused chloride of calcium at the other).

No. 3.—Dry AgCl in iodine vapour. (Turned yellow at once by partial formation of iodide of silver.)

No. 4.—Dry AgCl in air with phosphorus. (This darkened before exposure.)

No. 5.—Silver foil in dry chlorine. (The metal previously heated to redness, and dry chlorine gas passed over it for some time; the tube being full of chlorine when hermetically sealed.)

All exposed from 10 till 4 on October 30 (dull and cloudy day, with slight rain in the forenoon), and again from 10 till 5 on October 31 (a brighter day, with occasional gleams of sunshine).

Results.—No. 1 tube. Scarcely perceptible change at the end of the first day, becoming sensibly darkened in ten minutes of bright sunshine, ultimately changing to an "ash-grey."

Note—October 31, 1844.—"Now we learn from this experiment that, to a certain extent, the chloride of silver in chlorine affords an indication of the intensity of the chemical action of light; for that which underwent scarcely any perceptible change yesterday, became rapidly and sensibly affected to-day."

When put back again in the dark, the chlorine gas acted upon the coloured chloride, and in three hours it became perfectly white, ready to undergo a like change by repeated exposure. This observation induced Dr. Percy at a later period to propose the use of such an arrangement as an actinometer, which he described at the Photographic Society's Meeting of June, 1853.

Nos. 2 and 3 tubes both changed colour to a chocolate-brown, and, contrary to expectation, the iodide formed in No. 3 did not retard the the change, which the authors then supposed might be accounted for by assuming the existence of a chloro-iodide of silver sensitive to light, whereas pure iodide *per se* was known to be quite unaffected by exposure.

No. 4 tube also darkened considerably, and the phosphorous acid probably assisted the change, for it was found to have had an influence even in the dark.

No. 5 tube, containing the chlorinated silver foil, acquired a beautiful iridescence by exposure to light, the film showing a play of colours, red or green, according the direction of the reflected rays. The second day's exposure did not alter this appearance, but the *under* side of the foil began now to be attacked, and presented a dull leaden-grey colour. [Mr. Shaw repeated this experiment in a somewhat modified form, using Daguerreotype plates acted upon by the fumes arising from chlorine water. The results are described later on.]

A third series of tubes were now prepared, all charged with chloride of silver spread upon little glass plates, with the object of ascertaining whether the presence of moisture might have any influence. A pen-and-ink sketch shows the disposition of apparatus, with spirit lamp to warm the tube, and exhausting syringe to draw off every trace of watery vapour.

No. 1.—Dry AgCl in *dry* chlorine gas. Tube hermetically sealed.
No. 2.—AgCl in *moist* chlorine gas. Do. do.
No. 3.—Dry AgCl in dry air. Partial vacuum and tube sealed.
Exposed simultaneously from 10.20 until 5 o'clock, October 31; fine day, with gleams of sunshine.

Results.—The last rapidly changed colour (in ten minutes) and went on darkening; 2 was more quickly discoloured than 1, but the atmosphere of chlorine hindered the change; and the former (moist chlorine) proved most operative in bleaching the darkened chloride when the tubes were taken indoors at 5 p.m., and by 9 o'clock, as seen by gaslight, the white chloride was quite restored.

In order to set at rest this question of chlorine hindering the action of light, other experiments were arranged in which the white chloride of silver, dried upon a watch-glass and covered with a flat glass plate

cemented on with white wax, was exposed to light under a bell jar, with corresponding apparatus beside it in which chlorine (and afterwards bromine) had access to the chloride of silver. The results were, as before, that only a slight darkening occurred when chlorine had access, and the bleaching at night took place as usual. The authors sum up as follows:—"*We have now distinct proof that the vapour of chlorine does either retard, or otherwise modify, the chemical action of light. Is this owing to the colour of chlorine?*"

Next came comparative experiments with bromine, in which a difficulty occurred from the bromine vapours attacking the wax, so the white chloride of silver was enclosed in hermetically sealed glass tubes, placed within bell jars filled respectively with chlorine and vapour of bromine. Although the latter manifestly obstructed more light, it was found that the white chloride in the jar of bromine was *more rapidly and deeply coloured* than that contained in the jar of chlorine. "It would appear then (say the authors) that the modification induced in light, in its passage through the atmosphere of chlorine, does not depend upon the *colour*; because, if that were true, the degree of modification should vary directly with the intensity of colour, and should consequently be greater in the case of light passed through bromine, than is the case of light passed through chlorine."

Finally, the crucial test of exposing chloride of silver in sealed tubes, placed within a jar of *colourless* nitric oxide gas over water, and another one into a large stoppered bottle of the same gas with occasional admission of air, so as to produce the *red* nitrous acid fumes, showed most distinctly that with the colourless gas the darkening proceeded as rapidly as in air; whilst in the deep red gas the darkening was completely prevented for some time, and only very slowly changed to a lead-grey hue as the ultimate effect of protracted exposure. Here the observed difference could only be accounted for by assuming that the highly coloured nitrous acid gases cut off the chemically active rays, and apparently did so much more thoroughly than the bromine vapour.

EXPERIMENTS BY MR. GEORGE SHAW. NOVEMBER, 1844.

A couple of Daguerreotype plates were cleaned with dilute nitric acid and powdered tripoli, rubbed afterwards with dry cotton wool, and highly polished on a velvet buff sprinkled with charcoal powder. One of them was exposed, face downwards, for *thirty minutes* to the fumes arising from chlorine water, and the other for *twelve hours* to the same treatment. Both were alike in appearance, coated with a dead-white film of chloride of silver, which was very compact, had considerable lustre, and reflected the images of neighbouring objects with tolerable distinctness. So prepared, half of the twenty-four hours' plate was covered up to protect it partly from light, and then both plates were exposed for several hours on a "very dull day, the sky thickly clouded."

The surfaces gradually changed to a moderately dark slate colour, neither approaching blackness or the tint assumed by precipitated chloride of silver under like circumstances. On the next day, November 4, which was "very much brighter," the two plates were put out again, this time the half of the thirty minutes' plate being covered up, and both exposed for more than an hour to "hazy sunlight." They now suffered a very marked change, the slate colour disappeared, and the surfaces assumed a rich brown colour, with very metallic lustre, closely resembling the appearance of old bronze medals, and those parts which had been longest exposed to light actually assumed a much *lighter* colour than the surfaces that had been partly protected.

Here the only circumstance calling for notice is the fact that Daguerreotype plates were sometimes made of rolled Sheffield plate, the upper layer of which was standard silver (containing about one-twelfth copper), and the sensitive surface was, therefore, possibly a mixture of cuprous and argentic chlorides, in which the latter largely preponderated.

Amongst other interesting suggestions given in Dr. Percy's notebook was a proposal to try, as a substitute for the amalgamation process, the extraction of silver from its ores by first attacking them with ferric chloride solution, and then dissolving out the silver chloride so formed with a solution of hyposulphite of lime. There is no record of experiments actually performed, but we know that the process was adopted later in the treatment of certain silver ores, before other approved methods came into general use.

"Indigotic Acid in Calotype, Oct., 1850," is another entry, but it is not easy to guess the purport of such an experiment, unless it was an early idea of working with stained films.

"May 29, 1853. Photography. In the negative or positive impression in the Talbotype process, in what state is the silver? If it be *metal*, mercury should certainly remove it. Try the experiment. Is AgS soluble in KCy? I think not; if not, then after exposing a positive to HS it should not be obliterated by KCy. But is it not so?"

At this date I was an assistant in Dr. Percy's laboratory at the Royal School of Mines, Jermyn-street, and I well remember some experiments being tried with hot and cold mercury to extract the silver from paper photographs, but it was found impossible to get contact with the liquid metal. I do not know whether mercury vapour was ever tried for the purpose of forming an amalgam, and then extracting this with the liquid mercury. On the second point, I also remember Dr. Percy toning some silver prints on plain paper by exposing them to sulphuretted hydrogen, and these were afterwards exhibited at one of the Society's exhibitions.

About this time Dr. Percy, being on the first Council of the Society, was frequently engaged in photographic experiments, and testing the permanence of silver prints, on which, later, he was invited to report.—See *Photographic Journal*, vol. ii. pp. 175, 190, 251.

JOHN SPILLER, F.C.S., F.I.C.

THE USE OF PYROGALLIC ACID.

ALTHOUGH pyrogallic acid has had many rivals, most of which we have been told were so infinitely superior that the unbiassed would at once prefer them, it still holds its own. A few years ago, when it was often insisted upon that ferrous oxalate was *the* developer, and that Continental photographers were ahead of us English because they used the iron salt almost exclusively, the writer lost no opportunity of stating that, in his opinion, the users of ferrous oxalate were behind the times; and his opinion has since been amply justified. For the general purposes of negative development both ferrous oxalate and hydroquinone have been found wanting, though they may survive for the development of transparencies, especially so long as an exaggerated brilliancy is considered the only proper thing. The time may come when this abnormal brilliancy and the mechanical squareness or roundness of lantern slides will be regarded as defects. To the experimental photographer ferrous oxalate is invaluable, and for the control of density in negatives it is a reagent that cannot be effectively replaced by any other. But for the development of negatives it appears that pyrogallic acid is now more firmly established than ever as the most suitable and the most convenient reagent, unapproached except by eikonogen.

Every developer must by its very nature have a certain amount of inherent want of stability, though, as a rule, this is only manifest when in solution. Solid pyrogallic acid stored in glass bottles or in tin canisters (the former are preferable) does not, practically speaking, deteriorate through age. Whenever possible it is advisable to keep it in the solid condition. This entails very little, if any, additional trouble in taking the required amount, because although the bulk measurement of a solid is not so exact as weighing, it is in this case quite near enough; and the compound dissolves so readily that there is scarcely any more need for precaution as to its solution than it is necessary to observe in adding a fresh part of a strong solution to prepared developer. The error incurred by measuring the solid instead of its solution of known strength will be inappreciable. The spoon that has been recommended as a convenient measure is doubtless good enough when one is used to it, but it is probably the most inexact apparatus that could be selected. If the ordinary two or four-ounce measure is filled up to the one-drachm mark with the solid, it will be about four grains that is taken, and two drachms will be about eight grains. If the measure glass itself is used for this purpose, it is obvious that it must be dry; but this additional trouble, when several plates are being developed one after the other, may be obviated by using a small conical vessel marked with a file or diamond as desired.

There is one very valid objection to the measurement of dry pyrogallic acid, namely, that the dust is very liable to get disseminated through the air, and afterwards to prove troublesome by settling down upon sensitive materials and causing black spots, and the substance is so light that it is almost impossible to avoid some of it floating away. This difficulty is specially liable to prove an annoyance in dark rooms where much work is done, and it is, fortunately, under these circumstances that render it most advisable to use a stock solution of pyrogallic acid. So much of the reagent is required that there is no fear of a prepared solution spoiling through being kept on hand. A sufficient bulk may be prepared with a suitable preservative for the day's use, and probably such procedure will save trouble; but this is a very different case from that of the amateur who uses a little at irregular intervals, and would occasionally find that months had elapsed since his solution was made up. It is quite true that pyrogallic acid in solution may be kept for a year or more and still be "good," parts having been withdrawn from time to time for use; but it is a radical mistake for the photographer to try how long his solution will remain usable, or under what disadvantageous circumstances he can command success; his aim should be to eliminate even the shadow of a possibility of failure.

If pyrogallic acid is to be preserved in solution, the question at once arises as to what preservative shall be employed. A slight acidification with, say, nitric acid would probably serve well enough, but as everybody uses sodium sulphite nowadays, it is more natural, and doubtless advantageous, that this salt should be used. As sodium sulphite is invariably

slightly alkaline, and alkalinity tends to the discolouration of pyrogallic acid, the solution should be acidified. Whatever acid is added, it plays a different part from that when acid alone is used, because it simply liberates a little sulphurous acid after having neutralised the free alkali. The best method of acidifying is to pass a few bubbles of sulphurous acid gas through the solution, but if this is not convenient, the equivalent of three minims of fuming hydrochloric acid may be added for each two ounces of the solid sulphite taken, provided always that the sulphite is of good quality and in good condition. The proportion of sulphite of sodium does not matter very much if it is merely used to preserve the pyrogallic acid. But if the sulphite dissolved is intended to be the amount that shall be used in the mixed developer, its quantity is important, and this at once brings under notice the disadvantage of having any two ingredients of the developer in one solution, and the proportion between them unalterable. The amount of sulphite of sodium needed has little to do with the amount of pyrogallic acid used, but rather with the bulk of solution; that is, the quantity of water and the character of the alkali employed. When ammonia is to be used, the sulphite may be in the proportion of about six or eight grains of crystallised salt to the ounce of solution, and this whether much or little pyrogallic acid is taken. But if sodium carbonate is used, it is advisable to take at least fifteen grains to the ounce, and probably twenty will be better. If, therefore, the pyrogallic acid is to be varied within wide limits, it is necessary to have a separate solution of sulphite, that this may be added when the sulphite, with the pyrogallic acid required, would be deficient.

—*Photographic Scraps.* CHAPMAN JONES.

THE SALTING AND EXCITING OF DRAWING AND OTHER COMMERCIAL PAPERS.*

And now comes the question, What chloride are we to use? It is pretty clear that all we require is the chlorine, and it would seem, therefore, the simplest way would be to use chlorine water or hydrochloric acid; but, as a matter of fact, these substances do not do, but almost any of the soluble basic chlorides answer extremely well. They have each a slightly different result, but so slight that it can be neglected in practice, and the ammonium, sodium, or barium chlorides used indiscriminately. We should naturally expect that the different chlorides should produce different results, for at the same time that chloride of silver is formed, the nitrate that was with the silver forms a soluble salt with the base of the chloride; that is to say, ammonium chloride and silver nitrate give us silver chloride and ammonium nitrate, or, if potassium is used, we shall get potassium nitrate, or if barium, barium nitrate, and since some at least of these soluble nitrates will be left and dry on the paper, they may have an influence on the resulting print. With the chlorides I have named above, however, the difference is absolutely negligible. But we must not forget, however, that there is a difference in the quantity of chlorine present in equal quantities of the different chlorides; for instance, ten grains of ammonium chloride contain as much chlorine as eleven of sodium or twenty-two of barium chloride.

Barium chloride is the one generally used, but, as a rule, I prefer the ammonium chloride, for if a soluble citrate be added to the barium chloride, an insoluble white precipitate is formed, and a citrate is often a useful addition to the salting bath. It is for this reason that I use chiefly ammonium chloride, and all my remarks to-night will apply to this salt. I may mention that the crystallised variety of this salt should be obtained, and not common sal ammoniac, as this salt, through the evaporation of ammonia, becomes very acid.

We now arrive at a very important point, and that is, What strength or quantity of chloride should we apply to the paper? To settle this we must resort to experiment. The strips of paper that I have here have been prepared on salting baths of different strengths, namely, 1, 2, 4, 8, 16, 32 grains of ammonium chloride to the ounce of water. They were then excited on three different preparations of silver baths—the ordinary silver nitrate, silver citrate, and ammonio-nitrate of silver. The upper half of the strips represent a short exposure, in other words, the rapidity; and the lower halves, the prolonged action of light, or intensity.

A glance shows that rapidity increases almost directly as the amount of salt present, as does also intensity or the maximum amount of darkening; that is to say, a heavily salted paper will be more rapid and give a stronger image than a weakly salted one.

It will be noticed that in many cases where the maximum amount of salt has been applied to the paper it has darkened unequally; the cause of that is found by referring to one of our early experiments, that one that showed us that we should have the nitrate of silver in excess. Now, in these cases the paper was so rich in salt that nearly all the nitrate of silver was converted into chloride, and the paper, lacking this sensitising power of the free nitrate, has darkened unequally. On rough papers, even with sixteen grains, I have found a tendency, especially if the silver be applied with a brush, to this same unevenness, and, therefore, as a standard bath I prefer one containing eight grains to the ounce.

But we have not yet done with our slips. We can ascertain from them another fact, and that is a way for compensating for feeble or too hard negatives: or in another way, how to obtain either a vigorous or a flat pull from an ordinary negative.

If we take the least salted slip, we find that the most exposed portions are not nearly as dark as those in the highly salted slip, and this is still more evident in the slightly exposed portions. Now a hard negative simply means that it requires a powerful light or a long exposure to penetrate the deposit; during this time the clear glass portions are being rapidly overdone. If we, therefore, so prepare our paper that the portions under the clear glass, that is, the shadows, refuse to darken rapidly, we shall not be afraid of using a bright light to bring out the high lights, for we have obviated the danger of the shadows solarising. Therefore, for a hard negative, we see, the amount of salt may be reduced. For a thin negative, where exactly the opposite obtains, that is to say, where we want the clear glass to darken with all speed possible before the shadows under the thin deposit are too much reduced, we should increase the quantity of salt. The difference in the intensity of the light between winter and summer has the same tendency, and the quantities I have given (*i.e.*, eight grains to the ounce) are about a winter's light allowance, and will probably be excessive in summer time.

We may now give what one may call a winter salting bath, made up as follows:—

Gelatine	240 grains,	28 grammes.
Chloride of ammonium	160 ,,	19 ,,
Water	20 ounces,	1 litre.

When we were simply sizing the paper, we dipped it bodily into the sizing liquid; our object then was to fill up all the pores in the paper, but in salting all we require is a thin layer on the very surface of the paper, for we know that the colouration of the outer reduced film of chloride will protect the interior and keep it perfectly white, and therefore it is only the outside which is of use in forming the image; but *all* the salt in the paper must be converted into silver chloride by the addition of the nitrate, and unless, therefore, a very large quantity of this be applied we shall have no free nitrate in excess, and this excess we have learnt to be an absolute necessity; so that if we were to immerse the papers bodily we should only be forming absolutely useless silver chloride in the body of the paper, unaffected by light, and not forming any image but which would be simply fixed out again in the hypo and wasted.

Therefore I strongly recommend floating the papers, or the thick varieties at least; thin papers do not, of course, matter, the quantity that they take up will be so small—they are practically all surface.

I need hardly go into the manner of floating paper; it must be well known to all of you. The only point to be aimed at is to avoid bubbles. This is done by placing one edge of the paper on the liquid, and then lowering the sheet down gradually; it should then be lifted again by one corner and examined for bubbles, and if any are seen they should be broken with a glass rod or the tip of the finger-nail. Most English papers will be found to take the salting very unwillingly, but if left on the liquid for a short time they eventually become evenly coated. If very repellent of moisture they may be brushed over with a solution of oxgall or very weak HCl and water. By this means the surface size is destroyed. I myself prefer, however, to rub over them a little of the salting mixture itself with a tuft of swansdown, calico, or cotton wool, and then float them.

It is evident that the time that the papers should remain on the salting bath must depend on the nature of the bath and the kind of paper used. If our bath be rich in gelatine, the paper will naturally draw off a considerable and sufficient quantity of salt; but if our paper be hard, and the gelatine present in small quantity, some time must be allowed for the salting solutions to get hold of the paper. Somewhere between two or five minutes' floating may be taken as the average; if too long floated, the thick paper at least will absorb too much salt. With the above salting bath, as soon as the film is seen to be evenly attached all over the paper, it may be considered sufficiently floated.

The only failures that I can imagine likely to happen in salting papers are bubbles, or portions of the paper untouched by the salt, or else there may, on printing, be noticed a sinking in of the image generally; that is to say, by reflected light it appears feeble and lacks intensity, whereas when looked at by transmitted light, the image is seen to be vigorous, but to lie in instead of on the paper. This, if it does not arise from the softness of the paper itself, will probably be caused by the salting bath having been in an acid condition. This acidity destroys the natural size

* Continued from page 365.)

of the paper, and makes it like botting paper, absorbing speedily all the salting liquid. For this reason, when using ammonium chloride, if I have reason to fear its having become acid, I add a drop or two of ammonia till litmus shows an alkaline reaction. The ammonium chloride may become acid through loss of ammonia if it be added to the gelatine solution when very hot; it should, therefore, only be stirred in just before using.

In concluding the directions for salting papers, I cannot do better than point out that the object to be attained is to get a thin film, rich in salt and organic matter, right on the very surface of the paper, and not in its texture. LYONEL CLARK.

(To be continued.)

Foreign Notes and News.

THE Vienna Photographic Society has lost another well-known and respected member in the person of Herr Johan Fodor. The deceased gentleman was born near Pressburg in 1832, but migrated in early life to Vienna, where he conducted a chemical laboratory, making the production of photographic chemicals his speciality. The conscientiousness and reliability which he displayed, more especially in the preparation of gold and silver compounds, procured him such a reputation that all the principal photographers of Vienna made use exclusively of his manufactures. For the last six years Fodor was afflicted with blindness, his business being carried on almost exclusively by his wife. His modest and sympathetic disposition appears to have rendered him an especial favourite with his colleagues.

THE annual meeting and exhibition of the German Photographic Society will this year be held at Eisenach from August 27th to the 29th inclusive. Cards for admission to the whole of the proceedings cost for members ten marks, for non-members thirteen marks. An exhibition, in connexion with which a large number of prizes is offered, will be held in connexion with the meeting, and any persons in this country who think of exhibiting will doubtless be glad to learn that foreigners are admitted without being obliged to pay for space. The works exhibited must, of course, not have been shown anywhere previously. A large number of subjects for discussion in connexion with the meeting has also been arranged.

THE Buda-Pesth Amateur Exhibition is now in full swing. Among other interesting exhibits are a number of photographs of peasant costumes by the Archduchess Maria Theresa, and wood-cutter groups by the Archduke Ferdinand of Toscana. Among the works of several well-known amateurs, the series comprises landscapes and mountain views by Baron A. von Liebig, Baron Nathaniel Rothschild, and Messrs. Hiller and Einsle. In the scientific division, astronomical photographs by Dr. N. Konkolz and E. von Gothard, and micro-photographs by Drs. Molkar and Kowalski, are conspicuous for their excellence.

THE storms which may occasionally be raised by the vagaries of that generally unrecognised individual, the translator, are at present being amusingly illustrated by a discussion at present going on in the pages of the *Moniteur* between Dr. Vogel and M. Leon Vidal. The former gentleman has, according to the latter, been criticising the Paris Exhibition's photographs unfavourably. It now, however, appears that M. Vidal had based his strictures on a French translation of Dr. Vogel's article, which gives a much less favourable impression than the original; at least, so it would seem from Dr. Vogel's reply.

AS specimens of the translator's vagaries of which Dr. Vogel so justly complains, we may mention that "kohlendruck" (carbon print) has been rendered by "images on couleurs," and "licht-druck" (collotype) by "héliographie!"

BY the way, what a gifted individual Dr. Vogel himself is. Not only is he one of the leading photographic authorities of the present day, as our readers know, but he writes German, English, and French with equal purity, and, apparently, equal ease. What English or French *savant* can do that?

THE close connexion between magnetism and light, often already alluded to, has recently been studied by Liesegang in a new form. He points out that the iron salts are most magnetic, and that it was this fact which induced him to try his experiments. On magnetically exciting papers coated with iron preparations sensitive to light he found that the light-sensibility was diminished.

DR. PHIPSON makes rather a good remark in the *Moniteur* in reference to Captain Abney's article on photography in natural colours. "Captain Abney," he says, "might have contented himself with discussing the actual position of the subject without declaring its accomplishment to be impossible." And he proceeds to remind his readers of Arrago's *mot* on the employment of the word impossible in science.

THE latest novelty in photography in Germany appears to be the sensitised mount. These mounts are sensitised with bromide of silver gelatine, and the negative is printed on to them direct. They are then washed and fixed, and on drying no further trouble is required. The price seems to range from three to four marks.

Our Editorial Table.

A TREATISE ON MAGNESIUM FLASH-LIGHT PHOTOGRAPHY.

By ROBERT SLINGSBY. London: Marion & Co.

IT is known to many that Mr. Slingsby has for some time been devoting much attention to flash-light photography, and in this elegant and album-like volume he gives the result of his experience, together with pictorial illustrations of various applications of the flash light. Mr. Slingsby is not a believer in the employment of only a single lamp, but uses a number of them, according to the nature of the subject and size of the room; for example, in photographing a ball-room scene, the room being ninety feet long, thirty-five feet wide, and twenty-five feet high, he employs nine ordinary flash lamps.

A chapter on *At Home Studies*, although not long, yet contains many useful hints on this most valuable of all applications of the flash-light system. We say valuable because it affords the means not otherwise attainable of securing groups of the domestic circle after the labours of the day are over, and the members of the family are congregated together with the accustomed furniture and surroundings.

By diagrams our author shows in what manner the magnesium lamps are to be arranged with reference to the groups, so as to secure a soft and uniform lighting of each individual.

"Having made all your preparations," says Mr. Slingsby, "you will find it is not a 'bad move' to flash one lamp off first, in order to accustom your sitters to the brilliant and sudden light. Then light up your lamps (you need not turn down the ordinary gas or other lights, as they have a good appearance if well managed); give a rapid glance over your sitters, uncap the lens, and make your flash immediately; do not forget to cap the lens as soon as possible and put out the spirit lamps: then you may change the dark slide, refill the lamps with magnesium powder, and go on again in a few minutes; but it is as well to open the door and a window to let out any smoke previous to taking another photograph." A family group of five taken on a whole plate serves to illustrate Mr. Slingsby's success in this department, and here we may say that the work contains four full-page photographic illustrations.

It is truly (as the title on the cover states) a *practical* treatise, well written in a condensed style, contains a lot of sound information, with numerous hints in form of memoranda, and lastly is, as a book, most admirably got up in red and gold to fit it for the drawing-room table. Price 4*s*.

PHOTOGRAVURES.

By GUS. RAINGER.

MR. RAINGER has sent us several examples of his work in photo-etching, one of them having been partially touched, but the others quite untouched. These examples include a fine photogravure—*The Butterflies*—of about 12×10 inches. This is from life; others are from paintings. The tones range from the deepest possible to be obtained to the most delicate whites. The half tints are also well rendered.

PHOTOGRAPHY IN COURT.

DEBENHAM *versus* GABELL.

IN the High Court of Justice, Chancery Division, on Friday, June 6, before Mr. Justice Stirling, the case of Debenham *versus* Gabell was heard.

This was an action brought by Mr. Arthur Debenham, of 158, Regent-street, Photographer, to restrain Mrs. Annie Gabell, a lady in his employment as manager then, from interfering in any way in the business. Mr. Graham Hastings, Q.C., for the Plaintiff, now applied for an injunction in the terms of the notice of motion. The writ had been issued on the 29th of May, and leave was obtained from the judge in vacation to serve notice of motion.

It appeared from the affidavit that Mr. Debenham had been for some time prior to May 9, 1888, in partnership with the late Mr. Gabell, and the latter having died on that day, Mr. Debenham retained Mrs. Gabell as manager. The executors had transferred the business to Mr. Debenham pursuant to the partnership deed. On April 24, 1890, Mrs. Gabell gave notice to leave; after-

wards negotiations were entered into for the sale of the business to the executors, but on May 20 Mr. Debenham, having decided not to proceed with the matter, informed the defendant thereof, and reminded her that her notice would expire on the 24th. Mrs. Gabell, who occupied rooms on the premises, declined to leave, alleging that she had purchased the business, and was entitled to remain permanently. She declined to allow the new manager appointed by the Plaintiff to conduct the business, and opened the business letters.

The Defendant now set up a letter written by the Plaintiff in May offering to sell the business to the executors, but as this contained a clause to the effect that it was not to be binding until a proper agreement should be signed, the judge held it to be no defence, and made the order for an injunction.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8947.—"Improvements in and relating to the Focussing Arrangement for Photographic Cameras." J. C. SHEPSTONE.—*Dated June 4, 1890.*

No. 8724.—"Improvements relating to Means for Admitting Light to, whilst Excluding Actinic Rays from, Photographic Dark Rooms and the like." G. V. FOSBERY.—*Dated June 5, 1890.*

No. 8822.—"Improvements in Roller Holders for Photography." W. G. THOMSON and W. WARD.—*Dated June 7, 1890.*

PATENTS COMPLETED.

IMPROVED APPARATUS FOR TAKING PHOTOGRAPHS IN RAPID SERIES.

No. 10,151. WILLIAM FRIESE GREENE, 92 Piccadilly, London, and MORTIMER EVANS, Savile Club, Piccadilly.—*May 10, 1890.*

OUR invention has for its object the formation of photographic pictures, and relates chiefly to the production of such pictures as are necessary to illustrate and register the movements of animals, insects, or moving objects, either taken singly or in masses, as may be desired.

For this purpose we construct an apparatus by which with a single camera and lens a rapid series of such pictures may be taken, and by which a series of fresh photographic sensitive films, or portions of such photographic films, may be substituted for those which have been exposed to the action of light with sufficient rapidity for the desired end.

To carry out our invention we provide a main shaft which is actuated either by a winch turned by hand, clock-work, or otherwise. To this shaft is attached wheel-work and counter shafts by which the whole apparatus is driven, and the necessary cycle of motions performed.

By the rotation of this shaft the prepared film is paid out and placed in position to receive the photographic impressions, and it is then automatically exposed to the action of light; the light is then cut off, and the exposed film is passed on and wound up on a receiving roller, fresh film being at the same time paid out to receive the succeeding impression, which is, after exposure, again passed on and wound up as before. All these movements go on so long as the main shaft is rotated and there is film on which to operate, the number of such pictures being limited alone by the length or amount of film provided.

To provide for the production of many pictures, such as would constitute a lengthened series of such pictures, and to enable three hundred or more to be taken conveniently and in rapid series, we arrange a long roll of sensitive photographic film on one of the spindles or counter-shafts before mentioned, and this spindle is so arranged that as it rotates under the driving action of the main shaft it pays out the film as fast as it is needed. To another spindle or counter shaft the free end of the film is attached, and the arrangement is such that by means of the main shaft this second counter shaft is caused to rotate in a reverse direction to that of the former, or paying-out spindle, and its action consequently is to wind the film up as fast as it is paid out.

Intermediate of these two rollers or counter shafts we arrange an exposure screen, over which the sensitive film passes on its way to the rolling up shaft, and it is whilst the film rests on this exposure screen that it is subjected to the action of the photographic image.

As both paying-out and rolling-up rollers have a continuous motion communicated to them by the driving shaft, and as it is desirous that the film during its exposure to the light should be at rest, we provide an arrangement to effect this, which is as follows:—Immediately beyond the exposure screen and between it and the up-winding roller we place an intermittently acting drum of such a diameter and circumference as that each turn thereof will take up, or roll forward, the exact amount of film that is required for each picture, and in passing this film forward the drum also draws into the exposure position a fresh length of film ready to be exposed.

To effect this intermittent motion we provide the aforesaid drum with a single long escapement tooth, which, when the drum is not in motion, rests on the cylindrical portion of a slotted pinion, which gears into and is driven by the main shaft with a continuous motion. The slot in this pinion is so arranged that one only during each revolution of the pinion does it allow the escape tooth to pass, and when this occurs the drum under the action of a driving spring with which it is provided makes one full turn, when the escapement tooth coming round again, rests on the cylindrical portion of the slotted pinion as before.

The spindle on which the drum revolves also gears into and is driven with a uniform motion from the main shaft, and to this shaft is attached the one end of a coiled spring, the other end of which is fixed to the inner circumference of the drum itself. As the spindle revolves this spring winds up, and on the release of the escape tooth and drum the spring unwinds, carrying both the drum and escape tooth with it. Thus the film is passed forward between winding and unwinding rollers at this point only with the necessary intermittent motion.

The constant uniform motion of the paying-out spindle as unwinds causes a certain uniform length of the film to pass forward towards the exposure screen, when it collects into a kind of loop in readiness for use: it cannot, however, pass into the position for actual exposure until that portion of the film occupying such position has been withdrawn; as soon, however, as the detent tooth attached to the drum escapes through the slot in the pinion the drum makes a single revolution, and in so doing both removes the exposed film from the screen, and at the same time draws the loop of fresh film which has been gathering into the exposure position, and at the same time passes forward the already exposed film into the form of another loop in readiness to be wound up on the winding roller, which being provided with a similar uniform continuous motion from the main shaft as the paying-out roller proceeds gradually to wind up this loop, so that it is wholly taken up by the time the escape tooth again rotates, when a fresh loop of film is passed forward.

The shutter for exposing the film to photographic action is made in two portions, each provided with an aperture or slot which in one position only allows the light from the lens to pass, and it is only by the simultaneous action of these two shutters, that is, when the apertures in each coincide at a given moment, that any action of light on the film can take place.

One portion of this shutter is caused to revolve with a uniform motion as it is driven from the main shaft, the other portion is worked by a rocker or slide actuated by a cam. To this latter portion of the shutter is attached a spring with a tension screw to regulate its speed of action. In this way the duration of exposure is rendered entirely independent of the speed of the driving shaft, as by the turning of this screw a long or short exposure (within limits) can be ensured, whatever the number of exposures per minute may be.

The moment the aperture in the revolving shutter comes into position with the lens, the cam lets the sliding shutter go, and by means of its attached spring the aperture in the sliding shutter also crosses, and the exposure is effected.

The action of this shutter is so arranged that each exposure occurs simultaneously with the at-rest position of the drum escape tooth and the film on the exposure screen.

The claims are as follows:—1. So arranging the mechanism of a camera as to cause the cycle of operations necessary for the obtainment of a latent photographic representation, or a series of such representations, to be automatically effected in proper sequence, by means deriving their actuation from the rotation of a common shaft or the equivalent, to which motion may be imparted by hand or otherwise, with or without means for allowing of the period of exposure being varied as may be required. 2. In a camera, the combination of an intermittently opening shutter with mechanism for giving an intermittent movement to a sensitised strip, the whole being actuated from a common shaft, or its equivalent, in such manner that the opening of the shutter takes place during a period of rest of the strip. 3. In a camera, in combination, a device which at each operation advances into position for exposure to the action of the lens a portion of a sensitised strip fed thereto, and simultaneously advances from the position of exposure towards a take-up device the portion of the strip lastly exposed, and which between such times of operation arrests the portion of the strip in position for exposure or allows of its being so arrested, an exposure device (which may or may not be capable of independent adjustment to regulate the period of exposure as may be required) timed to operate while the portion of the strip in position for exposure is arrested, and a shaft to which such devices are so connected as to be caused to operate in proper sequence upon the rotation of such shaft. 4. In a camera, in combination, a device which at each operation advances into position for exposure to the action of the lens a portion of a sensitised strip fed thereto, and simultaneously advances from the position of exposure towards a take-up device, the portion of the strip lastly exposed, and which, between such times of operation, arrests the portion of the strip in position for exposure, or allows of its being so arrested, and a shaft to which such device is so connected as to be caused to operate upon the rotation thereof. 5. In a camera, in combination, let-off and take-up devices which at each operation respectively let off and take up a portion of a sensitised strip of the length required for each representation, a device which at each operation advances into position for exposure to the lens the portion of the strip supplied by the let-off device, and advances from the position of exposure towards the take-up device the portion of the strip lastly exposed, and which, between such times of operation arrests the portion of the strip in position for exposure, or allows of its being so arrested, an exposure device (which may or may not be capable of independent adjustment to regulate the period of exposure as may be required) timed to operate while the portion of the strip in position for exposure is arrested, and a common shaft to which such devices are so connected as to be caused to operate in proper sequence upon the rotation of such shaft. 6. In a camera, in combination, let-off and take-up devices which at each operation respectively let off and take up a portion of a sensitised strip of the length required for each representation, a device which at each operation advances into position for exposure to the action of the lens the portion of the strip supplied by the let-off device, and advances from the position of exposure towards the take-up device the portion of the strip lastly exposed, and which between such times of operation arrests the portion of the strip in position for exposure or allows of its being so arrested, and a common shaft to which such devices are so connected as to be caused to operate in proper sequence upon the rotation of such shaft. 7. In a camera, in combination, the spindle means for operating it, the roller and connecting spring, the escapement tooth, the escapement hub and gearing connecting the latter with the spindle. 8. In a camera, in combination, the spindle means for operating it, the roller and connecting spring, the escapement tooth, the escapement hub and gearing connecting the latter with the spindle, the let-off roll, the take-up roller, the connecting feed roller, the shaft, and gearing connecting the shaft with the rollers respectively. 9. In a camera, in combination, the spindle means for operating it, the roller and connecting spring, the escapement tooth, the escapement hub, and gearing connecting the latter with the spindle, the let-off roll, the take-up roller, the feed roller, the shaft, and gearing connecting the shaft with the rollers respectively. 10. In a camera, in combination, the automatically acting roller, the frictionally driven roller, the shaft, and gearing connecting the shaft with such rollers respectively, substantially as and for the purposes set forth. 11. In a camera, in combination, the automatically

acting roller, the frictionally driven rollers, the shaft, and gearing connecting the shaft with such rollers respectively, substantially as and for the purposes set forth. 12. In a camera, in combination, the automatically acting roller, the frictionally driven rollers, the connecting feed roller, the shaft, and gearing connecting the shaft with such rollers respectively, substantially as and for the purposes set forth. 13. In a camera, in combination, the roller, the shaft, means for frictionally actuating the roller from the shaft, the roll and the connecting feed roller, for frictionally actuating the roll from the roll, substantially as and for the purposes set forth. 14. In a camera, in combination, the roller, the shaft, and means for frictionally actuating the roller from the shaft, substantially as and for the purposes set forth.

The complete specification is illustrated.

An Improved Photographic Camera.

No. 5046. William Blake Luce, Boston, Suffolk, Massachusetts, United States of America.—*May* 10, 1890.

The object of this invention is the construction of an improved photographic camera of the kind in which several sensitive plates can be placed at one time and pictures taken on each of them consecutively.

The invention consists essentially of a vertically elongated camera box, having upright grooves in which the plate holders are loosely held, and an enlarged lens tube open at its inner end, and moveable longitudinally in the lower part of the camera box in such a manner as to support the plate holders and permit them to drop one at a time into the field of the lens.

A camera box has vertical grooves at the sides. In these grooves the ends of the plate holders loosely fit, so as to permit the latter to be easily moved up and down. Through an aperture in the front of the camera box is inserted the lens tube, which is of a length approximately equal to the depth from front to back of the camera box. The inner end of the lens tube is open, while its exterior end is closed and provided with a lens. When the lens tube is pushed entirely back into the camera box the plate holders rest upon its upper side, and as it is slowly withdrawn the plate holders drop one by one to the open end of the lens tube, where, being in the field of the lens, a picture can be taken upon the sensitive plate carried by each plate holder. The distance of the open end from the lens is of course made equal to the focal length of the lens, and the plate holders are formed of opaque material, such as sheet metal, in order to prevent the pictures from being fogged by the taking of the succeeding ones.

The plate holders consist each of a square of thin sheet metal slightly less in length than the width of the camera box, and having a slight flange at the top and bottom edges. The sensitive plates must be put in these plate holders when the latter are removed from the camera box, for the reason that when inserted in the grooves the plates and plate holders are inseparable.

Among the several ways in which the lens tube can be made, the patentee prefers to construct it of a cylindrical form, with a screw-thread on its external surface engaging a nut on the camera box. The pitch of these threads being equal to the width of the grooves, each turn of the lens tube causes a plate holder to fall into the field of the lens, exposing a fresh plate and shielding the preceding ones.

In other forms of camera the lens tube is smooth on its exterior surface, and adapted to slide in a light-tight packing.

For the insertion and removal of the plates and plate holders the top of the camera box is provided with a suitable sliding cover.

The claims are:—1. The combination of the vertically elongated camera box having the upright grooves and the aperture in the lower part of its front, and the lens tube open at its inner end and longitudinally moveable in said aperture, said parts being so arranged that when the lens tube is within the camera box sensitive plates placed in the grooves of the latter are supported by the lens tube, and, as it is withdrawn, the plates drop one by one into the field of the lens carried by the lens tube, substantially as and for the purpose specified. 2. The camera box having the vertical grooves and apertured front, said aperture being circular and internally threaded, in combination with the cylindrical, threaded lens tube removeable in said aperture, substantially as set forth.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 17	North London	Myddelton Hall, Islington, N.
,, 17	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 18	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 18	Bury	
,, 18	Manchester Camera Club	Victoria Hotel.
,, 18	Edinburgh Photo. Club	5, St. Andrew-square.
,, 18	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 19	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

June 10,—James Glaisher, F.R.S. (President), in the chair.

A paper by Sir H. Trueman Wood, on *Photographing the Induction Spark*, was taken as read.

Mr. W. E. Debenham read a paper on *Estimating the Efficiency of Plate Backings*, illustrated by photographs and a diagram. The subject of the paper was one that he thought deserved more attention than it had received. In commencing his investigation he had desired to form some judgment by inspection of the various backings when applied to glass, but this could not satisfactorily be done on plain glass, as the reflection from the front of the glass came to the eye in nearly the same line as that from the back, and so obscured the observation. The two reflections could be separated by coating a prism with the backing, and the reflection from the internal surface could then be examined by itself. He showed such a prism coated in various parts with different backings, and added that it was this sort of inspection which had suggested to him that bitumen, which was considered to stand so high as a backing agent, might be surpassed. This supposition was confirmed by a series of photographs which he had taken of a test object through a prism, the diagonal surface of which had been coated successively with various substances to be examined. Compared with an unbacked surface, bitumen appeared to absorb so much light as to require about two hundred and fifty times the exposure in order to obtain as much photographic action. This was, no doubt, a very large proportion, but gelatine, mixed with an equal quantity of caramel, gave less reflection, and a mixture of gum arabic, caramel, and chine ink, still less. The use of caramel or burnt sugar was not, so far as he was aware, known for plate backing, but it had proved remarkably successful. Another slide showed the effect of photographing by placing a plate immediately behind a small opening and exposing to a given light. Here an exposure of fifteen seconds sufficed to give, with an unbacked plate, the halo characteristic of internal reflection, whilst on a backed portion of the same plate sixty-four times as long showed no such halation.

Mr. J. Spiller said that there were a number of substances that might be available for plate backing, but some of them—aniline dyes particularly—were practically unsuitable on account of the effect which they would have if any got on to the surface of the film, as they would be sure to do. Aniline orange, if it did creep on to the surface of the film, could not be removed by any agent that he knew of. Bitumen was troublesome to remove, and it was very satisfactory to hear of a soluble substance, like caramel, that was so effective as a backing.

Mr. H. Chapman Jones, whilst appreciating the experiments shown, thought that to back plates was a retrograde step. It could only be necessary if the film was not sufficiently dense to stop all light from passing through it. With a less dense film light was lost to the image that ought to be used in building it up. Plates were now to be obtained commercially that showed no halation when photographing dark foliage against bright white clouds. For interiors, however, backing might still be necessary.

Mr. W. Bedford said, with regard to Mr. Jones's statement, that plates were to be had coated thickly enough to prevent halation, he believed it was understood that light did pass through the film and was reflected back on to it, but that the development did not go deep enough to reach it.

Dr. Lindsay Johnson referred to some experiences which made him appreciate the value of backing.

Mr. T. Samuels had used stained collodion, which he recommended as avoiding the dirty practice of removing pigment.

Mr. Jones then read a paper on *The Staining and Clearing of Gelatine Films*, illustrated by a large number of experiments, showing films treated with various combinations of developing and of so-called clearing agents. He had not found any of the latter to produce any greater effect than simple washing with water, and some of them retarded or prevented the clearing action which simple water possessed. He had used pyro, ferrous oxalate, eikonogen, and hydroquinone as the developers to produce stain, and these with and without varying additions of alkali and sulphite. In one set of experiments he found eikonogen to produce no stain, pyro a slight stain but even all over, whilst hydroquinone gave a well-marked stain, darker at the limiting edge than elsewhere. Alum he found rather to act as a mordant in fixing stain than as a remover of stains, whilst a mixture of alum, ferrous sulphate, and citric acid, so far from removing stain, made it more pronounced. The best stain remover was simple water, and the effects supposed to be due to clearing agents were, he thought, attributable to the extra washing the plates so treated received.

Mr. T. Sebastian Davies inquired whether Mr. Jones had experimented with distilled as against ordinary water in washing.

Mr. Arnold Spiller could not agree with Mr. Jones. He noted particularly that the author of the paper had found the use of a mixture of alum, ferrous sulphate, and citric acid give an increased stain. He (Mr. A. Spiller) had been in the habit of using that solution, and found it eminently satisfactory, and that a yellow stain was entirely cleared away by two or three minutes' stay in such a solution. He had also used hydrochloric and citric acids, both with good effect.

Mr. A. Mackie had about ten years ago found ferrous sulphate, used after fixing, gave intensity. A wash of acid removed the intensity and the stain at the same time.

Mr. Arnold Spiller said that during development pyro was decomposed and combined with gelatine. When this was treated with ferrous sulphate ink was formed, which added to the intensity of the negative.

Mr. Jones, in replying, said that he had been led to these experiments by direct observations which they had confirmed. The use of alum he had always found positively detrimental. His fixing bath was hypo, to which sodium carbonate was added, and he never used the same solution a second time.

Mr. J. B. Stacey was elected a member.

It was announced that pictures for the exhibition would have to be sent in by September 15, and that the *soirée* would take place on September 27.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 5,—Mr. W. Coles in the chair,

Mr. J. B. B. Wellington, in speaking of recent travels on the Continent, mentioned that he had passed eleven Custom Houses without meeting with any difficulty as to his photographic apparatus—an improvement upon the state of things formerly existing.

Negatives and prints were then shown, the result of a competition between Messrs. W. M. Hastings and C. H. Cooke in developing plates of unknown exposure; the former using eikonogen, and the latter pyro. Plates had been exposed in pairs by Mr. A. Cowan—some correctly, and some much under-exposed—and one of each pair handed to each competitor without any indication as to the exposures. The general verdict of the members was found to be

in favour of the pyro development for the correctly exposed plates, and of the citrate for the under-exposed ones. It was noticed, however, that the latter were considerably fogged; and Mr. COOKE thought that if he had been as regardless of fog in pushing development with the pyro plates they would have come up quite as much; an opinion that appeared to be generally shared.

Mr. P. EVERETT mentioned that he had tried the intensity of the pale yellow screen shown at the last meeting, and found that albumen paper required three times as long to print under it as without the screen.

The discussion on the subject of the evening, *The Printing Process that Best Renders the Gradations of the Negative*, was opened by Mr. R. P. DRAGE, who said that his own preference was for the good old silver paper, and of this he used and showed samples of two kinds—Lumière's Aristotype, which he thought best of all, and developed prints on Alpha paper. He obtained fuller details and better rendering of the gradations in the shadows with these than with platinum or any matt surface. He considered that the public, too, were of the same opinion, and that the vast majority preferred the older methods for the reasons he had given.

Mr. COOKE questioned whether such full rendering of detail and gradation was required or artistically desirable. He preferred a matt surface such as he got with platinum printing.

Mr. W. E. DEBENHAM thought that the gradation of the negative ought to be preserved as much as possible: there was not, owing to imperfections of the photographic process, such a complete scale of gradation in the negative as was found in nature, and to further cut down this scale by not registering the gradation existing in the negative, was, he considered, wrong. If, in order to preserve these gradations, a glazed surface was essential, then he would be indifferent as to the surface.

The CHAIRMAN said that a process suitable for one subject was not necessarily so for another: detail was important in portraiture, but for large subjects which would be looked at from a distance he considered platinotype more suitable. For anything small ordinary silver paper was better to look at, and quite as artistic. Miniatures were painted by the best artists with quite as much detail as in albumen prints.

Mr. CROUCH considered that Aristotype paper was best for registering the gradations of fine negatives and ultra-matted paper for fewer ones.

Mr. J. S. TEAPE had been printing by two platinum processes—the cold developing, and the Platinotype direct printing paper as now supplied. Prints by both processes were beautiful results, and those which were thought to be the best proved to be upon the new Platinotype paper.

It was decided to continue the discussion at the next meeting.

It was arranged that at the outing to take place on Saturday, the 14th inst., the meeting should be at Wood-street Station, at half-past two, and finish at Hale End, instead of commencing there, as previously announced.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

A meeting of the Committee was held on June 6 at 4, Great James-street, Bedford-row, Mr. W. Bedding, chairman.

Three grants were made and one new member elected.

The new bills were shown, and any firm desirous of assisting the Association can have copies on application to the Hon. Secretary, Mr. H. J. Beasley, 65, Chancery-lane, W.C.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

JUNE 2.—Mr. F. W. Hart in the chair.

The SECRETARY read the report of the Sub-Committee appointed to select a new room for the meetings of the Society, and it was decided upon this report to engage a very suitable room at Wellington Hall, belonging to Mr. Gregory, and after the next meeting, on June 17, the Society will remove into its new quarters.

It having been decided upon this evening to hold an exhibition of camera stands and photographic necessaries, several firms had, upon the invitation of the Council, sent exhibits for the inspection of the members.

Messrs. Linch sent a representative who explained and explained the action of their detective cameras and also the "Perfecto" camera and stand. He also exhibited some of the new aluminium lens mounts.

Mr. Gentry, of Buckingham-street, Strand, showed his patent portable camera and improved double sliding tripod. Mr. Gentry particularly drew attention to the tripod head and brass ring screwed to the base-board of the camera, by which the camera can be easily placed in position on the stand, and being once screwed firmly to the tripod can be rotated to any point. The camera stand is so made that the camera can easily be placed at even the low distance of two feet from the ground.

Mr. Newman, of Oxford-street, showed a new instantaneous shutter specially made for Mr. L. Medland for use with his detective camera, and by means of which he hoped to attain a quicker rate of exposure than could be given by any shutter yet made.

Messrs. Marion & Co. sent a Perfecto, a Samuel's, and an Ultra camera with double backs and stand, together with one of their stereoscopic cameras, which also formed a stereoscope. They also sent one of the well-known Ashford stands, and their new book on the flash light by Mr. Slingsby. The cameras were explained to the members by Mr. Marion.

Mr. Stanley, of London Bridge, had sent a selection of camera stands adaptable to various heights.

Messrs. Griffin sent several exhibits, and among them their new automatic rocker, which being once wound up needs no further attention to keep the developer flowing easily over the plate. They also exhibited a very compact and useful set of scales and weights.

Messrs. Abraham exhibited their two detective cameras, and also their new walking-stick camera stand.

Mr. Park sent one of his new light camera stands with ball-and-socket joint. The cost of this stand is to be about 6s.

Messrs. Harper Brothers, of Settle, Yorkshire, sent one of their new alpenstock camera stands.

Letters were received from several manufacturers stating that owing to the exhibition at the Drapers' Company's Hall they regretted not being able to send exhibits.

The next meeting of the Society will be on Tuesday evening, June 17, which will be a technical evening, and the last gathering of the Society in Myddelton Hall.

HOLBORN CAMERA CLUB.

MAY 30.—Mr. E. Dunmore was elected an honorary member.

The following questions were then read from the question box:—

"The sensitometer number of the Phœnix plates?"—This the SECRETARY promised to find out from the makers.

"A good hydroquinone developer?"—The Ilford formula, which is as follows, was strongly recommended:—Hydroquinone, one hundred and sixty grains; sodium sulphite, two ounces; bromide of potassium, thirty grains; water, to twenty ounces. Sodium hydrate, one hundred grains; water, twenty ounces; and using equal parts of each.

"The best way of keeping hydroquinone—in solution or crystals?"—Crystals, decidedly, in deep blue or yellow glass bottle.

"A remedy for green fog!"—Soak in solution of bichromate of potash and thorough washing afterwards in water.

ANOTHER meeting was held on the 6th inst. to see a demonstration and hear a few words about Alpha printing.

Mr. JOHN HOWSON, of the Britannia Works, Ilford, who had kindly consented to give the demonstration, then said:—Premising that Alpha paper is a development paper, and that it is often urged against such papers that they lack to some extent a perfect range of half tone, I claim for Alpha a complete freedom from that objection, and venture to say that the specimens I now pass round will carry with them full proof of this assertion. Here we have prints from the same negatives on platinum and Alpha papers, and I may freely say that I am a great admirer of platinum prints, and that any comparisons I make between the two processes are not made in any spirit of detraction of the merits of platinum, but simply in praise of Alpha as reaching that high standard of perfection which platinum prints possess. These prints were made in the studio of a prominent West-End firm which makes platinum pictures a leading feature of its work; with the Alpha paper the same operator was very imperfectly acquainted, and yet I think you will readily admit that these latter prints leave nothing to be desired in the way of comparison. It must be remembered also that the negatives were specially made for platinum work—crisp, dense, and vigorous—whilst the negatives most suitable for Alpha paper are those rather thin and wanting in the characteristics I have mentioned. Then as to colour, I show you all shades from black to red, all equally clear and brilliant. It is, I know, sometimes urged against Alpha that though the colours are varied enough, it is difficult to get the colours alike or those you want. Well, I say *that* is all a question of careful working, as all photographic processes are. Given exactly equal exposures, I will guarantee that any one of you can produce a dozen prints from any negative so true to tint that not any difference can be detected between them. This brings me to a point I cannot too strongly insist on, viz., the necessity of care in exposure. This is too often a matter of guess-work: you put a sheet of paper in the frame, hold it at random at a supposed twelve inches from the gas, and expose, and in turning the gas up for the next exposure you half do it, and make your random shot at a distance which is really two inches nearer or further away, and the result is half a dozen prints in as many colours. Mind, I do not say this is the rule; it is, of course, an exaggerated sketch of facts, but it will present to you the point to be enforced. Now I want to show you the method we adopt to secure uniformity of exposure, and though the apparatus is unnecessary in the completeness for an amateur's ordinary work, it will point the moral of my remarks. We have, first, a gas burner with a regulator and gauge, so that we know how many feet of gas we are burning, and can always secure a uniform light; second, a baseboard marked off in inches, and a printing frame holder sliding on the baseboard, so that it is always possible to gauge to a nicety our distance from the gas. These two give all the essentials for absolute uniformity in such work. Of the manipulations proper I need not speak, as the instructions issued with the paper cover the ground fully. I will only point out one or two means of variation for use in special cases. With a negative which is dense and shows great contrast it is necessary, in order to secure the full half tones, to give long exposures and use the normal developer. If this carries the colour of the resulting print too far into the reds then we can modify the method by shortening the exposure and using a developer with somewhat less bromide; that is (bromide being a retarder of detail), we have a more vigorous action of the developer and less contrast. It will thus be seen that length of exposure and strength of developer are to a considerable extent interchangeable in their power of producing the same results, and I might just mention that long exposure gives red tones, short ones greenish blacks. Then with a thin negative, where it is necessary to get more contrast in the print than the negative shows, we must give short exposure and use a well-restrained developer. Of course, in using the term short exposure I mean only in the comparative sense, as if too short you will get that greenish black I mentioned, which is not only objectionable to the eye, but difficult to get rid of in the toning bath. For black tones we need a short exposure, vigorous developer applied until the image is well out, and a quiet toning bath. For sepias and browns we expose a trifle longer, but still bordering on under-exposure, using a vigorous developer, and short toning little more than sufficient to fix the print. Reds, as I mentioned, are the result of long exposures, and can be toned to the point desired, passing through the various tones of that colour into the photographic purple and eventually a bright blue. It must be remembered that when first put in the toning bath the prints lose practically all their vigour, and become washed-out, unpleasant, coloured things, which have frightened beginners into a belief that they are utterly spoiled. They soon recover, and in a few minutes begin to take their ultimate appearance. They lose nothing in depth or detail in the toning bath, and the only change observable during this part of the process is that they are a little

lighter in tone than when ultimately dried. One other point and I have done. This is the necessity for cleanliness. One trace of hypo, pyro, or any other chemical than those we are using in each stage of our work is fatal to good results. That there is *not* more trouble in working the paper than albumenised papers I trust our operations here to-night will readily convince you, and if you try Alpha, as I hope you will, you will find a new power placed in your hands—a power of producing prints independently of daylight in any colour, blue, sepia, red, or purple, and any surface, ordinary, highly enamelled, or matt, and what is also most important, the pictures obtained are as permanent as the paper on which they are printed.

BATH PHOTOGRAPHIC SOCIETY.

MAY 28,—Mr. George F. Powell in the chair.

Dr. Preston King and Messrs. E. J. Appleby and G. J. Turvey were elected members.

Messrs. P. Graham and Friese Greene were requested to represent the Society at the Chester Convention.

Watkins' exposure meter was then exhibited, and the method of using it was explained by the Secretary.

Mr. C. CLOAKLEY showed an improved sliding tripod in which the lower parts are double. This he found conferred great rigidity. He also exhibited an instantaneous drop shutter arranged to travel on runners, the object being to slide the shutter clear of lens opening during focussing for stereoscopic work and other purposes.

Mr. PHILIP BRAHAM, F.C.S., F.R.M.S., then delivered an able lecture on the subject of *Photo-micrography*, which he fully illustrated. Mr. Braham commenced by saying photography is a powerful aid to science and truth, and in each branch of investigation its uses are increasing, and also arts and manufactures are benefited by it. What future developments may be, it is hardly competent for the human intellect more than dimly to surmise. In astronomical investigation it had already done great service, and objects unseen by the human eye have been developed by the sensitive film, and, assisted by spectroscopy, given information concerning systems hitherto unknown; and in microscopic investigations permanent and truthful records can be retained of transitive subjects, and successive periods in formation and development printed on the film for future reference. The small Bijou limelight was shown to be, next to sunlight, the best for producing sharp pictures, as the rays emanate from a spot of light, while with other lights a portion of a sheet of flame is used, and cannot give a perfect image. The diminutive limelight is fitted on a condenser stand, or on the microscope in place of the mirror, and has an adjustable lens in front to produce a microscopic objective, a convergent, divergent, or parallel ray being only used, with no eyepiece, as every additional lens interferes with the accuracy of the image. If different objectives are used and sufficient distance between them and the sensitive plate, photographs of any required size can be taken. There may be a slight adjustment required from the visually perfect image to the photographic. This can only be accurately ascertained by experiment, as this distance varies in different objectives. Photographs were taken of a microscopic photograph to graphically illustrate the difference between micro-photography and photo-micrography, and also of an opaque object, which were very successful. With regard to objectives generally, the lecturer said that in the telescope the effective or useful area should be clearly specified, and the angular aperture or effective area in microscopic objectives, and in photographic lenses the largest stop with which a sharp picture can be obtained should be known.

A discussion followed, in which Messrs. Wheatcroft, Wells, Bristow, Dr. Williams, C. G. R. Wood, C. Cloakley, Dr. King, and the Chairman took part. Several questions were asked and replied to.

A hearty vote of thanks was given to the lecturer.

Mr. J. A. Rudge exhibited in action the machine which he has invented and named "Biphantascope." The object of the invention is to take photographs which can, by the same lens, be reproduced with sufficient exactitude to record animation. Thus, facial expression, under any circumstances, may be shown by means of transparencies from suitable negatives with all the muscular action noticeable in life, and free from jerkiness attendant upon the "wheel of life" method adopted by Muybridge and others.

The Chairman showed a series of pictures made by means of the No. 2 Kodak charged with a band of sensitive celluloid. Many of the prints were the best we have seen of this class of work.

Mr. E. E. Peacock handed round examples of combination printing of a novel and effective character.

Two fine studies of cloudland, reproduced on bromide opals, 24×18, were sent for exhibition by Mr. Friese Greene.

LEWES PHOTOGRAPHIC SOCIETY.

JUNE 6.—The prints sent in to the quarterly competition were on view. Mr. H. S. STORNS acted as judge, and attended the meeting specially to explain the merits and demerits of the various prints submitted to him. The certificates in Classes 1 and 2 were both awarded to Mr. G. J. Wightman, who was congratulated by the members for securing both the awards.

Mr. G. J. WIGHTMAN then recounted his *Twelve Months' Experience as an Amateur Photographer* in a very amusing and interesting manner. In the course of his remarks he said he owed his success to the Society, and he advised all who wanted a healthy and instructive hobby to take up photography.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

JUNE 3,—Mr. B. J. Taylor in the chair.

Mr. T. G. Hibbert gave a demonstration on *Kallitype Printing*. Having some specimens printed, he proceeded to develop them somewhat after the manner of the platinotype process, after which a general discussion followed, and it was agreed that as yet it was not superior, if equal, to the platinotype process, but would no doubt be considerably improved.

VIENNA PHOTOGRAPHIC SOCIETY.

MAY 6,—Councillor Volkmer in the chair.

After the usual formalities and business had been gone through, the attention of the meeting was directed by Herr LÖWY to some of the exhibits placed before it. These comprised a number of platinotypes of pictures in the Belvedere Gallery—a reproduction of Kaulbach's *Lute Player*, and a miniature of Beethoven, the latter so excellently executed as to be practically indistinguishable from the original.

Herr DIMTSCHINSKY, from St. Petersburg, then proceeded to describe some improvements which he had introduced in zinc blocks, designed to combine the advantages of zinc and copper in one, and which consisted in coating, or rather plating, the former metal with the latter.

Herr LUCKHARDT then proceeded to describe an enlargement of a church which had been received from Herr Otto Müller, of Zürich, the original view of which was no larger than a pin's head. The enlargement, as Herr Luckhardt pointed out, presented the appearance of a view through a good telescope, even an inscription on the roof, and the hour indicated by the clock, being visible. Finally, Herr Luckhardt exhibited and described a series of prints on bromide paper, which were copied by magnesium light for the purpose of illustrating Herr Voigt's lecture, and which showed very well the gradual change on weakening the source of light from a negative to a positive.

Herr RUDOLF MUSCHEK was then invited by the CHAIRMAN to deliver his lecture on the *Technique of Heliogravure*, the delivery if which was followed by the meeting with much interest, and was greeted at its termination with applause.

The CHAIRMAN (Dr. R. Volkmer) thanked the lecturer for his interesting address, pointing out, however, that the future of the copper-block rapid printing process was not so hopeless as the speaker had supposed, for he had himself seen one at the Paris Exhibition which turned out some four hundred prints per hour.

Dr. EDER then delivered an address dealing mainly with Herr V. Schumann's recent researches in spectrography. The speaker stated that by employing a small spectroscope of quartz and fluorite, Herr Schumann had been able to prove the existence of bands of rays of high refrangibility in the blue. Dr. Eder then proceeded to exhibit several new cameras, devoting a considerable amount of time to a description of Lomann's new invention, which, as it is now fairly familiar to the public, may be omitted from this report. A number of new flash lamps had also been received at the photographic research laboratory, of which Dr. Eder especially praised the construction of Herr Henza (engineer), Vienna, as also that of Dr. Hesekiel, of Berlin; photographs taken by Herr Baltin with the latter lamp being of quite special excellence. Dr. Eder concluded his remarks by informing the meeting that the special course of instruction in "glass etching by means of photographic copying processes," which had been given during the last term, had been very well attended, and excellent results already obtained by the pupils.

The CHAIRMAN then called on Herr Einsle to read his promised paper on the *Facsimile Reproduction of Antique Engravings*. In spite of the lateness of the hour, Herr Einsle's remarks were received with the greatest attention, and their conclusion greeted with prolonged applause.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

To the EDITOR.

SIR,—Allow me through your columns to announce that the proceedings of the forthcoming meeting at Chester will be opened by the Mayor of Chester, at a *conversazione* to be held at the Town Hall, on the evening of the 23rd inst.

Excursions have been arranged during the week to the following places:—Conway Valley, Bettws-y-Coed, Hawarden, Eaton Hall, Vale of Llangollen, Royal Mersey Yacht Regatta, Old Moreton Hall.

At the evening meetings papers will be read as follows:—"The Records of Photo-micrography," Mr. A. Pringle; "Imagining and Imaging," Mr. P. H. Newman; "Orthochromatic Photography with Rhodamin," Mr. C. H. Bothamley; "Photography in Norway," Mr. Paul Lange; "Astronomical Photography," Mr. A. A. Common; "A Magazine Camera and Lantern," Mr. Friese Greene. Reports also will be received from the Lens Standard Committee and the Weights, Measures, and Formulæ Committee.

Permission has been given to photograph the following places at any time during the week upon production of membership ticket:—Conway Castle, interior and exterior, by invitation from the President and Council of the Royal Cumbrian Academy of Art; Chester Cathedral and precincts, by the Very Rev. the Dean; St. John's Church and ruins, by the Rev. S. Cooper Scott; interior and exterior of Eaton Hall and Park, by his Grace the Duke of Westminster; Hawarden Castle and Park, by W. H. Gladstone, Esq. A fully detailed programme will be forwarded on application.—I am, yours, &c.,

J. J. BRIGINSHAW, *Hon. Sec.*

128, *Southwark-street, S.E.*

MOTTLING.

To the EDITOR.

SIR,—I should like to offer a few remarks upon the subject dealt with by Mr. Dunmore in your article under this heading in your number of the 6th inst., having given the question some amount of consideration.

I feel convinced that the correct explanation of the most common

forms of mottling is to be found in no single one of the causes enumerated by the writer of your article, but most probably in a combination of the forth and fifth suggested causes. In adding ammonia solution to the pyro (Ilford formula), and holding the glass between the eye and the light, I notice it is some time before the two solutions mix intimately, owing, no doubt, to their different specific gravities.

Now, consider the effect of pouring this imperfectly mixed solution upon an undeveloped plate; of rocking the tray for a short time, and then *leaving it at rest*. The two incompletely mixed solutions would arrange themselves in much the same way as a mixture of fine sand and water will arrange itself under similar treatment, viz., the denser solution would break up into portions which, if they could be made visible, would appear as distinct mottles. A similar set of causes appears to be at work in the production of "mackerel" skies.

Given this *mottled solution*, and the appearances on the plate are at once explained.—I am, yours, &c., WM. S. BOGERS.

7, Addison-road, Chiswick, June 10, 1890.

To the EDITOR.

SIR,—I should like to offer a few remarks on Mr. E. Dunmore's communication in your issue of the 6th inst., on mottling of the negative film.

Mr. Dunmore asks whether this mottling can be produced at will. I say yes, it can; and as Mr. Dunmore has gone so thoroughly over the ground of mottling and its probable causes, I need not trouble your readers with a repetition of those causes assigned for it. I also think he has ably and truly run the plague to earth when he says, "I have not much doubt in my mind that by keeping the developer in motion the fault might be avoided." This I believe to be quite true with respect to two kinds of mottling, but there is a third kind that I have met with, even when the developing dish is kept in motion. This third kind I will speak of first, it being the one that first came under my notice several years ago—in fact, it was when gelatine dry plates first came into use.

At that time I obtained some white glass developing dishes. They were made with ridges running along the bottom, they had also a knob at each corner, which formed feet for the dish to stand upon, and raised the dish-bottom about half an inch above the table on which it stood. Now, in order to produce this mottling that I first met with, it is only necessary to wash the dish under the tap, and allow the water to run over the sides of the dish; it will find its way to this space between the bottom of the dish and the table, and there form into large drops and hang from the bottom of the dish. If you now pour on your developer, pyro and ammonia—one that has been used, say, twice—this will work rather slowly, and at the end you leave it at rest to gain density. If you have not displaced these drops of water, you will, after fixing the negative, no doubt find a nice crop of opaque markings, caused by the actinic light contained in these drops of water formed at the bottom of the developing dish.

The next kind of mottling that I have met with that can be produced at will is very simple indeed. Take some once or twice used ordinary developer; pour it rather quickly from one cup to the other, so as to produce a good cluster of air bubbles. Now flash the developer over the plate, but only just enough developer to cover the plate; rock the dish rather vigorously in order to keep these bubbles in goodly number. If you now leave the dish at rest, and still have a few nice clusters of bubbles on different parts of the film, you will obtain a fine sample of mottling.

The third kind is, undoubtedly, the mottling which Mr. Dunmore specially alludes to, and is very easy to produce in a similar manner to the last-named, only use a larger quantity and a little older developer, so as to ensure its working very slowly; but do not restrain. Now cover the dish, and leave it at rest; in fact, go about something else, and forget the developing. And if, when you fix the negative, you do not find a good and well-designed pattern of marbling or mottling, which Mr. Dunmore describes as honeycombed, with light and dark patches connected by fine lines over the whole film, try again; you are sure of success at last.

Mr. Dunmore asks why this mottling occurs on one negative and not on the other when two are in one dish. I think the answer is very plain. In the second case of mottling I have given, the air bubbles rest on one negative only. I also think a well-restrained developer will not cause these markings, and this accounts for some people taking half a day to develop without mottlings.—I am, yours, &c., J. KENNERELL.

8, High-street, Wisbech, June 10, 1890.

THE PROPOSED UNION.

To the EDITOR.

SIR,—In reference to the brilliant letter *re* the proposed union of photographic workmen in your issue of the 30th ult., which will be welcomed by all who have the welfare of their business at heart, and doubtless receive the most hearty support, both in principle and financially, from workmen who are earnestly endeavouring to protect their interests, whilst at the same time to raise the competency and market value of their profession.

The suggestions for the formation of this much-needed union are excellent in every way, both to the employer and *employés*, as the former will not be compelled of necessity to give unprofitable trials to incompetent men as at present, besides a choice of select workmen; whilst the latter will be enabled to command a better market price for their work in proportion to ability, which undoubtedly is a great incentive to industry, as underpaid, undermined, and unappreciated labour soon quenches that enthusiastic interest which should possess all who wish to succeed in that which proves to be their life's work.

I further suggest that the photo-mechanical processes be well discussed and encouraged by the proposed union, which, when established, might award orders of merit for progress in this important and rising branch of the profession. As one deeply interested in this admirable scheme, I shall endeavour to secure the interest of all my friends in photo-mechanical work toward the furtherance of the same.—I am, yours, &c.,

Taunton Villa, St. Ann's-road, Stamford-hill. A. ANNING.

EXHIBITION MATTERS, ETC.

To the EDITOR.

SIR,—The writer in your last week's issue is not the only "Disgusted Exhibitor," and I certainly am of opinion that it is high time that something should be done to regulate in a more satisfactory way the fast-and-loose method of treating exhibitors that now takes place at many of the photographic exhibitions, otherwise the glowing prospectuses with such long lists of classes and medals that are now so frequently placed in the hands of photographic workers will be looked upon and treated in the same manner as those very interesting foreign lottery documents that come to us from across the Channel, and which come in so handy for either pipe-lights or curl-papers. I should like to see something of a National Photographic Union started, which would not only take in the regulations of photographic exhibitions, but also the "very much vexed" question of professionals *versus* amateurs, as the cry is still becoming more general, "What is an amateur?" and should men who do work and allow the same to be published to the injury of the professional be recognised as amateurs? And these men, many of them, belong to *amateur societies*, and show work and take awards in classes which are open to amateurs *only*, and from which, of course, professionals are shut out. But in the general classes the "so-called" amateur is again allowed to step in and compete, as they are, I think, without exception open to both amateurs and professionals.

I think that if a National Photographic Union or Association supported both by amateurs and professionals were started, and were to adopt the rule that no amateur member should be permitted to do work on commission or publish work to the injury of the professional, and that all members of the "Union" should be furnished with a credential paper, the showing of which would enable them to obtain accommodation in the way of changing plates, supply of ditto, chemicals, &c. (the said credential should be sufficient to create confidence, and should of course be endorsed "Amateur" or "Professional," as the case might be), the professional would then know who he was dealing with, and we should then work together, "brothers" as of yore, and an amateur would not be looked upon with the suspicion that he now is, and the question, "What is an amateur?" would no longer remain a vexed one.

I trust, Mr. Editor, that now the ball has started rolling you, and abler hands than mine, may give it a push, and that the outcome will be a "National Photographic Union" worthy of the name, supported by both amateurs and professionals, and as members of which they will work together as "brothers."—I am, yours, &c., W. P. MARSH.

Bognor, June 4, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange boat with water foreground, good condition; wanted, good tripod stand for 12×10 camera.—Address, HUDSON, Woodbine-cottage, Mountain Ash.

Wanted, good whole-plate portrait lens in exchange for Bradbury's 9l. shoemakers' sewing machine, very little used.—Address, J. W. LONGSTAFF, Photographer, Spennymoor.

Half-plate light tourist camera, fine condition, with six double dark slides; will exchange for a new Kodak with flexible films and in perfect condition.—Address, PIKE, Chemist, Newcastle-on-Tyne.

Exchange, a cabinet lens, Watchouse stops, a 10×8 Lorebour view and four small lenses for plates two inches; wanted, a good 7×9 rapid rectilinear.—Address, J. PEACH, 117, Great George-street, Liverpool.

Quarter-plate hand camera, six double backs, two finders, outside focussing, enlarging lantern, five-inch condensers, front lens, both as new, in exchange for whole-plate or 10×8 camera, lens, and tripod.—Address, S. E. DAVIES, Troon.

DEATH OF MR. HERBERT B. BERKELEY.—We much regret to learn—although too near our going to press to have time to prepare a notice for this week's issue—of the death of Mr. H. B Berkeley, which occurred on Whit-Monday, the 26th ult., in Algiers, whither he had gone to recuperate his health, which, for some time past, had been failing. Readers of from ten to fifteen years' standing will remember that he was at that time a regular and valued contributor to this JOURNAL. More recently he was connected with the Platinotype Company. He was a good photographer, both in its technical and artistic departments, and his productions have received high medal awards. We trust next week to present a fuller account of the career of the esteemed gentleman, who has been cut off in the very prime of life.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:

P. Downie, Paisley.—*Photograph of a drawing in lampblack of "Highland Mary's House," Greenock.*

W. G.—For the developer of either negatives or positives by the wet collodion process methylated spirit answers quite as well as pure alcohol.

BOGUS.—We cannot in our columns go into financial matters. The financial journals, or some of them, have spoken pretty freely on the subject.

NEMO.—Celluloid negatives will, no doubt, answer the purpose. The thinnest films can be printed from either side, and without much loss of sharpness when the reverse side is used.

R. O. S.—Clearly the "sulphite" of soda is at fault. The local chemist has supplied the *sulphate*. This is confirmed by the price charged. Sulphite of soda cannot be sold retail at 5*d.* per pound.

S. S. S.—The reason why so many of the old silver prints remain unchanged after thirty years or so of existence, while modern ones fade, has so frequently been explained in these pages that we can only refer you to the back numbers.

N. R.—It is not the same firm referred to in our answer to "G. W. S." last week. However, as in your case one half of your travelling expenses was agreed to be paid, you can certainly recover to the extent promised, through the medium of the County Court.

R. E. SCOTT.—For bromide paper only the very best paper should be employed. If common paper be used, although it may serve as a support for the gelatino-bromide, and may be strong enough to bear the washings, it would be very liable to discolour with exposure to light.

T. R. O.—Working under the conditions mentioned, we should say that the negatives are at fault; that is, they are not sufficiently vigorous to yield the tones desired. Unless the negatives are far more brilliant than the general run of those now produced they will not give prints of a rich purple tone.

A. J. C.—If you examine the two negatives (returned as directed) you will see that the mottling has been partly removed from one of them. This we did by immersing the corner of a handkerchief in turpentine and rubbing the surface with it. You will find a good deal on the subject in the present number.

C. DRUCE.—The mistake has been in using extra rapid plates in copying the engravings. In all cases where clear glass is required for the lines, with great density, as in photo-lithography, slow plates will give the best result. Special plates for this work are supplied by Mawson & Swan, but, as compared with ordinary plates, they are slow.

C. HOY.—We will give you in our next such information relative to bichromate poisoning as we can obtain. In the meantime try the effect of the following lotion:—Alcohol, four ounces; glycerine, half an ounce; carbolic acid, one and a half drachms. If the skin is much broken, and this lotion causes too much smarting, dilute slightly with water.

W. PERCIVAL WISEMAN.—The smell arises from the colouring matter having been mixed with some rather stale albumen; but the paper will answer quite well for mats for lantern slides. To get rid of the smell, sift some freshly burnt charcoal over the surface and allow it to remain in contact with it a short time. But the slides will not be affected by the odour.

F. G. HILL.—1. It will depend upon the aptitude of the learner. Three years' tuition ought to produce a good worker.—2. All depends upon artistic ability. First-class operators command a salary of from three to six guineas a-week, and in exceptional cases more. Some "operators" only get 25*s.* or 30*s.* a-week, and that is often quite as much as they are worth. It is simply a question of skill.

GRAPHO sends two prints from the same negative—a portrait, one made before retouching and the other afterwards—and asks our opinion of the work.—It is this:—The negative was a moderately good one to begin with, but in the retouching it has been completely ruined. All the modelling of the face is destroyed and rendered completely flat; all likeness is gone. Study carefully the articles by Mr. Redmond Barrett, now appearing.

Z.—With such a studio as you have you ought to obtain good pictures at all times of the day, and why you cannot we do not see. One could hardly desire a better studio to work in. The difficulty arises from inexperience in the management of the light. A few tentative experiments will, no doubt, set you right. Failing this, we suggest that you invoke the aid of a professional photographer in your neighbourhood to give you tuition in lighting.

EXPERIMENTALIST.—You may take it for granted that all the different photo-mechanical processes are worked, more or less, as "secret processes;" that is, those who work them commercially do not publish the details of their methods. If they did it would require a considerable amount of experience to produce results equal to those most of them issue. In all the mechanical processes skill counts for quite as much as, if not more than, mere formulæ. Persevere with your experiments. We wish you success.

C. J. W. writes: "Could you inform me where the glass known as French crystal (used for covering lantern slides) can be obtained in sufficiently large pieces for small frames? I have inquired at some of the large London glass warehouses, and they do not stock it or seem to know where it can be got."—In reply: Colourless French glass can be obtained in large sheets at Goslett's glass warehouse, Soho-square, London. At any rate, we saw a considerable quantity of it when calling there over a year ago. But this kind of glass is not usually employed for covering lantern slides; it is rather used in the framing of water-colour paintings.

D. M. asks: "1, Is the tungstate toning solution fit to use after it begins to get yellow through frequent use?—2. How much paper ought ten ounces to tone?—3. What is the best developer to use for 'instantaneous' exposures?"—1. Yes, if it still continues to tone.—2. That depends upon the quantity of gold there is in the ten ounces of bath. Roughly, each grain of chloride of gold will tone one sheet of paper.—3. Any developer, if the plates are fully exposed. If they are much under-exposed perhaps eikonogen will yield most detail.

J. HUTCHINGS.—The studio will be very difficult to work, seeing that there is nothing but top light, and the lowest part of that is twelve feet from the floor; still, good portraits are to be obtained in such a studio. Stop off permanently five feet at the background end, and put dark blue blinds on each side of the ridge, so that either side can be used. Keep the ground-glass end, through which but little light enters, open to soften the shadows. One or two white or pale blue reflectors placed at an angle will be required to soften the shadows cast by the strong top light. The side walls of the room should be coloured or papered pale blue, as this will tend to diffuse the light, and so produce softer shadows. A platform two or three feet high, to raise the sitter, would be advantageous.

R. H. THOMAS (Youghal).—Our correspondent complains that in virtue of an advertisement for enlarging and finishing which he has seen in our outer pages, he, one month ago, sent three negatives with a request for invoice by return, when he would remit, as he was in a hurry for the pictures. Although he had written repeatedly since, and had even sent stamps for reply, he could not get an answer. He then sent stamps to have the negatives returned, and this, too, is disregarded. He asks if he has any redress for loss of customer and injury to business? In reply, we would say, from a careful perusal of the statements in the advertisement, that Mr. Thomas can certainly obtain redress through the County Court. We regret that any London tradesman should act in such a manner, a regret we have more than once previously expressed in connexion with a similar transaction. Of course, our readers must understand that we are not responsible for statements made in advertisements.

No. 6 says that when he, as an amateur, applied to a professional photographer in —— last week for the use of his dark room to develop a couple of trial plates, he was refused, and asks if this was not churlish.—It depends upon circumstances. Possibly the room could not well be spared, or the photographer might, from past experience, have had a reason for the refusal. Some amateurs when they gain access to a dark room have no consideration for the inconvenience they may cause. A gentleman of our acquaintance recently detailed his experiences to us of allowing the use of his dark room to amateurs. They were certainly not such as to warrant him in doing so in future. With one or two exceptions he said the room was monopolised for an unduly long time—in one case two hours during the middle of the day—and then left in such a dirtied and slopped condition, and this was the general rule, that it had to be thoroughly cleansed before a careful worker could use it again. Under such circumstances there is little wonder that the use of a professional's dark room is refused.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, June 18, *Mounting and Finishing Photographs;* June 25, *Matt-Surface Printing.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Monthly Outing, June 14. Members to meet at Wood-street Station (G.E.R.) at forty minutes past two, and walk through Cook's Folly to Hale End. Trains from Liverpool-street at two minutes past two and sixteen minutes past two.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Next meeting Tuesday, the 17th inst., at half-past seven p.m. Mr. J. Hedley Robinson will initiate a discussion on *Hand Cameras.* Members are invited to bring to the meeting any such cameras in their possession.

HOLBORN CAMERA CLUB.—Arrangements for June.—Friday, June 13: Mr. Plumbridge will read a paper, to be followed by a discussion. Saturday, June 14: Field day to Laindon Hills. Meet at Fenchurch-street Station, and all go by the cheap quarter-past two train, 1*s.* return from Plaistow. Friday, June 20: Hints and practical demonstration to beginners by Mr. Luxton, *On Lighting the Subject in Portraiture, &c.* Sunday, June 22: Extra official outing to St. Albans, organized by Mr. T. O. Dear, who will be pleased to hear from members intending to go. Friday, June 27: Lantern night. *Amateur Photographer* set of slides.

OUR attention is specially directed by Mr. J. R. Gotz to some prints on the new Obernetter matt-surface paper shown at the recent City Photographic Exhibition, but which had escaped our notice. They are obtained with the new concentrated toning solution of which we spoke a few weeks since, and are really charming as regards artistic merit. The surface is quite fine and smooth in texture but devoid of gloss.

Mr. J. Désiré England, too, directs attention to some celluloid negatives exhibited by him, which we had an opportunity of examining at leisure at the meeting of the Photographic Society of Great Britain on Tuesday evening last. They are of two classes, landscape and instantaneous. The former were taken (on his own films) at Weybridge, and the latter by Mr. William England and himself during an outing at Bushey Park on Whit-Monday. These negatives are excellent, and although the travelling was performed on tricycles on a dusty road are free from pinholes.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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THE STAINING OF GELATINE FILMS.

The conclusion arrived at by Mr. H. Chapman Jones, as the result of the experiments detailed in his paper read before the Photographic Society of Great Britain, that plain water is the best clearing agent for stained films, is so extraordinary and is so completely opposed to all past experience, that we cannot help making a few remarks on the subject.

We have to go back upwards of ten years for the first mention of a clearing solution for pyro stained gelatine films. At a meeting of the Photographic Society, Mr. Valentine Blanchard described how an over-dense negative that had been inadvertently left for a considerable time in the alum bath had had its intensity so reduced as to be capable of yielding respectable prints. In the discussion that followed, Captain Abney suggested that in all probability the reduction of density was due merely to the removal of the developing stain from the gelatine, and the consequent alteration in the general colour of the image, a view that was subsequently adopted as the correct one.

From that time alum, either in plain solution or in combination with an acid, has been pretty generally used as a clearing solution, as have also many other solutions of a more or less complicated character, and so far as we are aware it has never hitherto been denied that these have failed to perform the task set them. If, as is now alleged by Mr. Jones, plain water acts as effectually, it seems strange that so many earlier observers should have been so far led astray; and in as complete a manner as the time has permitted, we have put the matter to a series of practical tests of our own.

The developing stain which the clearing solutions are intended to remove varies in character with the agent employed, and to a slight extent with the support upon which the gelatine film is carried; thus the discolouration caused by pyro is quite different to that produced by eikonogen, while a positive on gelatino-bromide paper will be spoiled by a degree of colouration that would probably escape notice in a glass negative.

Pyro is, as all are aware, the substance most liable to produce stains, and its effects are also more difficult to remove than all others, unless it be the peculiar transparent stain sometimes produced by hydroquinone. In conjunction with carbonate of soda it produces a curious effect of general yellowing, which, though removed by the usual clearing solutions, is quickly restored by simple washing. The yellowness caused by the prolonged action of hydroquinone and washing soda is of a deeper and more intense character, and, so far as we have found it, scarcely amenable to any curative treatment. Eikonogen, on the other hand, though rarely showing any serious signs of stain, does occasionally produce a semi-opaque yellowish brown veil, much resembling a bad case of pyro stain, but curiously enough this gives way with the greatest ease to simple washing, no clearing solution being necessary.

Such being the facts of the case, we have confined our experiments to the removal of pyro stain alone, as being the one most generally troublesome, and also the one that seems to form the fairest test. In producing the specimens upon which we have experimented, the films were submitted to the action of pyro in conjunction with ammonia and carbonate of soda—the two most usually employed alkalies—and with and without bromide, sulphite of soda being for obvious reasons omitted in all cases. Stains of various degrees of intensity were produced, from the merest shade of yellowing to the brown semi-opacity produced by long immersion in a much oxidised solution.

The clearing solutions employed were plain saturated solution of alum, and the same with the further addition of the usual proportions of hydrochloric and citric acids. These we considered sufficient, at least as a preliminary test, any more powerful applications being reserved in the event of simple washing proving equally effective.

In every test, strips cut from the same plate were immersed side by side in beakers containing the different clearing solutions as well as plain water, a portion of the film remaining unacted upon in order to show what difference was produced by the treatment.

The results may be summarised as briefly as possible. Pyro and ammonia (whether with or without bromide). Slight stain: removed instantly by alum and citric or alum and hydrochloric acid, and in a few seconds by plain alum; no alteration after ten hours immersion in plain water; subsequent soaking in water caused no restoration of the stain. Medium stain: completely removed in a few seconds by alum and acid, and more slowly but not perfectly discharged by plain alum; water, as in the previous test, produced no change in ten hours. Dense stain: completely removed in a few minutes by alum and acid, not completely removed in ten hours by plain alum; a very slight reduction by plain water in same period.

Pyro and carbonate of soda gave very similar results, with the exception that the stain was in no case so completely removed, and in every instance reappeared on washing the discharged films. Where the stain was produced by means of a developer containing bromide, the stain reappeared with its original intensity; but where bromide was absent, a slight difference remained after washing—a rather curious result. In no instance, except that of a very dense stain, was any perceptible change noticeable from the action of pure water.

It is possible that our application of simple washing was not sufficiently prolonged, but we think that ten hours is quite as long as we should feel justified in allowing a gelatine film to

soak, especially in hot weather. But even supposing that a further extension of the washing effected the removal of the stain, such treatment can scarcely be considered as affective as that which removes the stain in a few seconds or minutes.

THE EFFECTS OF THE BICHROMATES ON THE SKIN.

The ever-increasing uses of the bichromates in photography, owing to the extension of photo-mechanical processes, induces us once more to refer to the ill-effects the salts sometimes have upon those who have to deal with them. More especially we do this, because, within a very brief period, several inquiries from sufferers have reached us as to the symptoms and the remedies. There is yet another reason for again referring to the subject, namely, many who are now using the bichromates are quite unaware of their physiological properties. In some instances even, no ill-effects have been suspected until they were incurred, and then when the regular medical practitioner was consulted he appeared to be in total ignorance of the cause. In one instance that came under our notice at a London hospital, the effect of bichromate of potash was mistaken for something else having a totally different origin.

With ordinary care no evil result need be met with, but if care be not taken, very unpleasant effects may follow, and when they do, they generally prove difficult of remedy; therefore it behoves employers to caution their assistants or apprentices as to what may be incurred, and how it may be avoided.

The pernicious effects of the bichromates are of two kinds the one is produced by weak hot solutions, such as those resulting from the development of the gelatinous image; the other by cold and more concentrated solutions of the salts like those used in sensitising photo-lithographic papers, carbon tissues, &c. We will deal with the latter first.

It appears to be the opinion of those medical men who have devoted attention to the subject—Dr. B. W. Richardson, F.R.S., &c., among others—that with cold solutions, although they may be strong, little injury need be anticipated if the skin be intact, provided the hands be well washed after contact; but if the skin be scratched or abraded, a very painful sore is liable to result. The place festers and ulcerates, the ulcer eats deeply into the flesh—sometimes to the bone—and then the wounds are exceedingly difficult to heal. They cause a deal of pain, and invariably leave a deep scar behind. However, this may be avoided, as ample warning is given, for when the solution touches an abraded part a smarting ensues. Then the place should at once be well washed under the tap, the full force of the stream being allowed to impinge upon it for some little time. The scratch should then be well sucked for a few minutes. Generally, when this is done without delay, no further inconvenience will be experienced. Should, however, the smarting return, and the part get inflamed, it must not be neglected. It should be bathed with warm water, then washed with very dilute ammonia, and afterwards poulticed. This treatment is usually effective if applied promptly.

The other form of the pernicious effects of bichromate—that caused by more dilute and warm solutions, such as those produced in developing carbon prints and the like—takes the form of a cutaneous disease. This seldom makes its appearance for a long time in continual working, generally many months, even years elapse, though it has been known to show itself within three or four weeks.

The precautions to be taken in evading this evil are to avoid longer contact with the solution than is absolutely necessary, and never to wipe the hands without previously rinsing them in clean water. The hands and arms should be thoroughly washed immediately operations are concluded, using a carbolic soap for the purpose. With these timely precautions serious inconvenience is rarely incurred.

The first symptom of mischief is an itching on the backs of the fingers and between them, accompanied by minute watery pustules. Next, the irritation extends to the backs of the hands and increases in intensity. The pustules also get larger and assume a mattery character. As the disease advances, the skin dries up and throws off bran-like scales, and, in acute cases, it becomes brown and like hardened leather, cracks in a painful manner at the back of the joints, and the itching becomes intolerable. Throughout its progress the disease closely resembles one form of psoriasis, for which it has been mistaken by medical men.

Unfortunately no effectual remedy for the disease is known, but if the use of the salt be discontinued nature herself will effect the cure. The best remedial measures to be adopted appear to be these:—When the first symptoms make their appearance the work should henceforth be done in indiarubber gloves. At bedtime, strong nitrate of mercury ointment should be very sparingly applied, but well rubbed into the skin. During the daytime a lotion composed of alcohol, five ounces; crystallised carbolic acid, forty grains; glycerine, half an ounce, may be applied to allay the irritation. If the skin be badly cracked, and the lotion causes excessive smarting, it must be diluted with water. In very acute cases this lotion would cause too much pain, then a dilute solution of sub-acetate of lead, with a little glycerine added, must be substituted. Carbolic compounds, generally, seem to act beneficially in the bichromate disease, therefore coal-tar soaps should regularly be used by those who work with the salt.

It is a curious fact in connexion with this disease, that it is confined entirely to the parts that come in contact with the solutions, and does not appear to extend beyond. The bichromate seems to be very extraordinary in its action, for many persons have used it with impunity ever since the carbon process was first introduced, and have experienced no inconveniences whatever, while others have suffered severely within a few weeks. It would seem to be dependent entirely upon the system of the individual.

Apropos of the new automatic photographic machines a rather good story is going about. An elderly lady of the sternest "British matron" type, who had heard of the wonderful new "process," happened to come across one of the already common "penny-in-the-slot" machines that supply photographs of celebrities at our railway stations. Placing her penny in the proper receptacle and following the instructions given, she artistically posed herself, and after a due interval opened the drawer and drew out the photograph of a famous burlesque actress in full (?) dress. We have not yet heard the *grand finale*.

Mr. Thos. Comber's ingeniously simple heliostat for use in photo-micrography has excited great interest, and promises to become a popular instrument for that class of work, if indeed the word popular can be used in regard to the details of a subject worked at by very few experts or tyros. It had been hoped that the heliostat would be seen at the Photographic Convention, but Mr. Comber's absence from the district at the time will prevent his exhibiting it. The simplicity of Mr. Comber's arrangement is due chiefly to the fact that the reflected beam is limited to the polar direction, and is deflected in the horizontal

directions by a fixed mirror placed at half the angle of the latitude above the heliostat mirror.

Speaking of mirrors, it is not possible to avoid referring to the latest invention in that direction—the use of celluloid in lieu of glass, a patent for which was accepted in this country a few months ago. The new reflector consists of a sheet of celluloid of the transparent class, silvered at the back with any of the usual silvering materials. According to the patentee, his invention enables him to obtain a tough, flexible, and pliable reflector or "looking-glass," which can be made to assume a great variety of shapes. Originally devised for use instead of a glass reflector in the parabolic semaphore railway signal, it is obvious that a large number of other uses are open to it. The fact that it would not be difficult to obtain it in parabolic or other intricate curve form suggests many opportunities of employment for optical purposes of the coarser kind if only it can be obtained sufficiently transparent. Indeed, one of our readers has suggested that seeing that this substance can be made homogeneous and fairly transparent, photographic lenses of small size might be made possessing no insignificant optical excellence, especially as it would be as possible by means of a mould to give the surfaces elliptical instead of circular.

At the tower of Saint Jacques, Paris, a large water barometer has been erected, and promises to be of real usefulness. It is connected with a registering apparatus, and the addition of a photographic apparatus to enable thermometric readings of the water in the barometer is under consideration. It is, as will be readily understood, owing to its necessarily extreme length, very sensitive, and it is stated that during thunderstorms it is especially active. To erect the instrument special openings had to be made. It is believed that the tube, which is of glass, has the greatest length of any glass tube hitherto made, the length being twelve metres sixty-nine centimetres, about fourteen yards!

We learn from the report of the annual visitation of the Royal Observatory, which was presented the first Friday of this month, that the 14-inch photographic refractor, with 10-inch finding telescope by Sir Howard Grubb, has lately been mounted in the new 18-foot dome over the principal computing room, and that a few trial photographs have been taken with it, and show generally satisfactory results.

Last week's *Nature* contains a very interesting report of a lecture by Mr. Shelford Bidwell, at the Royal Institution early this year, upon lightning and the electric spark, the article being illustrated by woodcuts from photographs of some remarkable flashes recorded by photography. The article itself is too long for complete extraction, and we refer our readers interested in the subject to page 151 *et seq.* of that journal. We refer more particularly to it on account of a remarkable plan devised by members of the Berlin Meteorological Society for photographing flashes. At the last meeting, Dr. Wagner announced that arrangements had been made for endeavouring to take simultaneous photographs of flashes of lightning at widely separated stations during the approaching summer. It was hoped that by these means, if successful, it would be possible to obtain some idea of the special and dimensional relations of the flash.

For a long time past the effect of common salt upon the flame of burning alcohol has been familiar, and its pure yellow has been recommended as a suitable colour for dark-room illumination when burnt under suitable conditions. It is, however, difficult to get a continuous luminous flame by its aid. Herr E. Fleischal von Marxow recommends the use of bromide instead of chloride of sodium for the production of monochromatic light, as it melts without decrepitation, and gives a much brighter light than the latter.

The silver market is still in an extremely unsteady condition, and in all probability is likely to remain so for some time to come. The price of the metal often varies as much as a halfpenny to a penny an ounce from one day to another. Now that the American Silver Bill has passed, by which the American Government is compelled to make heavy purchases of the metal every month, there is very little prospect of a lowering in price—on the contrary, a considerable increase is to be anticipated. Platinum, too, unfortunately for photography, is still increasing in value, and we fear will continue to, until some fresh source of supply is discovered to compete with the present one and the monopoly pertaining to it.

THE LATE HERBERT B. BERKELEY.

As briefly announced in our last issue, Mr. Herbert B. Berkeley, who up to quite recent years, when his health broke, was well known in all photographic circles, has passed away. Not only in the literature of photography was Mr. Berkeley's name "as familiar as household words," but at the meetings of the chief societies his face was seldom missed, and his works have appeared successfully on many of our exhibition walls.

Born of a good old Worcestershire family, the subject of our notice found his tastes and inclinations to tend rather in the direction of science than of those pastimes usually favoured by his class, and early in life was attracted to chemistry, and by easy stages to photography, when the latter science was, perhaps, in its most interesting transition stage. In 1874 or 1875 Mr. Berkeley first commenced to contribute to our correspondence columns, and from that period up to a year or two back he was one of our most regular and valued contributors.

In the earlier years of his connexion with the literature of photography his attention was chiefly given to collodion emulsion and the more difficult problems connected with the then popular subject. When gelatine came into vogue Mr. Berkeley was naturally one of the earliest and most earnest of its supporters, and contributed many useful hints and suggestions on the working out of some of the earlier difficulties. Amongst these practical suggestions, the one which has probably borne more fruit than all the rest combined is the introduction of sulphite of soda into the developing solution for the double purpose of preserving the solution itself—whether of pyro, hydroquinone, or eikonogen—and of preserving the cleanness of the shadows of the negative, which was a far more difficult task in the days of pyro alone than it is now. Mr. Berkeley's introduction of sulphite of soda for the purpose, however, worked a veritable revolution.

In 1878 or 1879 Mr. Berkeley became connected with the Platinotype Company, and in conjunction with Mr. Willis his energy and application have worked that method of printing into what may certainly be fairly called the very first position at the present day.

Although Mr. Berkeley will be best remembered for his advocacy of the use of sulphite of soda for the purpose of preserving solutions of pyro, and for his subsequent introduction of the preparation known as sulpho-pyrogallol, it is, perhaps, not generally known that he was the first to practically demonstrate the possibility of developing successful images on chloride of silver by means of the ordinary alkaline developer. In our Almanac for 1875 Mr. Berkeley gives a detailed account of experiments made the previous year, from which it appeared that chlorised collodion sensitised in the bath, emulsion of chloride of silver in collodion, or, better still, in gelatine, were alike capable of yielding satisfactory images when treated with pyro and ammonia, and not, as had been previously supposed, subject to general reduction. No particular advantage was, however, derivable from the discovery, but some five years later, when Dr. Eder showed that by the substitution of the ferrous citrate developer a large variety of colours could be obtained upon chloride of silver, the latter came gradually into use for positive purposes. Developed positive images upon paper had, of course, been obtained previously, but by means of silver development, and a chloro-iodised collodion had been employed for negative purposes under the same conditions, but to Mr. Herbert B. Berkeley is due the discovery that similar results are attainable under modern conditions.

JERSEY: ITS PHOTOGRAPHY AND SCENERY.

When in the early morning we neared Guernsey, *en route* for Jersey, it was evident, from the aspect of both sky and land, that the weather, for that day, at any rate, was to be rainy and unpleasant. And such it proved.

There are two leading routes by which Jersey may be reached

from the metropolis, viz., that by Southampton and by Weymouth. Those who prefer the shortest sea journey proceed by the latter port, from whence to St. Heliers, Jersey, the passage is made in six hours. By Southampton the railway journey is shorter, and the sea journey about two hours longer. The return fares are moderate either route, and the accommodation on the steamers comfortable, irrespective of the "class" in which one travels. In the Weymouth boats the first saloon is in the middle of the ship, the second being at the stern. Both are well appointed. *To* Jersey the passage is made by night, leaving Paddington, if the shorter sea journey is preferred, at 9.15 p.m., and landing in St. Heliers at nine next morning. Here hotels and restaurants around the quays are plentiful, and one can have plenty of time to breakfast, saunter around, secure lodgings, provide a supply of cigars or tobacco (which here are astoundingly low-priced), and still be in time to avail himself of one or other of the many *chars-à-bancs* or public pleasure conveyances which, about eleven o'clock, start on excursions to one or other of the salient points worthy of being visited, and of which there are many in this charming island. Time was when hotel accommodation, including three good meals a-day and attendance, did not exceed five shillings per diem; but in all save a few instances—the South-Western Hotel, where we tarried, being one—an advance in prices has recently been made. Keen competition ensures moderation in charges.

Among the first visits we, in company of a London friend, made was one in fulfilment of a promise that when we were at Jersey we would call upon Mr. James Rae, well known in Dumfries and the south-west of Scotland as a clever photographer and intelligent man, whose state of health compelled him, a few years since, to adopt the mild climate of this island as a residence. We had seen photographs of his pretty house and large vinery, situated on St. Aubin's Bay, about three miles from St. Heliers, and he had promised to act as our cicerone when we should pay the island a long-desired visit. On calling, we were much shocked to learn from his niece that he had died quite recently. While in Jersey he confined himself to fruit culture and amateur photography, but Miss Rae showed us many large and admirable works in portraiture produced by him and his business partner professionally in Scotland. His surroundings were exceedingly pleasant, betokening the man of taste; but even these, with the genial climate, were unable to ward off the disease to which he eventually succumbed.

Hiring a private conveyance we and our friend devoted the best part of a day to a pilgrimage to St. Brelade's Bay, at one time and for many years the residence of the late Mr. Thomas Sutton, B.A. St. Brelade's Bay is one of the numerous pretty bays which characterise the whole Jersey coast. It is separated from St. Aubin's Bay (on which St. Heliers stands) by a promontory, also indented with baylets, of nearly a mile in width, and is about four miles distant from the capital town. Sutton's house is so surrounded by trees as to render it difficult to obtain a photograph of it, while immediately in its rear runs a range of precipitous rock and tree-clad banks. Climbing one of these to try and obtain a better view of the house, we realised that about a hundred and fifty yards from it was one of the largest and most ornate houses we had yet seen, and which turned out to be that of the famous General Boulanger, who must be complimented upon the selection of such a site for a residence.

Sutton's house was untenanted and in a state of considerable disrepair. Obtaining access through an unfastened door, we went through the whole of this house, which is so largely associated with early investigations in photography. Here Mr. Sutton resided from 1847 to 1867, with the exception of a brief period, during which he occupied the professor's chair of Photography in King's College, London, in which he had succeeded Mr. (now the Rev.) T. Frederick Hardwich. Here he, with Blanquart Evrard, conducted a large printing establishment, in which the prints were produced by development, and issued nine thousand in one year, mounted, each being stamped "Permanent photograph;" here he wrote and prepared his once well-known *Dictionary of Photography*, which was published by Sampson Low & Co.; here did he start, in 1856, his journal, *Photographic Notes*, which, after twelve or thirteen yearly volumes had been issued, was discontinued; here he invented his panoramic camera and lens, with other cameras and lenses; and here, too, he wrote pamphlets on theological, but mainly on photographic topics, and contributed to photographic journals and societies. As our older readers know, he eventually became one of the staff of THE BRITISH JOURNAL OF PHOTOGRAPHY, to which, for some time prior to his sudden death from cramp in the stomach, he was a regular weekly contributor, his last communication being written within a few days of his death, which occurred at Pwllheli. Born at Kensington, he in 1846 took his degree at Cambridge as Twenty-seventh Wrangler. It is not to be wondered at that we should examine the residence of such a man with a species of reverential attention, and we bore away with us sundry "exposures" we had made, which will hereafter serve to recall his once pretty dwelling-place—once pretty, we say, for those to whom it was sold have allowed it to get into the law courts, by which it has been closed up and right of way to it prohibited until it is exposed for sale, which it is soon to be, when it will probably realise about 300*l.*; so, at any rate, were we informed.

Jersey has much to recommend it to tourist photographers, who may occupy many days around its really lovely coast scenery. The transit to these places is greatly facilitated by the arrangements made for conveying tourists in large and comfortable four-horse brakes at exceedingly reasonable fares. Each of these is attended by a guide, who is commander of the situation. They are men of good attainments, versatile, courteous, and, in some instances, jocular. While the visitors are taking lunch, for which ample provision is made, these guides (we speak from only two experiences, the well-known Mr. Cherry being the guide on both occasions) provide really high-class musical entertainments. Mr. Cherry played like a finished artist, and, in addition to operatic selections, sang with admirable effect some of his father's well-known compositions, such as *Shells of Ocean*, *Will-o'-the-Wisp*, and others. This combination of *bonhomie*, versatility, and undoubted musical talent is, we rather imagine, peculiar to the Jersey guide, for nowhere else have we heard of it.

Another feature connected with these excursions is the photographing of each party in group. This was managed so skilfully, and with so much expedition, as to merit a detailed notice. When on the carriage that was proceeding to Boulay Bay, we drew up at Prince's Tower, a ruin with which scarcely credible legends are associated, and which is three and a half miles out from St. Heliers, and after time having been allowed to inspect it, we realised the presence of a photographer with a rather large camera. Being suitably posed, some on the carriage and others in front of it, seated on benches and standing (the party numbered twenty-four in all), the exposure was made, and the party then drove on to our destination. Soon after our return to St. Heliers a proof was submitted for examination. This showed that the negative was $8\frac{1}{2} \times 6\frac{1}{2}$, that every one of the twenty-four in the group was sharp and well lighted, and, in short, that it was all that could be desired in a photograph. As the likenesses were really good, several orders were given, all of which had to be delivered next day, only two shillings each mounted print being charged.

Being desirous of learning all about the system employed by which such expedition was obtained, we called on Mr. J. R. G. Stroud, of New-street, St. Heliers, the head of the establishment by which the photographing is done, and found him an intelligent and clever man, well up in the very latest photographic movements of the day. He is the successor to Mr. Baudoux. Here are produced prints in all the varieties of silver, including albumenised and bromide paper, in carbon and in platinum, both direct prints and enlargements. We conversed *inter alia* on the subject of the fading of prints, *apropos* of a recent lawsuit, and he showed us some very dark-green enamelled cabinet mounts, which he said has caused prints mounted on them to show indications of fading, whereas on other and plainer mounts the prints were permanent. From this it is apparent that it is not the presence of deleterious matter in the cardboard itself by which fading is induced, but rather something in the dark-coloured enamel with which the card is surfaced. We brought away with us some of these mounts for careful examination, and shall possibly report on them soon, for they are alleged to be the best, irrespective of price, that can be procured in London, and may therefore be considered as representative.

More astonished were we at being shown some carbon prints which had changed colour under the action of light, although only to a slight extent. It was the warm element in the tone of the pigmented

prints that had given way: not, as in cases we reported upon several years since, the paper itself which had become lowered in tone, but the pigment which had become colder by the bleaching of the alizarine, which is the pigment now employed in all the best tissues for warming up the carbon. Now as we are aware that "Turkey red" is one of the most durable dyes known, we can only surmise that it is only so when employed with a mordant, which it is not easy to conceive of when introduced as a pigment into the gelatine with which tissue is made. Or perhaps it may be acted upon by the potassium-bichromate by which the tissue is sensitised. But we must return to our group.

Mr. Stroud informed us that at a certain point of the route which each excursion car takes, a negative is taken of the occupants of that car. Some are taken about 12.30, or soon after midday; others in the afternoon. Once or twice a-week a negative is taken at Prince's Tower already spoken of. The plate is immediately brought back to St. Heliers to be developed; it is dried by alcohol, and from it three proofs are printed, toned, and fixed by seven o'clock the same evening. Orders are then taken from these, and by seven o'clock the next evening the finished copies are ready for those who ordered them, or ready for packing for post to England or France. The majority of those for French excursionists have, however, to be ready by one o'clock, in order that the visitors may take them to France, assuming that they go by the boat that day. Oftentimes at Greve de Lecq, where the cars stay two hours, the negatives are taken and a print made and submitted to the visitors, and orders are booked within an hour. The negatives are made as thin as possible, because frequently there are as many as fifty or sixty, and at times more, ordered from one negative, and these *must* all be printed in one day. Proofs of ordinary sitters are invariably submitted the same evening, but these are mostly submitted untouched and untoned, as oftentimes people are leaving by the 7.30 boat in the morning. The light is very quick, there being no fogs, but a nice, clear, soft light, and one can work without any blinds and yet get a good picture.

We have before us, while we write, a print of the group taken when we were present: it is whole-plate size, every figure is beautifully distinct, and it is well mounted. They are supplied, as we have said, at the very moderate price of two shillings each.

There are several very good photographic portrait establishments in St. Heliers, and we were sorry that our stay in the place was so limited as to prevent our being able to visit them. We did find time, however, to pay a hurried visit to the new galleries of Mr. C. P. Oulee, of New-street, which are only recently finished. The reception room opens on to the street, and it communicates with the dressing rooms and studio through a glazed corridor overhung with grape vines. The studio is ridge-roofed, and is very large, being 46 feet by 21 feet. One of the slopes of the roof is glazed to the extent of 30 feet by 8 feet 6 inches, the side lighting being 30 feet by 12 feet. The lighting is well controlled by blinds.

Amateur photography, too, flourishes in Jersey. Availing ourselves of a courteous invitation, we visited Dr. Cumberland Taylor, who, although in active practice as a physician, still manages to find a little time to devote to the art science. He showed us many negatives and prints betokening high proficiency, and informed us of the existence of an amateur society there (of which he is Hon. Secretary) containing seventeen members, exclusively amateurs. We regretted our inability to accompany the Society on one of their outings, but it would have entailed a longer residence in the island than was possible.

What struck us in driving over the island was the paucity of apple orchards, Jersey having had such a fame in connexion with this fruit. It was explained that in consequence of the mania which now prevails for potato culture the apple-trees have been extensively cut down and the orchards converted into potato land, of which some parts yield no fewer than three crops a-year. On the day before we left, in one store adjoining our hotel eighty-seven tons had been packed and despatched to England, and on that same day 2500 tons had passed over the weigh-bridges, of which there are three at the harbour. The total this year was given as 57,000 tons. The growers have to pay from 10*l.* to 18*l.* per acre as yearly rent. Some of the residents realise that a mistake has been made in cutting down the apple-trees, and we saw that several young ones had been planted.

It is impossible to indicate any particular locality in which to go for a day's outing with the camera, for one is certain to obtain numerous pretty pictures, go where he may. The whole island is only small, being about twelve miles long by four and a half in average breadth, and as it is surrounded with bays, cliffs, villages, cottages, coves, and fishing-boat quays, these being interspersed at frequent intervals, one can scarcely go wrong anywhere when seeking for subjects for the camera. The population is said to be 60,000, of whom one-half resides in St. Heliers.

Taken all in all, Jersey can be very strongly recommended as a delightful place where to go with a camera.

FURTHER NOTES ON MOTTLING.

Since calling attention to this matter a few weeks ago, I have made some experiments in order to get, if possible, at the cause or causes of the imperfection. I cannot say that they have been altogether successful, or altogether barren of usefulness. I will, however, in the first place, make a few remarks on the causes suggested by your correspondents, premising that in all the instances in which the trouble has come under my notice, all the precautions taken by most workers were attended to, especially in the avoidance of bubbles and the mixing of the developer.

With regard to bubbles or congeries of them, froth, produced by rapidly pouring solution from one vessel to another, or quickly dashing it over the plate, the effects produced are quite distinct in character from the mottling to which I have called attention, and leave markings corresponding to the bubbles more or less numerous, together or detached, but always in the form of small rings with definite margins, and about whose origin there can be no shadow of doubt, and would, with any careful worker, be unlikely to occur except as an oversight, and if they did, be at once assigned to their proper cause. With regard to "light reflected from drops of water below a transparent dish," I am at a loss to conceive how the light of the operating room, which is or should be of a non-actinic character, could anyhow affect the plates by any reflecting surface whatever. Development is, however, almost always carried on in opaque dishes, where such cause would be impossible.

Your other correspondent suggests the imperfect mixture of the constituents of the developer; ammonia, being of a higher specific gravity than the pyro solution to which it is added, continues floating about like oil on water, so to say, and in this imperfectly mixed condition acts irregularly on the surface of the plate when poured over it, and left quiescent, possibly would produce markings; but in all the cases that have come under my notice, either soda or potash has been the alkali used. The difference in the gravity of these solutions to that of the pyro might of course have the same effect, but they have, without any exception, been well stirred together before flooding the plate with them, so this imperfect admixture could scarcely be the reason.

Since I have gone into the matter I have come to the conclusion that, in the majority of instances, mottling is not produced by ordinary development at all. I do not mean to say development *will not* produce this fault, but that it is not the usual cause of its appearance, although eventually it is the outcome of development. The leading article in this Journal of the 13th has, I think, hit the matter fairly on the head when it suggests that mottling is caused by the treatment the plate receives after development, and is produced by the continued action of the solution left in the film after removal from the developer. This theory fits the case exactly, and is strongly supported by evidence. If a plate is rapidly developed it never seems to be subject to this complaint, whereas a plate kept for a long time in the developer is particularly prone to it.

In one case *time* has not been given to the film to absorb much developer, and in the other it has. A strong developer, and with protracted and forced development, and a thickly coated plate, supplies the best conditions for mottling, the film being saturated, so to speak, with developer, and washed in a strong stream of water from the tap, not sufficiently long to remove the whole of the imprisoned developer from the film, which continues its action until exhausted, but merely extracting it from those parts on which the full force of the water impinges; this will account for the different forms in which mottling shows itself without further searching, the *pattern* being regulated by the manner in which the washing water is applied to the surface. This, of course, indicates that long development requires a more careful and prolonged washing than when the image has been rapidly brought up to the proper density; in fact, soaking the newly developed image in a dish of water for some little time before placing it in the

fixing bath seems to be the preferable method of working, or even putting it direct from the developer into the hypo without any intermediate washing. Unfortunately, the defect remains invisible until the image is fixed, when it is too late to do anything of a remedial character; the chief precaution is therefore either to omit washing after development, or to give it plenty of time to act evenly.

It will be readily understood that a precisely similar method of procedure may produce this defect at one time and not at another, dependent, firstly, on the length of time occupied in development; secondly, the thickness of the film; and thirdly, the hardness of the gelatine used in the preparation of the emulsion. Thickly coated plates are more liable to the defect than thinly coated ones, as a matter of course, but knowing the cause, the remedy is obvious. In reviewing the cases that have come under my notice, the defect has occurred on plates that were the best procurable, but in every one, to the best of my recollection, imperfect or insufficient washing between development and fixing *might* have been the cause; but not having the attention particularly directed to this part of the process, it escaped detection, more especially as the fault was attributed to the development. The fact that the film retained sufficient developer after receiving a short washing to continue its action was altogether overlooked.

I thinks the thanks of photographers are due to the editor of this JOURNAL for pointing out what I quite believe to be the *principal* cause of a puzzling and annoying defect. EDWARD DUNMORE.

THE ART OF RETOUCHING.

CHAPTER XI.—A HEAD, AND HOW TO RETOUCH IT.

IN past chapters we have, more or less, minutely discussed the various points in a negative where the artistic assistance of the retoucher is most needed, and fixed in our minds, I hope, the necessary and beneficial treatment for same. In case, however, we may have lost or forgotten any of the various details, it may be advantageous to now take a head and retouch it. By this means we can exercise our memory upon its treatment and, when necessary, firmly fix any points which may have been but lightly remembered, if not altogether forgotten.

Sometimes, in long and minute descriptions as to the treatment of the various parts of the face, portions may easily be forgotten or escape our notice which are absolutely necessary to enable us to successfully produce good and artistic work. My intention, therefore, in this chapter is to run quickly, yet thoroughly, through the retouching of a head, and so find out and strengthen the weak points in our study of the subject.

For this purpose we cannot do better than select a head as full of natural characteristic markings as possible, as well as one possessing the varieties of light and shade at the same time. I can mention, as an example, the heads of two very noted personages which will tax the skill of the retoucher to the utmost to do them justice. Heads full of character and expression, symbolical of the active and intellectual lives the owners have led; heads literally covered with characteristic markings, and none of which should be removed. To obliterate any of these markings would be to detract from the natural intelligence of the portrait, as well as to lessen our chance of ever producing an artistic and truthful representation of the original. The portraits I refer to are those of Cardinal Manning and the Right Hon. W. E. Gladstone. I have seen very many pictures (photographs) of them both, but very few indeed which did them justice. The head I have before me, and which I intend treating, is a better all-round subject perhaps; but for those who have not such a specimen, I can safely recommend the study of a good photograph of either of the gentlemen whose names I have mentioned.

The head I have before me, and which I propose, as far as words will allow me, to retouch, is that of a gentleman (almost full face) of about fifty-five to sixty years of age. I will endeavour, as far as I can, to give my readers an idea of what he is like as well as the effects of light and shade depicted upon and influencing the expression of his features. The head is posed, as I said before, in such a manner as to present almost a *full-face* portrait. The tone of the skin must have been ruddy and healthful, rich in colour—if I am to form any judgment from the general half tone which completely covers the lower part of the face, from the eyebrows down. The shape of the head generally is what may be termed *square*, but at the same time it is highly intellectual and pleasing. The expression is *firm* but not *harsh*, and the majority of the characteristic markings of the face are rendered with a blackness and intensity that are alike objectionable and exaggerated as they are untrue to nature. By careless treatment such a head as this may very easily be spoiled. All heads more or less *square* and possessing as much half tone or shade of such a general character as is to be found in this specimen must be treated cautiously, as they are very liable to be made *round* by the process of retouching. To the most casual observer the truth of this will appear evident on examining a few so-called Rembrandt pictures. It is but seldom, in pictures so lighted, that the natural features and muscles of the face are preserved as they should be, the retoucher through carelessness or want of knowledge softening them all away, losing the natural *squareness*, and evidently forgetting everything else in his desire to secure an even *grain* and pretty effect for his work. Of course, his work so carried out may be very *effective*, but it is not *true to nature*, and consequently fails to possess artistic merit. Besides, this intense desire to secure a *grain* I hold to be a very great mistake, for never *in life* do we see the skin of our fellow-men so represented. If they are never so in nature, why should we in retouching struggle to represent them as they are *not?*

The forehead is square, having defining shadows showing up its natural formation on both sides. The lines between the eyes are very firmly marked, so much so that one might almost say the brows were *knit*. The corners of the eyebrows come to almost a sharp angle at the starting-point of the nose, and a rather heavy shadow is thrown over the eyes, owing to their square or heavy formation. The cheeks are very slightly hollowed, but this is more the hollowing in natural keeping with the squareness of the subject rather than the falling away of the flesh consequent upon advanced years. The shadow or furrow running down from the side of the nose is well marked upon both sides of the face. The mouth is rather straight, lips somewhat compressed, showing great firmness and determination of character. This is still further accentuated by a shadow running right round the under lip, and which will require considerable softening, but must *not* on any account be taken quite away, for by so doing we would undoubtedly detract from the *vigorous expression* of the feature, if we did not altogether lose it. There are shadows falling from each corner of the mouth which will require treatment; they are absolutely *black*. They must be rendered transparent, but not removed. The lower shadows around the eyes, those marking the socket of the eye, are very strongly marked; the light catching the skin between same and the lower eyelid, producing a baggy effect, must also be modified. There are lines also running horizontally across the forehead which must be retained, although softened, or much of the beauty of the portrait will be lost. The chin, too, in the picture I have before me, is flat and square, being in general harmony with the rest of the face. I cannot say if this description will enable the student to realise for himself the head I have taken for a model. I only wish I could reproduce it here for the reader's benefit, as it is a very exceptional subject for a study. To those who fail entirely to grip the idea of such a head as I have tried to describe, I would recommend the purchase of a cabinet head of a gentleman about the age above stated, and having as many of the markings indicated as possible, then mark in those wanting, yourself, with a little water-colour, so as to keep before your mind's eye the various points as you proceed to retouch. (I will see if it be possible to arrange for the issuing of this study, and so save the reader further trouble. I have no doubt I could if there were a number likely to be wanted.) In the meantime, however, assuming that you have a fair idea of the head in question, we will proceed to retouch it.

Starting as one would with an ordinary drawing, we will begin with the forehead, pencilling away all the unnatural roughness or irregular, dirty bits of shadow, which are meaningless, and in many cases only photographic defects. Great care, however, must be taken, when softening the shadows running down each side of the forehead, *not* to obliterate them or even to retouch them in such a manner as to impart to them a *round* appearance, which would be most dreadfully incorrect and out of all keeping with the general expression of the head. In what we may call *cleaning* the forehead, we must be very careful not to remove all traces of the wrinkles running horizontally

across it. The indications of their presence may be ever so slight (they should *never* be too strongly marked), but they are essential to the beauty of the picture.

We have next to treat the lines or shadows between the brows. If too strongly marked, these lines give the appearance of a frown to a portrait, and necessarily make it unpleasant as regards expression; if left untouched, this might cause the original to refuse it as a *successful* likeness. We must, therefore, soften them very considerably; but, like the wrinkles in the forehead, on no account must we obliterate them. They may also be left somewhat deeper in tone than the frontal wrinkles. In a younger head, very often these markings may with advantage be taken *almost* away, leaving but an indistinct shadow, which is necessary to preserve the true shape of the forehead. If sharp shadows be formed at the angles where the brows join the nose, they should be softened so as not to appear too harsh and hard in their formation. Much expression is contained in these markings, and their judicious treatment may have much to do with securing a pleasing and successful portrait. The shadow thrown over the eye by the rather heavy formation of the brow must be slightly worked upon in order to make it somewhat more transparent. In doing this, a few strokes of the pencil will prove sufficient, as too much work on this part of the face would easily ruin your picture. The markings around the eyes will next want softening. Too much care cannot be bestowed upon these very important formations, for they not only help the expression of the eye, but they have also much to do with the shape of the cheek. Many retouchers take these markings out too much, while others leave them too strongly indicated. Care and practice alone can enable you to secure the happy medium.

The cheeks, which in ordinary pictures may give absolutely no trouble, in *this* picture are of very great importance and demand a very careful treatment. Owing to the predominance of half tones in this study, if careless we are likely, in securing even a delicate and unobjectionable grain, to produce the effect of *roundness*. This would be fatal and out of all keeping. This picture so treated would be completely ruined. In such a portrait as we have set before us, consistency must be preserved in *all* the features, or else the result would be an absurdity which would not bear the inspection of people competent to pass a sensible opinion. The slight hollow in the cheeks must be fully, although lightly indicated.

The shadow from the side of nose, too, must be lightened, but not too much. Care as well must be taken to preserve a proper relative and perspective strength between the one on the light side of the face and that on the dark side. More than one thinks, at first sight, depends upon the successful handling of these markings. They may be made to hold the balance of the face. Should the shape of the nose be offensively irregular, we must alter it. If the light gives the idea of crookedness to it, we must so work upon it that straightness and regularity will take its place. Yet this must not appear too evident in our method of carrying out the alteration. When even a nose is very irregular, be sure not to do too much to it; you must not impart to it a shape it has not got. Work it in such a manner as to better its *own* shape, but still adhere to its general bearing. A *little* may sometimes make a very considerable difference to a portrait, and with care and practice the necessary judgment will be acquired to ensure success in the treatment of this feature.

Sometimes a dark shadow is thrown on the upper lip by the nose; this should be simply cleared, that is to say, made more transparent by a few touches to infuse a little light into it and so relieve it from its quality of heaviness. If left untouched, this heavy appearance would be greatly increased by the fact that the surrounding parts were rendered more brilliant by the retouching. The shadows falling from the corners of the mouth should be softened very much. These shadows, however, should not be retouched *too much*, or they would fail to aid the expression of the mouth, and, on the contrary, would impart a feeling of hardness to the feature. The shadow under the lower lip will be found to require lightening, softened and cleared up only, so as to reduce the severity of the expression; taking it altogether away would have anything but a beneficial result. In a well-lighted head all these little markings are invaluable, and should not be removed except at the expressed wish of the original or the people by whom you are engaged and under whose orders you work. The mouth and its surroundings demand the most extreme care and attention—no trouble should be spared to master the various influences which may affect its shape and expression.

Here there is much expression in the chin. It is broad and flat, but every modulation in it is worthy of preservation. Rounded, it would be abominable; and too much worked, it would become expressionless. I will conclude by drawing attention to the manner in which the work on the face must approach and join the hair; also with the whiskers down the entire sides of the face. If not carefully attended to, a hard line will assert itself where the hair and whiskers begin. Such would never be if due attention were bestowed upon the work as it progressed. The first and most essential thing to be remembered is, *preserve all the half tones you can*: and if you do this, *hard lines* can never result from your work. A very small amount of work will render dark shadows transparent, so never fall into the habit of *overworking* them—it is losing both time and effect. *Over-work* in the treatment of a negative will only produce a hard, *wooden* effect, and in nine cases out of every ten falsify the natural expression and ruin the resemblance. Needless to say, retouching carried out on the *overwork* principle can have no pretentions whatever to the artistic.

REDMOND BARRETT.

PSEUDOMORPHS.

In the mineral kingdom we often find a class of crystals that, while they have a certain chemical composition and exhibit certain well-defined properties, such as hardness, cleavage, specific gravity, and so forth, peculiar to the substances having this definite chemical nature, they are entirely misleading in the matter of crystalline form. For instance, crystals of quartz often take the form of calcite, fluor spar, or barite; that is, while the form of the crystal would lead us to believe that the substance is calcite, fluor spar, or barite, the hardness, cleavage, specific gravity, and chemical composition, all would prove the crystalline body to be quartz. In a word, these crystals are false to their crystalline structure, and the mineralogist has given a name that embodies this idea; he calls them pseudomorphs, or false forms.

Now amateur photography is beginning to exhibit a similar state of affairs. There is a constantly increasing number of amateur photographers who seem incapable, or are too lazy, to develop the plates that they expose in the camera. All they care to do is to take some automatic machine in the form of a camera, hold it up in front of a view, and trip an instantaneous shutter. These exposures, plates or films, are handed over to some other person to develop, fix, and make ready for the printer; or the same individual may even make the prints and mount them. All that is done by these so-called amateur photographers is to select the view and expose the plate; and it appears to us that they are not entitled to be considered as amateurs any more than the man that turns the panorama should be called an artist, or the quarryman a sculptor. It is true that a certain amount of artistic taste is necessary in the selection of the view, but the production of a good negative after the exposure is made is a matter of training, skill, and patience that only comes to those who love the art of photography. These pseudo-amateurs are rushing into our societies, and receiving the same rights and privileges that belong only to the true amateur—the lover of our art. Many of them are utterly incapable of producing a decent negative, and are no more amateur photographers than the daubing schoolgirl who colours a bromide enlargement and thinks she is an artist. The success or failure of the exposure of these pseudomorphs depends not upon the selection of the view, but upon the skill in development of some other person, and they should not be allowed the same rights and privileges, neither should they be classed among the true amateur photographers. They are a species of *dilettanti* that are gradually bringing photography into disrepute, and, if they wish to be connected with amateur photographic societies, should be classed as a separate set of members from the regular workers.

One thing more than another that has served to encourage the growth and development of pseudomorphs in photography is the rise of a number of firms who make it a business to develop amateur negatives. We do not blame these men of business—it is a question of profit with them; but the tendency is to debase photography, and, instead of encouraging a healthy association of men and women in the pursuit of an art, we are fast drifting into the condition where those outside photographic circles remark, "Oh! anybody can take photographs." Now, every true worker in the art knows that this is not so, and those who are encouraging any such ideas are simply helping to retard photographic progress. What we want are workers, artists and lovers of photography, who will take the trouble to search

diligently for the beautiful, and, having found it, will take greater pains to develop the beauty upon the photographic negative with their own hands. We want workers like the old etchers, not merely satisfied with cutting the scene into the wax on the surface of the plate, but who lovingly, patiently, and earnestly watched the plate in the etching fluid, so that every detail might be brought out to give character and life to the picture. This is the spirit of the true amateur photographer. He loves to see the view in process of creation under the influence of the developer; he marks every detail as it appears, and patiently coaxes out those points in the negative that caught his eye in the scene to which he presented his camera. The amateur that exposes the plate and, with an artist's eye, notes the scene in front of the camera, is the one, and the only one, that can properly develop the negative of that scene. If other hands undertake the work they invariably fail to bring out some details essential to a good negative, or, in straining after something unimportant, block up features of the view that otherwise would add to its charm.

What we have said is uttered kindly, and in the spirit of love for our art. Those of our readers who are drifting into carelessness and indolence in the matter of making negatives should shake these off, return to their old love, and develop both themselves and their own negatives. Above all things, ignore work where but a small portion of the resulting product is the work of the individual to whom it is credited. Don't be satisfied with the advice, "You push the button, we do the rest," but do it all yourself; push the button, make the negative and print, mount it, and if it is not all you desire, it should urge you to yet other efforts, rather than to a state of indolence, in which you accomplish nothing yourself, and utterly fail to appreciate the efforts of others.

—*Anthony's Photographic Bulletin.*

INTERCHANGEABLE SCREWS AND FLANGES.

During the earlier days of photography, when a single lens and camera were considered a sufficient outfit for all practical purposes, the question of interchangeable screws and flanges did not arise, although we remember of thinking a considerable advance had been made when the ordinary portrait objective was so constructed that the back lens might be removed and the front one put in its place for simple landscape work. Gradually, however, as the possibilities of photography and the limitations of any particular lens became better and better understood, opticians introduced, and photographers bought lens after lens, until at the present time the collection of the average photographer is limited only by his ambition or the depth of his purse.

With the accumulation of lenses began the multiplication of flanges, camera fronts, adapters, &c., the burden and inconvenience of which increased in inverse ratio to the decrease in weight and greater portability of the outfit, until it has become almost intolerable. The first move in the right direction was made by one of the French opticians, who introduced a casket containing a number of lenses, each in its own cell, and all fitting into one mount and giving singly and in combination objectives ranging in focus from three or four inches to perhaps twenty inches. Although those lenses were really good, and such caskets are still made by several first-class opticians, they have, for various reasons, not become so popular as they deserved to be. A more successful effort was made by Ross, of London, England, by the introduction of the "portable symmetrical," the whole series, ranging from three to fifeen inches focus, and with the largest stop covering plates 3×3 to 13×11, all fitting into one flange. This series of lenses soon became very popular, and is still largely employed, but it only touches the border land of the trouble, as few photographers are now satisfied to use only the lenses of one maker, and nothing short of a general interchangeability will satisfy their just and reasonable demands.

The question has attracted the attention of the energetic executive of the Photographic Convention of the United Kingdom, which will meet at Chester in June, and a lens standard committee has been formed, with Mr. A. Haddon as chairman, from which at least some benefit may be expected. Already several meetings have been held, attended by nearly every manufacturing optician of note, and although the necessary alterations in plants and the construction of new appliances may be a costly affair, we have no doubt but what the necessary changes will be made if the buying public insist upon it.

But, supposing that the committee agree to their hearts' content, that their recommendations are approved and adopted by the Convention, and that the opticians carry the recommendations into effect, will that cure the evils complained of? We venture to think not. It is no doubt true that at one time English-made lenses were in almost universal use, or at least exclusively employed by all who could afford the higher prices demanded for them, but that cannot be said to be the case now. The right hand of the English optician has certainly not lost its cunning, but the skill of the lens grinders of other nations has increased to such an extent that lenses of American, French, and German manufacture are obtainable in every respect equal to the English.

A photographic lens is something more than a mere mechanical product; it, like the photograph in the production of which it is employed, partakes, to a certain extent, in the individuality of its maker; and as these individualities are as varied as opticians are numerous, photographers will always fancy, either through prejudice or the pressure of facts, that a particular lens by some particular maker is better adapted to some special work than those of any other optician, and will gratify that fancy to an extent limited only by the depth of their purses. As an example of the extent to which this is carried, we may cite the case of one of our friends who has not much leisure to give to photography, and who would not be said to be more than "well to do," so far as worldly wealth is concerned. In a conversation with him, a few days ago, he said, in speaking of a new lens that he had just bought, "I begin to think now that my stock of lenses is just about as complete as I can afford to make it. I have a five-inch Beck, an eight-inch Dallmeyer, a nine-inch Darlot, an eleven-inch Clark, and a thirteen-inch Voigtländer's euryscope."

In this we have another evidence of the fact that in scientific apparatus, as in true art, there is neither nationality nor patriotism, the artist and philosopher alike bestowing their favours equally on all people that on earth do dwell, and drawing inspiration and material from whatever source it may be best obtained. Our friend patronises equally his native America, England, France, and Germany, and therefore to him, and he is but a type of a large majority of the devotees of the camera, an English system of interchangeable flanges and screws would be of no value.

This brings us to the real object of this article, the advocating of an *international* system of interchange of screws and flanges. Now, it will be evident that no number of meetings of English opticians and no action of the Convention of the United Kingdom can bring that about. Nothing short of a meeting of authorised delegates sent from every centre of lens making in the world, fully acquainted with the wants and wishes of their own people, and empowered to acquiesce in any decision that may be arrived at, can bring about the desired result. Something of the kind was attempted, but in a very perfunctory way, in France last year, and another, and we fear equally unsuccessful attempt will be made this year in Germany, as little benefit can be expected from a few hours' talking of a few unauthorised and unempowered men.

Photographers, then, and others interested in photographic apparatus throughout the world, should at once begin to agitate the question of an international system of interchange of screws and flanges by meetings and discussions, until each section or society is satisfied, not only as to its wants, but also as to how those could best be met. When the subject is fully threshed out, representatives from various districts should meet in central localities and go over the matter again, until something approaching unanimity was reached, and then each centre should send a fully empowered delegate to the World's Fair in Chicago in 1893. In this way, England, France, and Germany might each send half a dozen of the flower of the flock, who, aided by six of our best men on this side, would make short work of the difficulty, and give to the world an international system of interchangeable screws and flanges.

To the screws and flanges might be added the question of a standard sensitometer screen and light, but we must leave the consideration of those till our next, and in the meantime will only say that if the delegation should come to Chicago we can, in the name of the fraternity here, promise it a right royal welcome.

—*The Beacon.*

NEW APPARATUS FOR PHOTO-MICROGRAPHY.

The most complete apparatus for photo-micrography of which we have any record has just been completed by Messrs. Swift & Son, of Tottenham Court-road. It has been made from designs by Mr. A. Pringle (who has of late devoted much attention to this department of science), by order of the Privy Council Office, for use at the Royal Veterinary College, for photographing micro-organisms. In this College a special room has been constructed in the base of the building with a solid concrete foundation to ensure steadiness, and to check vibration as much as possible.

Keeping this point in view, Mr. Pringle has designed an entirely new form of microscope to the ordinary conventional one usually employed for this purpose. From the following some idea may be formed of the construction of the apparatus. The stand of the instrument supporting the optical tube and rectangular motion mechanical stage upon which the object to be photographed is placed is very solid, and its form (the limb) is designed to offer as great a resistance as possible to strain and flexure. The optical tube carrying the objective slides in a dovetailed fitting in the limb. This being the coarse adjustment it is moved by a spiral rack-and-pinion adjustment, and the fine or slow focussing motion is effected by a similar dovetailed slide fitting, and which is acted upon by a long lever having a very short fulcrum. At the extremity of the lever a fine thread screw works, and against the upper or fulcrum end a hardened steel roller rests, which is kept in contact with the roller by a spiral spring; therefore any movement of the fine thread screw that acts on the tail end of the lever raises the slide in its fitting, to which the steel roller is fixed. One turn of the screw only, moves the optical tube the

eight-hundredth part of an inch. The limb of the instrument is supported on massive trunnions and supports similar to those of an astronomical transit instrument.

The end of the limb is supported in the same way with a collimating adjustment to assist in arranging a disc of light properly on the sensitive plate. This support is very essential, as the instrument is intended to be used with a projection eyepiece. This being the part of the instrument where most tremor is likely to occur, it is thoroughly checked by this additional support.

The rectangular motion slides to the stage are divided to the one-fiftieth of an inch, and with verniers read to one thousandth; they serve the purpose of enabling the position of an object that has once been recorded to be readily found, and any object up to the one-thousandth of an inch can be measured in both directions.

The microscope is also fitted with a second or lower stage for the adapting and adjustment of an achromatic condenser, &c. This stage, in addition to ordinary course focussing and centring adjustments, is fitted with a fine motion; and below this again is a similar stage, but of much larger construction, for carrying an achromatic bull's-eye condenser and ebonite alum cell, behind which is a limelight jet. The whole is mounted upon a very solid mahogany base three inches thick and six feet six inches long, with a bellows camera that can be closed to ten inches or extended by sections to fifty-six inches. The focussing is effected from the extreme end of the baseboard by a rod extending from the microscope to the end of the baseboard or focussing screen. The instrument is fixed on a revolving table, so that it can be turned out of the line of the camera to arrange the object.

The whole is admirably made, and the rigidity of the parts when clamped is such as cannot be surpassed. It reflects credit alike upon designer and makers.

Foreign Notes and News.

The recent meeting of the Berlin Society of Practical Photographers at Schmöckwitz was held in a thoroughly German fashion under a wide-spreading willow tree, not far distant from which, it is needless to say, was situated the inevitable "Restaurant." There, Teuton like, they exchanged social professional reminiscences, and later betook themselves to skittles, after which they returned to Berlin by a midnight train.

Last weather in Germany, in contrast to the meteorological vagaries which have afflicted the unhappy country, appears to have been unusually warm, and has caused the Vienna Photographic Society to determine on holding its open meetings during the month. We suppose it is for the purpose of affording its readers some sort of alleviation from the excessive temperature that the *Deutsche Photographen Zeitung* has regaled them with a very charming reproduction of a winter landscape representing plenty of snow frozen hard upon the trees and hedges of a Baden lane.

Scarcely a week passes without bringing into the world some new form of flash lamp. A somewhat new departure has recently been made in this direction by M. D'Otroppe of the *Association Belge*. He was led to the invention of his lamp by observing the fact that in the case of the ordinary lamps the flame is pierced by an air channel which is comparatively cold, and often causes the magnesium powder to pass through unburnt. To obviate this defect he introduces a sponge moistened with benzene between the indiarubber ball and the magnesium receptacle. The air takes up the benzene vapour and is rendered combustible, thus preventing the escape of any of the powder unburnt. In addition, the tube for blowing in the magnesium enters in the middle of the flame, as in Dr. Miethe's lamp.

We must say that, in spite of the probability that undoubtedly exists of this arrangement ensuring the complete combustion of the magnesium, we have grave doubts about recommending its employment. Lamps are mainly preferred to flash-light powders, for one reason amongst others that they are free from the danger of explosion attaching to the latter. Now, benzene vapour and air form a decidedly explosive mixture, and if the flame were to strike back into the benzene reservoir a dangerous bang might be the result.

The Committee of the Odessa Photographic Exhibition have at length published their list of prizes. A silver medal has been awarded to the Eastman Company, and they further enjoy the reputation of being the only English or American firm which has obtained a prize.

In a communication from the Photo-chemical Laboratory of Charlottenburg, Dr. Vogel states that the result of his recent researches goes to show that eosine-silver plates, even without the use of a yellow screen, are more sensitive to chrome-yellow than to ultramarine blue. On developing, however, no matter with what developer, it is those parts of the image which have been acted on by blue rays that come out first. After lengthened development, when the negative is seen by transmitted light, exactly the opposite phenomenon is observed—the intensity of the yellow surpassing that of the blue.

It would follow from this that the action of the blue is more superficial, while the yellow rays penetrate further into the film, and as a practical consequence, that the development of orthochromatic plates should never be interrupted too soon, and that the developer should be allowed time thoroughly to penetrate into the film, even at the cost of obtaining over-developed, *i.e.*, too dense, negatives, as the latter can easily be reduced by ferrocyanide of potash in case of need.

Our Editorial Table.

Anleitung zur Photographie für Anfänger.

Introduction to Photography for Beginners.

By G. Piszkiewicz. Halle: W. Knapp.

The above, which we have recently received, is a handy, practical treatise. The name of the author is an adequate guarantee for the quality and reliability of the work, and at no point does the handy little volume stray beyond the limits indicated in the title, into subjects of too abstruse or advanced a nature for the practical requirements of the beginner. In fact, if any exception is to be taken to the work, it would rather be on the ground of its extreme condensation, facts and results being often stated without any explanation of how or why they take place. This slight defect is, however, fully compensated for by the amount of information conveyed, its extreme conciseness, and the excellent way in which the accounts of apparatus and receipts and formulæ are brought up to date.

The little work, of which the present edition (the third) comprises some 200 12mo. pages, is divided into four parts. Part I. deals with the apparatus employed, and includes an excellent chapter on lenses, especially suited for bringing home to the amateur the principles which should regulate his choice of an objective. Part II. is on exposure. Part III. treats of the production and manipulation of the negative, and may be specially praised for the conciseness and excellence of the formulæ given, most of which are drawn from Dr. Eder's *Handbook* for 1889. It also contains a notice of recent improvements in orthochromatic photography, coupled with the excellent advice to the amateur to let the subject alone till he is perfect with ordinary plates; while Part IV. is concerned with printing and toning, including platinotype.

We miss all mention of retouching and enlargement, but suppose this must be due to the work being intended exclusively for beginners.

The Lighting in Photographic Studios.

By P. C. Duchochois, New York.

Mr. Duchochois is a veteran New York photographer, and we know of no one more competent than he to discourse concerning the proper modes of lighting the sitter. This is not a large book by any means, as it contains only eighty-eight pages; but it is brimful of invaluable information relative to the highly important subject of which it treats. It contains seven chapters and an appendix, a different topic being touched in each, but all subservient to the main subject. In making a portrait he says, "The first principle to be borne in mind—and indeed it is the most important—is, that to make a portrait is not to represent *an action*, but a person with his proper character and as he appears every day to his friends," and he goes on to say how this is to be done. When at all possible he recommends that gentlemen should never be taken standing, the dress, which is convenient for daily occupations, being entirely inartistic. On the whole, it is very difficult to make *a picture* of a man, all being straight and angular even in a sitting position. A bust only is, therefore, tolerable. But the case is otherwise with ladies, whose dresses lend themselves more to pictorial composition. Many instances of good and bad composition are pointed out. While posing is important, the study of the effects of light and shade is equally so. He says: "It is the lighting which gives the illusion of relief and imparts character and variety to the composition, not less than the arrangement of the lines and the grouping of the different parts. However, the art of lighting is much neglected by photographers; the pose attracts all their attention." He follows with rules and effects of lighting; the construction of the glass-house, and the means for effecting a proper disposition of the light upon the sitter; backgrounds; the use of screens; the treatment

and disposition of the eyes—these and kindred topics are all ably descanted upon by Mr. Duchochois, who concludes his book by remarks on the development of the plate in relation to the lighting.

It is difficult to conceive of a more practical treatise than this, which the author has dedicated to his friend, Napolean Sarony, who, as most of our readers are aware, is one of the leading portrait photographers in New York. We are unable to state either the price or from whom it can be obtained; but, doubtless, those who supply American productions in this country will soon have it in stock. It is a little work which certainly ought to be productive of much good among the profession.

Father Perry, F.R.S., the Jesuit Astronomer.

By Aloysius L. Cortie, S.J.

London: The Catholic Truth Society, Westminster Bridge-road, S.E.

It would have been a great pity had this talented scientist been allowed to pass away without a more fitting record of his labours being allowed to appear than those published in our own and other journals at the time of his death. In this sketch of the life, work, and death of Father Perry, the author takes us within the veil, and affords us an insight into the private life of the esteemed father, and much connected with his public career of which we were unaware. He was, indeed, an indefatigable worker. The details of his death are very, affecting. He died at sea, about seventy miles from Demerara, whither the ship put back to, and where he was buried.

The book sells at a shilling, and contains ten illustrations, which include the portrait of the deceased *savant*, Stonyhurst College, places visited by him in Madagascar and elsewhere, together with the *Solar Corona* of December 22, 1889—his last work, for on his return to the ship his illness had so rapidly developed that, although as usual he steered the boat by which he was brought to the ship, yet when he got on board he could scarcely walk. After this he sank rapidly.

PHOTOGRAPHY IN COURT.

Trapnell *versus* Bridge.—Action between Photographers.

In the Divisional Court, on June 16, before the Lord Chief Justice of England and Mr. Justice Wills, the case of Trapnell *versus* Bridge was heard.

This case was tried in the Woolwich County Court in May last, and was an action brought by E. Trapnell, of Woolwich, against F. A. Bridge, of Dalston, for the specific performance of a contract wherein the defendant undertook to assign the lease of 77 and 78, Wellington-street, Woolwich, as soon as he was legally in a position to do so. The original lease was in the possession of Mr. Hughes, a solicitor, of Woolwich, who claimed a lien of 10*l.* on it for work done for W. Cobb. The Court of Queen's Bench had ordered Cobb to give up the lease to Bridge, and execute a proper assignment thereof. This order, however, had not been complied with. His Honour (Judge Powell) took time to consider, and eventually gave judgment for the plaintiff with costs. Against this decision defendant now appealed. Two objections to the ruling of the Judge of the Court below were taken—firstly, that the Judge had no jurisdiction, as the contract between the parties was executed in Bedford-row, London; secondly, that equity could not compel "specific performance" of an agreement where the consent of a third person was or might be necessary. Mr. Pitt Lewis, Q.C., and Mr. H. A. Smith appeared for the defendant, and Mr. Overend for the plaintiff. Their Lordships allowed the appeal with costs.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8928.—"Improvements in Cameras." F. W. Bransom.—*Dated June* 10, 1890.

No. 9058.—"Improvements in and relating to Lamps for Enlarging or Copying Photographs and the like." J. C. Shenstone.—*Dated June* 11, 1890.

No. 9118.—"Improvements in and relating to Photographic Apparatus." Communicated by R. Krügener. H. H. Lake.—*Dated June* 12, 1890.

No. 9158.—"An Improved Form of Adjustable Tripod suitable for Supporting a Camera or other Instrument." C. H. Gale.—*Dated June* 13, 1890.

No. 9218.—"Improvements in Colouring and Softening Photographs on Paper." F. W. Hayward.—*Dated June* 14, 1890.

No. 9231.—"Improvements in Photographic and other Camera Shutters." W. Milner.—*Dated June* 14, 1890.

PATENT COMPLETED.

Improvement in Photographic Objectives.

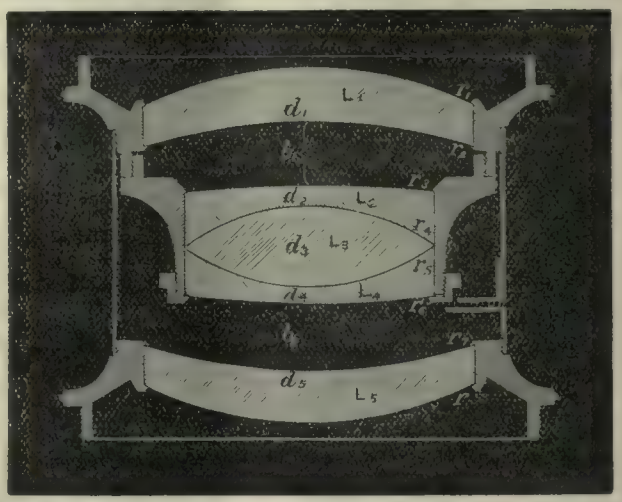
No. 6029. Dr. Ernst Abbe, Jena, and Dr. Paul Rudolph, Jena, Saxe Weimer, Germany.—*May* 24, 1890.

Our invention relates to photographic objectives, and the improvement consists in the construction of a system of lenses in which the function of collecting the rays of light forming the image, and that of correcting the spherical and chromatic aberration, are allotted to distinct parts of the system.

In constructing photographic objective glasses in which the advantage of an extended image-field is to be coupled with a large effective aperture, particular difficulties are encountered in attaining the desired degree of absence of spherical aberration of the pencils of light that produce the image. In view of obtaining the extended field aimed at, objectives of the usual types require to be provided with lenses of high curvature, and these always give rise to certain residual spherical aberrations (the so-called "zones"), whereby the distinctness of the image is impaired when the aperture is fully opened.

For the purpose of obviating this defect and simultaneously facilitating an improved correction of the chromatic aberration, we compose the objective of two uncorrected single collecting lenses, which, in view of the aplanation of the field, have their convex or more convex sides turned outwardly, and a collecting system possessing an infinite, or a large positive or negative focal length, so that it does not at all, or but inconsiderably, alter the focal length of the two collecting lenses combined; the said collecting system being constituted by two or three single lenses, cemented together and arranged between, and separate from, the collecting lenses. By means of this disposition it is possible to considerably diminish the aforesaid residual spherical aberration or "zones." At the same time it gives a wider scope in the selection of the glasses to be employed in the manufacture of the lenses composing the correcting system. In particular it furnishes favourable conditions for the application of those kinds of glass which have the property of almost completely uniting three colours of the spectrum, or, with other words, which neutralise the secondary spectrum and thus produce a superior degree of chromatic correction. The construction, therefore, yields comparatively ready means for the manufacture of such highly achromatic objectives as are called "apochromatic," according to the terminology introduced by Professor Abbe.

In the annexed drawing an objective carried out according to our invention is shown partly in outside view and partly in section. L_1 and L_5 are the two



collecting lenses, made in this case of concavo-convex form. The correcting system consists in the biconvex lens L_2 and the concavo-convex dispersing lenses, L_3 L_4, the two latter being composed of glass having such power of chromatic dispersion as is necessary to compensate the chromatic aberration of the lenses L_1 L_3 and L_5.

According to the kinds of glass used in the construction of the described objectives, and according to the special conditions to be realised by the total result obtainable from the system, a perfectly symmetrical arrangement of the lenses, such as is shown by the figure, may, in certain cases, suffice; in others, where a wider range of means for corrections or for removing objectionable reflexions is desired, a dissymmetrical arrangement may be preferable.

In the following tables we append three numerical examplifications of the manner in which lenses of given kinds of glass have to be ground for carrying our invention into operation. In these tables the letters r_1 r_2 r_3 r_4 r_5 r_6 r_7 r_8 denote the radii of curvature of the lens surfaces marked by the said letters in the figure. d_1 d_2 d_3 d_4 d_5 are the central thicknesses of the lenses, and b_1 b_2 the respective air distances between the lenses L_1 L_2 and L_4 L_5. All dimensions are expressed as fractions or multiples of the focal length of the entire system taken as unity. To obtain the dimensions of any particular objective, all that is necessary is to multiply the numerals given in the tables by the focal length required. The kinds of glass to which the tables refer are determined in the first example by the refractive indices n_D n_γ and n_{e1} corresponding to Fraunhofer's spectral lines D and F and the line Hy of the spectrum of hydrogen respectively, whereas in the second and third examples the indices n_D n_γ only are employed.

I.

Symmetrical arrangement. Apochromatic correction (the secondary spectrum removed).

Radii.	Thicknesses of glass and air distances.
$r_1 = -r_8 = +0{\cdot}2574$	$d_1 = d_5 = 0{\cdot}034$
$r_2 = -r_7 = +0{\cdot}3847$	$d_2 = d_4 = 0{\cdot}011$
$r_3 = -r_6 = +2{\cdot}3040$	$d_3 = 0{\cdot}056$
$r_4 = -r_5 = +0{\cdot}1374$	$b_1 = b_2 = 0{\cdot}042$

Glasses employed:

	n_D	n_γ	n_{e1}
L_1 L_3 L_5:	1·51840	1·52457	1·52956
L_2 and L_4:	1·57950	1·58745	1·59388

Position of diaphragm close behind lens L_4.
Largest effective aperture: 0·16.
Angle of field: about 90°.

II.

Unsymmetrical arrangement. Achromatic correction.

Radii.	Thicknesses of glass and air-distances.
$r_1 = +0{\cdot}2473$	$d_1 = 0{\cdot}022$
$r_2 = +0{\cdot}8707$	$d_2 = 0{\cdot}010$
$r_3 = +2{\cdot}2000$	$d_3 = 0{\cdot}062$
$r_4 = -0{\cdot}1321$	$d_4 = 0{\cdot}011$
$r_5 = -0{\cdot}1452$	$d_5 = 0{\cdot}036$
$r_6 = -2{\cdot}4750$	$b_1 = 0{\cdot}041$
$r_7 = -0{\cdot}4272$	$b_2 = 0{\cdot}044$
$r_8 = -0{\cdot}2798$	

Glasses employed :

	n_D	n_{G1}
L_1 L_2 L_3 :	1·50682	1·52037
L_2 and L_4 :	1·56884	1·58231

Position of diaphragm close behind lens L_4.
Largest effective aperture : 0·16.
Angle of field : about 90°.

III.

Symmetrical arrangement. Achromatic correction.

Radii.	Thicknesses of glass and air-distances.
$r_1 = -r_8 = 0{\cdot}4491$	$d_1 = d_7 = 0{\cdot}050$
$r_2 = -r_7 = 1{\cdot}3993$	$d_2 = d_6 = 0{\cdot}029$
$r_3 = -r_6 = \infty$	$d_3 = 0{\cdot}130$
$r_4 = -r_5 = 0{\cdot}2991$	$b_1 = b_2 = 0{\cdot}100$

Glasses employed :

	n_D	n_{G1}
L_1 L_3 L_4 :	1·51780	1·53201
L_2 and L_4 :	1·56716	1·58233

Position of diaphragm close behind lens L_4.
Largest effective aperture : 0·30.
Angle of field : about 50°.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is :—In a photographic objective the combination of two single collecting lenses and a compound correcting system, composed of single lenses cemented together, the said correcting system having a large focal length and being placed between the collecting lenses, substantially as described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
June 23	North Middlesex Club	Jolly's Hall, Hornsey Rise, N.
„ 24	Great Britain (Technical)	5a, Pall Mall East.
„ 24	Bolton Club	The Studio, Chancery-lane, Bolton.
„ 25	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
„ 25	Bermondsey	Bank Chambers, Hargreaves-street.
„ 26	Dartmouth-Trust	The Institute, Union-street.
„ 26	Halifax Photographic Club	Mechanics' Hall.
„ 26	Liverpool Amateur	St. George's-crescent North.
„ 26	Oldham	The Lyceum, Union-st., Oldham.
„ 26	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JUNE 12.—Mr. H. M. Hastings in the chair.

Mr. J. B. B. WELLINGTON inquired whether any member had tried the use of hydroquinone after eikonogen to get density. Eikonogen alone he found gave him a poor, weak image, but by continuing with weak hydroquinone he could get what density he desired.

The CHAIRMAN was in the habit of using eikonogen, and never found any difficulty in getting density with the new white kind as now issued. With an earlier sample he had found weakness.

The comparison of developed platinum prints and those by the Pizzighelli process was then considered. In Mr. J. S. Teape's specimens the Pizzighelli prints were generally preferred to the developed prints, whilst with those shown by the Chairman the contrary was the case.

In connection with the adjourned discussion on *The Printing Process that Best Renders the Gradation of the Negative*, Mr. Teape showed prints by four processes—albumen paper, Aristotype, platinum developed paper, and Pizzighelli platinum paper—printed from the same negative.

Mr. R. F. DRAGE thought the Aristotype carried everything before it.

Mr. WELLINGTON believed that as much gradation existed in the platinum print whilst wet as in silver prints, but only whilst wet.

Mr. T. E. FRESHWATER said that for rendering micro-photographs he had never found anything so good as albumen paper; if printed upon matt surface paper nearly half the detail was lost.

Mr. J. J. BRIDGMAN agreed that matt surface paper was of no use for micro-photography.

It was finally resolved *nem. con.* that in the opinion of the members the process that best renders the gradation of the negative is a printing-out process with silver and a glazed surface, such as albumen paper or Aristotype.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

JUNE 9.—Mr. Walker in the chair.

Mr. G. J. CLARKE delivered a lecture on *Photographic Optics*. First speaking of the action of light when entering or leaving one media of different density to the other, so as to make quite plain the reason of the action of lenses; and afterwards speaking of the defects incident to different lenses and the means by which they were overcome, and illustrating by means of well-drawn diagrams.

Mr. MCINTOSH wished to know if a stop placed behind as well as before a single combination lens would prevent distortion of marginal lines, and whether it would introduce other and more objectionable disadvantages.

The SECRETARY: Such an arrangement would prevent such distortion, but would cut off more than half the light, even with the largest stop, and with smaller ones the proportion would be much greater; besides which, it would practically form a tube of the diameter of such stops and of the length which separated them, thus allowing only a very small portion of the plate to be illuminated, and as this would reduce the angle to a very small one, any picture taken with an ordinary landscape lens of the same angle would not show any distortion, while being free from the inconvenience of the other.

Mr. W. T. GOODHEW: Would not sandwiching the new Jena glass which was affected by the atmosphere between two plates of other glass affect the optical properties?

Mr. CLARKE explained that allowances were made for such alteration.

On Monday, June 23, Mr. Goodhew will open a discussion on *Development*.

HOLBORN CAMERA CLUB.

JUNE 13.—Mr. PLUMBRIDGE read a paper from *Abraham's Annual* on *Hand Cameras*.

A discussion on the subject followed.

On Saturday, June 14, seventeen members went to Laindon Hills, under the leadership of Mr. Sexton. About eighty plates were exposed.

HACKNEY PHOTOGRAPHIC SOCIETY.

JUNE 16,—the President in the chair.

Mr. A. R. DRESSER read a paper on *Hand Cameras*. There was a good show of these cameras. Messrs. Smith (Eastman Company) and Abraham were present. Mr. Dresser (who had over fifty awards) sent a number of enlargements, some of which were very fine, and considerable time was spent in examining them. In addition to the cameras sent, Mr. Dresser brought his own, which he had constructed. He preferred for the lens one of Voigtlander's wide angles, and for a shutter one which he could regulate up to one-three hundredth of a second, and was much in favour of Eastman's new films, which he had found quicker than any plates made. In his camera he could use either films or plates with little or no extra trouble. He gave an outline of exposure and development, using an admixture of eikonogen and quinol, and when intensification was necessary used quinol, but warned his hearers not to get the negative too dense. He had travelled through Brittany and other places, and had always found the great advantage he had with the hand camera, on account of extra weight, setting up, &c., than with the ordinary camera, and he always obtained more natural photographs with it and was not bothered by crowds of people, such as the camerist of the present day always has to endure.

The PRESIDENT said he had found lighting marks in the Eastman film, but the representative of that firm informed him that it was now a thing of the past.

Messrs. Grant, Dean, W. Fenton Jones, Crouch, and others, took part in the discussion on hand cameras.

The evening was brought to a close by putting some of Mr. Dresser's slides through the camera.

BRIGHTON PHOTOGRAPHIC SOCIETY.

JUNE 11,—The President in the chair.

Mr. A. H. C. COMBER read a paper on *Platinotype*, and practically demonstrated the hot-bath process.

Mr. E. J. BEDFORD spoke on the cold-bath method, and exhibited several prints.

A large number of prints from negatives taken on the Whit-Monday excursion were shown.

NEXT excursion to Steyning, on Saturday, June 28. Train leaves Brighton Terminus at two p.m.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE members held their annual excursion on Wednesday, the 11th inst., the venue being Bolton Abbey and Woods. By invitation a goodly number of members of the Rotherham Photographic Society joined the train at Masborough. About noon a heavy storm came on and compelled the suspension of operations for about an hour, after which the weather cleared up splendidly and was all that could be desired, considering the large amount of rain which fell. On comparing notes it was found there was altogether fifteen cameras which had been used, and about one hundred and forty-five plates exposed, and ten Eastman's films. After tea several plates were exposed on the members and friends on the lawn.

MANCHESTER PHOTOGRAPHIC SOCIETY.

JUNE 12,—Mr. Alan Garnett (Vice-President) in the chair.

After the usual formalities were disposed of, the CHAIRMAN called the attention of members to the exhibition to be held at Liverpool in 1891, and also to the application of the Manchester Amateur Photographic Society for negatives to be used in connexion with the Manchester Survey.

In response to an inquiry in the question box, "Which plate is considered best for shutter work—a thinly coated one or a thickly coated?" various gentlemen recommended thickly coated plates.

Mr. S. D. MCKELLEN exhibited his detective camera, and explained its special advantages, both internal and external, with great lucidity. His remarks were

duly appreciated, and he was cordially thanked for bringing his admirable camera before the Society.

The Secretary then showed Fallowfield's Facile camera, lent for the purpose by Mr. W. I. Chadwick. Several gentlemen were pleased with the construction, and the easy method by which it could be manipulated, rendering it worthy of its name; it was, however, considered by some members rather bulky for the size of plate used.

Mr. Hughes passed round prints from his negatives taken by a Facile after three p.m., showing very satisfactory results in all respects.

Mr. JOHN SCHOFIELD then gave a demonstration of his method of developing dry plates, nominally for inexperienced members, but practically affording useful hints to all present. He did not adopt any special formula, but advocated the use of pyro, ammonia, and bromide with judgment, simply regarding them as developer, accelerator, and retarder respectively. He used one grain in eight drops; or—

Pyro	1 drachm	made up to	8 drachms with water.
Ammonia.....	1 drachm	,,	8 drachms ,,
Bromide	1 drachm	,,	8 drachms ,,

Novices were prone to jump from one make of plate to another, condemning each instead of their own want of experience. He warned beginners against using thinly coated plates, and recommended them to adopt a good thickly coated plate and keep to it until good results were obtained. Mr. Schofield preferred tentative development, commencing with one grain of pyro to the ounce, with one grain of bromide, and one drop of ammonia. For convenience he used three solutions—pyro, bromide, and ammonia—each containing one grain (or drop) in eight drops of water, as already mentioned. As development proceeded he added either of the above as required; if no image appeared in one minute another drop of ammonia was added, and the effect awaited patiently. The use of a weak developer at the commencement afforded opportunity to observe the behaviour of the plate and to judge of the treatment necessary. When a plate was known to be over-exposed, it was useful to pour over it a one-grain solution of bromide and gelatine, allowing it to remain on it for at least five minutes before commencing to develop. This treatment usually had a salutary effect, and it yielded a good negative with the plate he was then using, which had four times the normal exposure. Another method he had tried with success was to replace half the water required in making up the developer with old, stale beer, and to add the pyro, ammonia, and bromide as the subject demanded. When a subject was known to have great contrast, but little pyro should be used, and no bromide at the commencement; with each additional drop of ammonia, however, a quarter of a grain of bromide should be added. For views with heavy shadows, and for well-exposed but dimly lighted interiors, use two grains of pyro to one drop of ammonia to the ounce, and with each additional drop of ammonia take a quarter of a grain of bromide. If there are windows (interiors) or white objects introduced, be careful with the pyro, and for such subjects always use backed plates and thin glass. Some makers' plates required more development than others, their peculiarities could only become known through experience; nevertheless, with reasonable care a knowledge could readily be obtained of how long development should be continued in order to obtain suitable printing density when the strength and chemicals had been correctly adjusted.

Mr. Schofield illustrated his remarks by the development of plates exposed by members for the purpose without any information as to the time of exposure and other conditions, also plates which had received various exposures on different parts of them, and stereoscopic plates in which one picture had been stopped down four times as much as the other, the general results being very satisfactory.

Mr. Schofield brought the demonstration to a close by presenting the Society with the large gas lamp he had designed and used that evening. It was of novel construction, and exceedingly well adapted for use at a general meeting, for abundance of red, yellow, or white light could be obtained as desired, while, by a peculiar method of ventilation, the sides and top of the lamp, excepting the chimney, were maintained remarkably cool.

IPSWICH PHOTOGRAPHIC SOCIETY.

JUNE 14.—The usual monthly excursion took place, when thirteen members took a two-horse brake to Washbrook, Copdock, Capel St. Mary, and Little Wenham. The light was unfortunately a very bad one, the sun only shining for a few minutes during the earlier part of the afternoon, and it is feared the resulting negatives will lack brilliancy. The old Hall at Little Wenham forms an interesting subject, being of very ancient origin, built of Flemish bricks, containing the remains of an ancient chapel, fortifications, and double moated.

BERLIN PHOTOGRAPHIC SOCIETY.

MAY 22.—Dr. Stolze in the chair.

The honours of the meeting on this occasion belonged in a special degree to Herr Kühn, from whom most of the interesting communications made to the Society emanated.

The proceedings commenced with the exhibition of a number of sport episodes in collotype, received from the American Canoe Association, the picturesque grouping and excellent execution of which called forth general commendation. This exhibit was followed by a flash-light view of the interior of a circus, which included a group of several hundred persons, and the result of which was so natural as to have the effect of completely rivalling a painting in monotone, and was justly regarded as a triumph of flash-light work.

Some interesting discussion then took place in reference to the employment of photo-etching processes in illustrated papers. Herr KÜHN drew attention to the remarkable success attained in this direction in the pages of the *Illustrated American;* and Dr. STINDE drew attention to the very unsatisfactory results obtained in Germany in similar processes, notably in the Leipzic *Illustrirte Zeitung*, the phototypes in which lack depth in the shadows and brightness in the lights.

Around the next exhibit—a canvas transfer—began a truly Homeric contest of opinion as to how it had been executed, which after a while became unanimous in favour of the opinion that the copy had been made on chrome-gelatine, rubbed in with lampblack, and so printed on to the canvas.

The indefatigable Herr KÜHN then proceeded to the exhibition of a number of photographs of copies in oils of modern and old masters, the discussion on which was led by Dr. STINDE, who connected the subject with a number of interesting and valuable remarks on the value and the causes of naturalism in art.

The subject then changed to the discussion of pliable films, and the CHAIRMAN (Dr. Stolze) discoursed on the difficulties of manufacturing films from amyl-acetate or fusel oil. He dwelt on the enormous size of the buildings and cost of plant required, and also on the tremendous and penetrating odour produced, and humorously remarked that a factory of the kind would have to be relegated to the centre of the Sahara or the moors of Luneburg if protests against the nuisance were permanently to be avoided.

Herr M. STOLT said he had found Wilde's films made from guncotton and alcohol ether to be the best and as transparent as glass, but the alcohol ether vapours were a great nuisance in the case of manufacture on a large scale.

To the proposal to get rid of them by combustion, Dr. STINDE very properly objected that dangers from explosion would ensue unless the vapours were so diluted with air as not to be combustible, the desideratum of the future, according to him, being to find a means of replacing amyl-acetate by some less objectionable and more quickly drying substance which chemistry would doubtless in time supply.

A resolution expressing the thanks of the meeting to Herr Kühn was then passed on the motion of the CHAIRMAN.

A number of experimental photographs in natural colours were then exhibited by the Chairman on the part of Herr Stolt, who was obliged to leave. Some of these exhibited the peculiarity of appearing blue when seen from above, but yellow when seen through. Attempts to fix the colours with ammonia and ammonium chloride obliterated the distinction between the shades, making the plates quite clear and of one colour. The photographs were, as usual, made on chloride plates.

The exhibition of Herr Lindenheim's flash-light lamp then followed, the inventor showing, by means of tobacco smoke, that both in the case of quick and slow blowing through, the air escaped equally through all the openings. Another lamp was exhibited by Herr Himly; and after the communication by Herr F. CORNAND of an interesting photographic legal case the proceedings terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

STANDARD SCREWS FOR LENS FLANGES.

To the EDITOR.

SIR,—At some meetings of a Sub-Committee of the Photographic Convention, certain sizes were suggested as standards for the flange screws of photographic lenses. We, the undersigned, who were present at the meeting, with every desire to assist in the settlement of this important question, were convinced that the sizes arranged would not be universally adopted by the leading manufacturers. We felt, however, quite confident that it would be possible to arrange a series of flanges which could be adopted by ourselves, to which we could arrange to make all our lenses in the future, and which should also be of such a character that the majority of lenses now in the market should screw into them.

We are making a careful investigation into the matter, and we have gone quite far enough to see that we shall be able to adopt such a series of sizes. Several important considerations are being carefully considered, amongst which may be mentioned the absolute necessity of arranging a series of diameters which are in suitable ratio to the dimensions to which the lenses themselves must be made. In order, therefore, to obtain standards that will be in future adopted by the leading makers, we are carefully arranging a series of sizes to which we shall work in future, and which we shall submit for the careful consideration of the Photographic Society of Great Britain and the Photographic Convention.—We are, yours, &c.,

Ross & Co.	J. H. DALLMEYER.
R. & J. BECK.	W. WRAY.
HENRY CROUCH.	JAS. SWIFT & SON.

DEVELOPMENT IN SEPARATE SOLUTIONS.

To the EDITOR.

SIR,—In reading Mr. W. B. Bolton's article on *Intensity with Eikonogen*, I have tried several formulæ, but do not succeed well with eikonogen on the brand of plates I am using (Ilford). There appear to be several advantages in the separate bath method of development, both for pyro and eikonogen, but one point strikes me: If a *fresh* strong bath of either pyro or eikonogen is to be used for each plate *no* saving would be effected; in my case it would be a loss, as the amount of pyro recommended is about double the strength I usually employ.

If, however, say, a dozen half-plates were to be soaked in succession in the same bath (say the usual two ounces of pyro solution), it would be

necessary to know two things: first, the amount of silver in the plate: and second, the amount of pyro necessary for the complete reduction of that silver. These two factors being known, it becomes an easy matter to maintain the bath at its normal strength, or to know when as many plates have been passed through it as it is capable of developing.

Can you give me an approximation to the quantity of silver in the average commercial plate, taking a half-plate as a convenient standard for size? Of course, they vary very much, also thick and thin films, but I expect most of the cheaper plates, at about 2*s.* 3*d.* per dozen, run nearly alike.

Secondly, how much pyro, theoretically, will be required for the reduction of that silver; of course, presuming the whole of the plate to be reduced? In practice, the whole of the silver not being reduced would leave a safe margin for working, and prevent the bath becoming too weak unknown to the operator, if he kept careful note of the number of plates passed through.

Any information would much oblige.—I am, yours, &c., W. W.

Having sent this to Mr. Bolton, he replies as follows:—

I am afraid I have not made myself quite clear in my description of the mode of using the separate solutions. The only economy, of course, exists in being able to use the same *strong* solution repeatedly, and your correspondent seems to labour under some misapprehension as to what occurs when such a *plain* solution of pyro or eikonogen (*i.e.*, without alkali) is applied to the film. The latter simply absorbs a certain quantity of the solution without changing the character of the remainder. This neither undergoes rapid oxidation as it does in the presence of alkali, nor is it reduced in strength by abstraction of any portion of its solid contents, what remains after several plates have been immersed is practically the same strength as at first. I say *practically*, because, of course, the fact of dilution from the stock solution, and the inevitable exposure to the atmosphere in use, must bring about a slight oxidation, but nothing in any way approaching that which occurs in the same period when alkali is present. Your correspondent also, it seems to me, suggests an unnecessary, if not an impossible degree of exactitude in our knowledge of the precise quantity of pyro or eikonogen to be taken up by the film. As to the absolute reducing power of pyro, Captain Abney published some twelve or thirteen years ago the results of his experiments in this direction, but I cannot at the moment put my hand on them. They are not necessary for our purpose, however, since if we knew exactly how much silver the film contained, we should still have to discover how much of it was influenced by light, or, at any rate, the average quantity reduced in a negative of ordinary character. Failing mathematica exactitude in this, it is useless to apply it in other directions, and for all practical purposes we secure what we require by ascertaining experimentally *about* what strength of solution and length of immersion best suit each kind of plate. I have not tried eikonogen with the plates mentioned by your correspondent, but judging from their behaviour with pyro or hydroquinone, I should not anticipate any special difficulty in getting equally favourable results with eikonogen. The chief point for your correspondent, however, is that having once ascertained the proper strength of solution to apply for a normal exposure, he need not fear its losing its power by use.

CONVENTION VISIT TO OLD MORETON HALL.

To the EDITOR.

SIR,—Many of your readers who purpose visiting Old Moreton Hall during the Convention week will be greatly disappointed to find it undergoing a course of whitewash and tar. The creamy old plaster and woodwork are being daubed all over with glaring whitewash, and where the timbers and carvings come it is receiving a coat of tar on the top of that. I don't know if this piece of Vandalism will be finished and the scaffolding removed in time for the Convention visits, but I thought it best to make known what is being done, and what to expect. If the Council can suggest some other of the fine old mansions with which the county abounds as an alternative, it would be well.—I am, yours, &c.,

Dalby Cottage, Western Bank, Derby, *June* 14, 1890. RICHARD KEENE.

MOTTLING.

To the EDITOR.

SIR,—While coating some plates with chloride emulsion for printing-out purposes, and working therefore by full gaslight, I moved some of them along the levelled glass before they were perfectly set; this threw the coating into waves, and I noticed that, after setting, the surface of these plates was marked with a series of heights and depressions just about similar in outline to the mottling which sometimes appears in negatives and which you describe in last week's BRITISH JOURNAL OF PHOTOGRAPHY as "resembling the wave marks left by a receding tide upon a sandy shore." Now this may possibly throw some light upon the cause of the phenomenon mentioned. If in the manufacture of the plates they should happen to have been moved too soon, and this irregularity of surface produced (it would probably not be visible by an ordinary dark-room light), it would reappear when the film swelled in the developer, and if the solution were left long undisturbed any insoluble matter which might be present would settle down into the depressions, forming darker lines. I have found that this defect is sometimes strongly marked in negatives after treatment with the uranium intensifier, a solution which soon becomes more or less turbid.

I was some time ago trying some experiments in emulsion work, and, as the following does not quite agree with your experience that the addition of a soluble iodide to an emulsion reduces sensitiveness, it may perhaps be interesting. Twenty ounces of ammonio-nitrate emulsion were prepared, using 400 grains of nitrate of silver, 340 grains of potassium bromide, and 60 grains of gelatine. The batch was emulsified at 140° for some time, portions being set aside at intervals and cooled down, to test the effect of the "cooking," till the bulk was reduced to 16 ounces, then 12 grains of iodide of potassium were added and other samples taken. These sample portions were left till the silver haloids had precipitated, the supernatant solutions being then decanted off, and each lot of precipitate mixed up with the proper quantity of a solution of gelatine of 20 grains per ounce strength. Plates were coated with each portion and tested in the sensitometer. The emulsion proved to be rather slow. The plates containing only plain bromide of silver showed a gradual increase of sensitiveness according to the length of time of emulsifying, but no great gain; but in the plates coated with the first sample containing iodide, taken *immediately after* the last plain bromide, there was a sudden increase of rapidity, amounting to from three to four times that of previous samples, this gain being maintained or further increased in all plates coated afterwards. In this case it was perfectly clear that the addition of the iodide greatly increased sensitiveness. My experience is that it is a great preventive of chemical fog, but decreases density.—I am, yours, &c.,

Woodlands, Lewisham, S.E., June 15, 1890. H. J. CHANNON.

AMATEUR AND PROFESSIONAL.

To the EDITOR.

SIR,—I hope you will not think I wish to reopen that very sore question, "The Amateur *versus* Professional," but in reply to your correspondents "No. 6" and Mr. Marsh, I should like briefly to give my recent experiences with an amateur. Without wishing to blow my own trumpet, I beg to say I have always given every amateur the use of my dark room *carte blanche*, and have never had cause to regret it until now.

About Easter a fellow, named ——, hailing (so he said) from a suburb of Birmingham, came here for his health and asked for the use of my dark room, to which, as usual, I freely assented. Well, he gave me a lot of trouble by using the room, both early and late, never asking whether such times were inconvenient to me. After using it for seven weeks his self-assurance culminated in his locking up the studio (which is not near the house), locking my lad outside, and walking off with the key. I then requested him to find other dark-room accommodation, and told him that although I never made any *charge* for the use of the room, as he had never given the boy *one penny* for all the trouble he had given him, I should expect something for the use of the room. He then gave me 5*s.* for seven weeks' accommodation, and further begged for a continuance of the favour during the remainder of his visit (about a fortnight), which, under restricted conditions, I gave him, and he repaid my kindness by secretly taking his dishes and chemicals out of the room and leaving the town without as much as saying "Thank you." But the climax has yet to come. He by some means obtained admission into a certain institution in this town, took orders from them (under a promise not to show the negatives or pictures to any one in the town, but which promise he flagrantly violated), got a good price for the work, developed the plates in my dark room, got the prints done somewhere else, but when ready to go home the results were so *good* he got a local chemist's boy to deliver them after he had left the town. He belongs (or says he does) to one of the Birmingham amateur societies, and I only think it right the Birmingham amateurs should know what sort of a character they have among them, as I feel sure there are gentlemen in Birmingham who would "scorn" to sit in the same room with such a fellow, much less associate with him. I may add, that so far from this statement being exaggerated, it is (for want of space) very much underdrawn. And this brings me to the latter part of Mr. Marsh's letter, with which I fully agree, for if such a union had been in existence such miserable "cads" as —— would hardly be able to show their nose in any decent society.—I am, yours, &c.,

Fore street, Sidmouth, Devon, June 14, 1890. J. A. BELLINGER.

P.S.—Should any Birmingham gentlemen doubt my statement and will write me, I am prepared to give him fuller particulars than I can give in this letter.

[In the excess of his courtesy we think Mr. Bellinger acted unwisely. We have suppressed the name, but are not averse to supply it to any Birmingham gentleman on request.—ED.]

RAPID DISCOLOURATION OF PAPER.

To the EDITOR.

SIR,—I have noticed from time to time in your pages articles and letters regarding the fading of photographs. I enclose for your inspection a remarkable case of discolouration of paper. I purchased the periodical enclosed at 5 p.m. to-day; the newsvendor assured me that it had only been exposed since the morning. I know that the tanning action goes on very rapidly here. I have seen a whole family tanned and deeply affected (not by the birch) in one day *without* sunshine. I feel sure the albumenised paper is somewhat at fault.—I am, yours, &c.,

1, *South Cliff Villas, Lowestoft, June* 12, 1890. A. G. TROTTER.

[The periodical enclosed is printed on white paper, but a portion which has been exposed to atmospheric action is of a deep yellow colour. The sun has not had anything to do with this, as we have had it exposed for many hours without discolouring.—ED.]

PHOTOGRAPHY IN CENTRAL AFRICA.

To the EDITOR.

SIR,—I have only just seen your correspondent "Missionary's" query in your issue of the week before last, hence my delay in replying. I would advise "Missionary" to take a half-plate camera, with a Wray's lens, Iris diaphragm, three or four double backs, and, if instantaneous work is contemplated, a shutter worked by brass or steel springs *in a barrel*, to protect them from the air. On no account use a shutter provided with elastic springs. A black bag with arm-holes will serve to change plates, and while in the bag, open the slides and dust the plates with a brush. For developer, ferrous oxalate is the handiest; pyro used to turn black in the bottle a few years ago; it may now be better, so an ounce might be taken for trial. Do development and washing at night, when it is cooler than during the daytime; besides, there is the advantage that a native hut will serve instead of a darkened room. A portable lamp and nightlight are sufficient for the purpose of development.

"Missionary" need not seek extreme portability, as a native, not he, will do the carrying.

Silver printing is tiresome. I have never known ready-sensitised paper that would not darken spontaneously during the outward voyage; it must be sensitised and used at once. After fixing, and previous to washing, give the prints a five minutes' rinsing in clean hypo; that is to say, use two hypo baths in succession before allowing the print to come in contact with water.

Take views or portraits from 8.30 to 9.30 a.m., and from 3.30 to 4.30 p.m.; never at midday, as the light is then vertical, and pleasing pictures cannot be obtained.

If your correspondent desire further information, and will write to me at this address, I shall be happy to reply to his questions to the best of my ability.—I am, yours, &c., R. C. PHILLIPS.

The Arts Club, Manchester.

PROPOSED SOCIETY FOR CAMBERWELL.

To the EDITOR.

SIR,—It has been suggested that a photographic society should be formed in Camberwell, and in furtherance of this a few amateurs residing in the neighbourhood have arranged to meet at the "Stirling Castle" Hotel, Church-street, on Wednesday, 25th inst., at eight p.m., to consider the matter.

Perhaps you will be able to find room in your valuable JOURNAL for the insertion of this letter, as no doubt some of your readers, amateur or professional, interested in the subject may be glad to know of the formation of such a society, and willing to promote it by attending the meeting.—I am, yours, &c., GOERGE C. PIKE.

Louth-road, Camberwell, June 17.

FRENCH CORRESPONDENCE.

(*From our own Correspondent.*)

Excursion to Poitiers and Angoulême—State of Photography in those Two Towns—The Paris "Salon"—Automatic Machines and the Societies working the Same—The Phonograph rendered Useful—A New Book in Print—June Meeting of the Photographic Society of France—New Developers—A Report on the Advantages of Backing Plates—Standard Screws for Camera Stands—A Sensitometer—Coloured Screens for Orthochromatic Effects—How to Make the Same—Replacing the Footboard of Cameras—Flash Lamps—Lantern Exhibition—New Books Published by Messrs. Gauthier-Villars—The Photographic Club of Paris.

HAVING been on a visit for the last ten days to the old French towns of Poitiers and Angoulême, I naturally took an interest in the standard of photographic productions executed therein. Poitiers is intimately connected with English history on account of the famous battle fought there by the Black Prince, who, with 14,000 men, was obliged to defend himself against 50,000 under the command of King John. The battle field is about four miles from the town, and the celebrated farm of Maupertuis exists to the present day. Nothing else remains to indicate to the traveller that French and English blood had been mingled there in profusion; nothing left to show the so-called heroic actions and the bravery there displayed, excepting now and then (so said the farmer) a few bones and pieces of rusty iron are turned up by his ploughshare. Nature has asserted all her rights, and has hidden under a green mantle the site of that great disaster for France. I sought in vain for some vestige of that battle in the museums of Poitiers, but could find no *souvenir*. The cathedral was built by Henry Plantagenet and his wife Eleonore; and although some of the ramparts still exist, the town is modernised, but dull and dreary to a Parisian. The town seems to be the last residence of the old aristocratic families of France. With all their ancestral pride, they will not intermingle with the new France, with its democratic tendencies, excepting that a golden marriage is sometimes found necessary to regild the old coat-of-arms. Bigotry, superstition, and intolerance is predominant; a photograph for the aristocracy, another for the burgesses, others for the different classes, as numerous as the sects in India. This intolerance does not revive trade; photographers complain very much, although their work is very good ("Nothing doing," said they), and every enticement is employed to draw the customer. With a dozen *cartes-de-visite* a large bust is offered; soldiers are photographed at fifty per cent. reduction, &c.

Angoulême, a very pretty and lively town, built upon an eminence, and surrounded by ramparts, formerly scenes of deadly struggles with the English, is now transformed into pretty gardens and delightful promenades. I paid a visit to M. Braun, the principal photographer of the town, a gentleman who keeps himself on a level with the progress of the art. He has abolished from his establishment chloride of silver on albumenised paper; all his printing is done in carbon and platinum. I saw some very fine specimens during my visit. His artistic taste is also very developed. The best work is done in his establishment. He kindly insisted upon taking a portrait of Madame, as a *souvenir* of our visit to Angoulême. I will send one as soon as received to the editor, as a sample of style in provincial studios. M. Braun is a nephew of the celebrated Braun, of Dornach, who obtained permission to reproduce the National Gallery. He follows in the steps of his uncle, and does all he can to elevate photography. He is also a successful plate maker, and the founder of the South-west Photographic Society of France. With all these advantages I saw that he was obliged to hold out a certain enticement to customers in the shape of a painted portrait. Here, as elsewhere, photographers do not do a very brilliant trade.

On my return to Paris I visited the "Salon." There are many pictures, but few I would choose. I remarked a picture painted from the legend of Peeping Tom of Coventry. The horse bearing the fair lady is admirably painted; I never before saw such a life-like resemblance of that noble quadruped. I think that the painters of the "Salon" must have been afflicted with Daltonism, in that they must see violet, for the predominant tint all over the exhibition is a violet hue. Some very good statuary is to be seen. Victor Hugo's hero struggling with the devil-fish is a *chef-d'œuvre*. I admired also the marble bust of the celebrated publisher, Gauthier-Villars, well known to the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY.

It appears that the Automatic Photographic Company of London will not have it all their own way, as it is probable that a lawsuit will be entered. A similar Company is being formed in Paris to work the patents of M. Engalbert; his apparatus for producing automatic pictures was exhibited in the late Paris Exhibition.

Many experiments have been proposed to control the clerks and their cash box, but the following appears to be the most intelligent:—In the large establishments of Paris the *employé* goes with the customer to the cashier's desk and calls out the amount to be paid; this is written in the ledger, but, if omitted, the cashier, if dishonest, may appropriate certain sums. At present the *employé* calls out the sum before a phonograph, which registers it on a revolving cylinder. In the evening the verification is very simple; the master has only to make the instrument repeat the sums registered during the day, which, by being added up, must coincide with the amount found in the cash box. No frauds need be feared; the incorruptible phonograph does not forget nor will not lie.

M. Gauthier-Villars is now about to publish a book upon the use of photography in the Assise Court; M. le Docteur Bertillon is the author. He explains the use of photography in prisons, its value in putting into the hands of the law the resemblance of a criminal, which can aid the perspicacity of the detective. The author writes against retouching, which, says he, completely changes the portrait and renders it of little use in a court of justice. He finishes up by saying that photography must go hand in hand with the anthropometric system, which consists in taking exact measure of the different parts of the body, such as the waist, the breast, the length and width of the head, the ear, and especially the length of the fingers. This system has been in constant practice for several years *à la Préfecture de Police de Paris.*

Last Friday, the 6th inst., the Photographic Society of France held their monthly meeting, M. Davanne in the chair.

Several new developers were introduced to the members, among the number, "Le Cristallos," introduced under the respectable name of Jumeau. The authors claim for it a superiority over all others; that it shortens the exposure by half, can be kept a long time, and does not blacken the hands, &c. I learn that it is composed of cocaine.

It may be remembered that I offered to the Society last month, to be experimented upon, a bottle of coloured collodion to prevent halation; M. Chardon was invited by the President to experiment upon it. This gentleman made his report, which was very favourable, and showed the advantage of its use by exhibiting a negative of some trees standing out on a strongly lighted sky. No halation could be detected; every leaf and branch was perfectly sharp.

M. Sauret presented some camera-stand screws made to the Whitworth thread, as proposed by the late Photographic Congress. Formerly every camera maker had his own screw, and when one camera was wanted to take the place of another it could not be screwed upon the stand. The Photographic Congress did well in that it proposed uniformity, and, putting national pride aside, accepted the English three-eighths of an inch screw with the Whitworth thread. All camera makers are now taking up the subject, and ere long uniformity will be attained.

M. Faubel presented to the Society a dark slide, intended to act as a sensitometer, with which to ascertain the sensitiveness of dry plates. This kind of sensitometer was also proposed by the late Photographic Congress.

I will endeavour to describe the one presented, and how to make an experimental one. Take a half-plate dark slide and fix the lower part to a piece of wood, so that the frame may stand upright. Instead of the frame being wholly opened by pulling up the blind, it is necessary that this blind or slide be made in two, so that only half the plate in its length be exposed at a time. This done, take a piece of thin sheet zinc and cut out a certain number of rectangular holes—I believe ten holes on each side is the proper number; the figures in Roman numbers are also cut out from I to XX. This perforated plate of metal is now put into the slide, a sensitive glass plate to be tried is then introduced, and the door of the slide is then closed. A lamp filled with acetate of methyl of the size given by the Congress is placed at the distance of one metre from the slide, all in the dark room, naturally. As soon as the lamp is lighted the right hand blind is drawn up to the first catch, and hole No. 1 is exposed five seconds; then the blind is drawn up to the next catch, and hole No. 2 is exposed five seconds; and so on, until the ten holes on the right-hand side have each been exposed five seconds; then the blind on the left is drawn up in the same manner; thus No. 20 will have been exposed five seconds, whereas No 1 will have received the light for one hundred seconds. The exposed plate is then taken out and developed by the formula given by the Congress. The tints obtained are compared with a standard tint, and thus the rapidity of the plate can be ascertained. The standard tint is obtained by an equal mixture of white and black.

A presentation of coloured screens was made, and their manufacture was explained in this wise:—A normal aqueous coloured solution, composed of aniline yellow and aurentia, is obtained which will give, with the proper weight of gelatine, a film with the maximum of colour and the proper thickness, to be called No. 4; for No. 2, half this normal solution is measured out carefully and the other half is added water; the same quantity of gelatine is employed, therefore the screens made with this coloured gelatine will be exactly the half in colour density as the No. 4. For No. 1, a quarter of the normal coloured solution is taken and three-quarters of water added; for No. 3, the contrary is done—three-quarters of the coloured solution to one-quarter of water. The weight of gelatine is the same for every batch, therefore a series of screens from No. 1 to No. 4 are obtained, so that if two of No. 1 be superposed the tonation will be like that of No. 2; if three be laid one upon the other, No. 3 will be imitated; if four be superposed, the maximum tint of No. 4 will be attained. All this is well and good as regards colour, but, as was said before, gelatine screens become tarnished. The author of the screens presented to the Society informed us how he manipulated, and what care was taken to obtain parallelism and purity. Patent sheet glass, such as is used for mirrors, is cut into 12 × 18 cm. strips or bands of the same glass about five-eighths wide are glued round the edge of these glass plates, which now form a kind of tray. When well cleaned, and an isolating powder rubbed on, the tray is then collodionised with a normal collodion, composed of pure ether, alcohol, and pyroxyline. When all the ether and alcohol has evaporated, a given quantity of the coloured gelatine solution is carefully measured out and spread all over the glass tray; this is laid upon a large slate slab carefully levelled; the liquid gelatine here levels itself and soon sets. The glass tray is then hung up out of the way of dust until it is bone dry; it is then coated with collodion, taken off the tray, and cut up to the proper size for use. The opinion of practitioners in that line screens are superior to glass ones, and much more easy in their employ. If the lens carries the Waterhouse diaphragm it is very easy to hedge the screen. A piece of thin cardboard is chosen which, being doubled, is of the thickness of the diaphragm; a hole is cut in the centre of the size of the diaphragm to be employed; the coloured screen is laid between the cardboard, and the whole is inserted into the slit of the tube of the lens. A remark was made before the Society that the focussing must be done without the screen, and even if the image did not appear sharp after inserting the screen the focus must not be tampered with.*

M. Gaudin presented a camera in which he had replaced the footboard by a sliding brass tube, on the end of which was a brass bobbin connected with the lens; by its aid he could obtain any inclination. He claims less weight, and no moveable front or back.

M. Lévy-Sons distributed some sensitised albumenised paper, in order to be tried. He claims purer whites, and that it can be preserved longer than that in the market.

Several flash lamps were shown, all upon the principle of former ones, and an alcoholic lamp burning, through the flame of which powdered magnesium is blown by means of an air ball.

M. Marion made a lantern exhibition of scenes in Egypt.

Professor Holmes, of America, showed us some of his slides of scenes in California. These obtained well-deserved applause.

Messrs. Mariller & Robelet exhibited a stereoscopic camera.

Messrs. Gauthier-Villars presented to the Society a certain number of their new publications on the photographic art:—*Photography by the Aid of Kites*, by Arthur Batut; first and second volumes on *Film Photography*, by M. Balagny; *Photomicrography*, by M. Bonnet; *Calculations for Exposure*, by M. A. de la Baume Pluvinel.

The Photographic Club of Paris informed us that they had organized a competition for stereoscopic views, and an exhibition of apparatus, &c. Invitations to take part in the same were kindly forwarded on.

* Coloured films of this nature greatly mar the sharpness of the image. They bear no comparison whatever with the coloured glass now prepared for the purpose.—Ed.

Royal Society, Burlington House.—At the *soirée* held on Wednesday evening, Mr. Gambier Bolton, F.Z.S., read a paper on *Animal Photography*, and exhibited about fifty slides from his series of animal and bird studies from life, before a large and appreciative audience, including many of the leading naturalists of the day. Those who are present at the Conference at Chester next week will have an opportunity of seeing these slides, as we notice that Mr. Gambier Bolton's name is down for a paper on animal photography, illustrated.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

I will exchange fifty-four-inch bicycle for a good half-plate camera.—Address, F. Day, 22, Canonbury-road, Essex-road, London, N.

Humber tricycle, ball bearings, &c., for detective camera, not less than quarter-plate.—Address, T., 21, Foxley-road, North Brixton, S.W.

Sands & Hunter No. 3 cabinet lens, ten-inch focus; want good whole-plate or larger camera, or 10 × 8 wide-angle lens.—Address, W. C. Chipper, 39, Highgate Hill.

Two accessories, outdoor and indoor pedestal; will exchange for a good banjo or folding tripod.—Address, H. Fletcher, 267, Friern-road, East Dulwich, London, S.E.

A studio camera with excellent lens, and studio stand, by Meagher, in exchange for a good portable camera.—Address, F. Lawrence, 64, Cottage-grove, Stockwell, S.W.

Superior salmon rod, eighteen feet, never used, cost 2*l.* 10*s.*; will exchange for half-plate camera, and give cash.—Address, S. H. Bryan, Ashleigh-road, Barnstaple, Devon.

Modern half-plate camera and one double slide, by London maker, in exchange for whole-plate double dark slides.—Address, A. Glass, Stanley-villa, Devereux-road, Windsor.

Wanted, collodion ferrotype plates, mounts, and roomy dark box (on wheels preferred); give good, useful, artistic exchange.—Address, Arthur Hopkins, 6, Bernehah-road, Torquay.

Wanted to exchange an "Optimus" whole-plate burnisher, nearly new, to which has been added a gas stove for heating bar and roller, for a good-sized background (interior or exterior) by good artist. Photographs exchanged.—Address, Holdsworth, Excelsior Studio, Glossop.

History of United States, 2 vols., about sixty plates and maps, for *Photo-Engraving and Photo-Lithography*, by W. T. Wilkinson; Cassell's *Franco-German War*, half calf, 2 vols., for *Collotype and Photo-Lithography*, by Schnauss, translated by E. C. Middleton.—Address, H. J. Sarney, Westgrove Terrace, Milverton, Leamington.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. Greenwood & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

Photographs Registered:

T. N. Langton, Sheffield.—*Photograph of Rev. G. P. Metcalf.*

A. Cramer, Inverness.—*Photograph from a copy of the original Master-Mason Chart of St. Mary's Caledonian Operative Lodge of Freemasons, Inverness, No. 339.*

Printer.—In the same manner as gold residues are collected.

Memo.—The price of the Journal has been twopence since April 1, 1889.

J. Martyn.—Send a pattern of the shut-backs to any fancy box maker, and he will supply your requirements.

O. O. O.—We should not insert your structures, even if you allowed your name to be appended, as we know they are totally unwarranted.

A. W.—The trouble, without doubt, arises from the paper being abnormally dry at the time of printing. The remedy in this case is obvious.

Critic.—Let us see the circular; we can then judge whether it would be worth calling attention to it. Do not send the money without making full inquiry. Write to the superintendent of police for the district.

A. Z.—From the samples sent, there is no question the glass of the studio has changed in colour; but, from the tint it has assumed, we do not think the exposure is much, if at all, prolonged. Certainly not to the extent as to warrant re-glazing the building.

C. Gardner.—The reason why all the faces in the group are so dark is that they are in shadow. Had the light been in front instead of nearly behind, the result would have been different. Retouching, as the faces are so small, would be of but little improvement.

C. Hoy.—In the formula we gave you last week, for "one and a half drachms of carbolic acid" read *half a drachm*. The numbers of the Journal containing the information you desire are those for March 15, 22, and 29 of last year. See also leader in present issue.

Swindled.—We are pleased to learn that you have succeeded in obtaining your specimens back. You could, doubtless, obtain compensation for their detention, but the law is so uncertain that we question whether what you would obtain would repay you for the further trouble.

Disappointed.—Your remarks as to the awards of medals are, on the whole, correct. If those who offer medals were to be more explicit, and lay down more definite conditions for the judges to abide by, considerable heart-burning might be avoided. It ever was so with medal awards.

Looker On.—We do not know what the shares are quoted at now, or if they are quoted at all. We fear we are not fully posted up in financial matters. Anyhow, we imagine the shares in the Automatic Company are worth quite as much, and more, now than they will be twelve months hence.

H. W.—1. Some of the dry collodion processes will answer, but the plates must be re-wetted with a solution of nitrate of silver prior to development.—2. We are not aware of any patent in connexion with the subject. Opaque bags for changing plates in the field were in use more than thirty years ago.—3. No.

REV. E. HEALY, writing from Dot Gethin, Bettws-y-Coed, *apropos* of the Convention excursion to Bettws on the 24th inst., says that Mr. Parry, chemist, of that place, has just completed a dark room, so that those who visit Bettws can change their plates if they wish. "A word of warning as regards one of the show-places—the Machno Bridges (a sweet bit). The old janitor, not content with the usual fee of 2*d.* for entry, is trying it on by charging 6*d.* to photographers. This is to be resisted."

C. DILWYN writes: "Do you think an amateur can ever get on with printing by development on bromide paper, seeing he had no guide for the exposure necessary for different negatives?"—Amateurs can certainly "get on" with bromide paper, as witness the excellent results shown by them. A very little experience or a few tentative experiments will soon teach the requisite exposure. If the amateur can judge the proper exposure for a negative he will have little difficulty with regard to timing a print.

TOTTY writes as follows: "I have been using a quarter-plate camera with three dark slides, and I now want to go to a larger size: what would you suggest for a lady who has to carry everything herself, and often takes long walking journeys?"—Much will depend upon the physique of the lady. A half-plate outfit or, at largest, a $7\frac{1}{2} \times 5$ is quite as much as any lady, unassisted, should carry; and then it should be of the lightest description. The weight of apparatus with the slides charged appears to be widely different after carrying it a few miles on a hot day from what it was at the time of purchasing.

RURAL.—1. So far as we are aware, there will not be anything of special interest in the London photographic world early in July.—2. Galvanised iron vessels should be avoided; the stoneware vessels you are using are far preferable.—3. The washings from three or four reams of paper would well repay for saving. If the first washing be made in a tolerably large quantity of water, and pretty completely, the others may be discarded, for, although they may look milky, they are scarcely worth saving.—4. This is a mistake, the carbonate of soda only makes the slight trace of silver left more conspicuous.

J. HUBERT writes as follows: "A late valued assistant of mine applied for a situation to a firm of photographers on the south-west coast, and received no answer to repeated requests for the return of his specimens, whilst the firm in question are still advertising. I should be glad if you would kindly lend your influence to bring pressure to bear upon the individuals named, or if you think proper to give publicity to the fact."—We are exceedingly sorry at the prevalence of this shameful custom, which seems to be becoming epidemic. We advise Mr. Hubert to put himself in communication with the superintendent of police of the town mentioned. We have noted and filed the offender.

INQUIRER says: "I shall be obliged if you will kindly give me a remedy for the following:—As soon as my showcases are hung out the inside of the glass becomes covered with steam to such an extent that the specimens are not properly seen. The place where the cases hang is exposed to the full rays of the sun all day. If you can suggest a remedy, in the usual column for such inquiries, you will confer a great favour."—The cause is that moisture is enclosed in the case and cannot escape, hence it condenses on the glass. The remedy is to ventilate the case so that there is a free current of air through it. If some holes be bored in the bottom of the case and corresponding ones at the top the trouble will be avoided.

WILKINSON & CO.—Singular as it may seem, we do not see that there could be any appreciable amount of silver in the lead sent for assay; anyhow, sufficient to pay for separating. Hence the report. With regard to the other residues, unless the fused mass was intimately mixed at the instant before cooling, the bar could not be considered perfectly homogeneous. Had any gold been present it would be alloyed, and not in a separate form. As the metal was allowed to cool in the crucible, instead of being run into an ingot mould, portions taken from different parts of the block might vary considerably, and to a much greater extent than shown in the assay notes. In future we advise you to keep lead quite away from silver residues. The assay notes are returned as requested

GEO. BANKART says: "I have taken up carbon printing during the last two months, and have been fairly successful. There is one slight point of difficulty in it, however, which I hope to overcome, and upon which your remarks (of June 6 issue) on *Influence of Moisture in Certain Processes* bear to a noticeable extent, and on which I ask to be favoured with your opinion. Being a busy man all day, I cannot afford time to *develop* my prints at once as soon as they come off the negatives, and I have to leave them in contact with the plates *till evening*, and then complete the work. It is known that a continuation of the light action goes on, and somewhat shorter printing by actinometer should compensate for it; but what I gather from your remarks referred to (at page 354), is that if the tissue can be reduced to absolute dryness no further action will then take place. Suppose that at eight or nine a.m. I were to expose some sheets of tissue by actinometer, and then remove them from the negatives and place them in a platinum calcium tube, would the action of the desiccator be sufficiently prompt and energetic to withdraw all traces of moisture and to keep the tissue at its normal exposure for any length of time, or would it have any deteriorative effect on it for subsequent development? Of course the soaking in cold water previous to attachment to the developing 'support' would be a little more increased, but that would be nothing as compared with the convenience of keeping the exposed tissue safely for unlimited periods. A short reply in next 'Answers to Correspondents' will oblige."—If the prints be at once removed to a chloride of calcium tube, and the gelatinous surface is fully exposed, the action is practically suspended, especially if the tube be stored in a cool place. When our correspondent speaks of "unlimited periods" the case may be different. Exposed prints have been kept for six months without change, but they were immediately on removal from the negatives transferred to a drying closet, thoroughly desiccated, and then transferred to a tube and sealed. Under the conditions mentioned we have no doubt that the prints will remain without material change for several days, unless the tissue contains an undue amount of moisture.

GEO. BROUGHTON says: "I can get far more brilliant prints on bromide paper than I can with platinotype with most negatives, but with others the bromide paper only gives chalky results. Can you explain the reason?"—The explanation is simple. For the platinotype process a vigorous negative is required; for bromide paper a feeble negative will suffice; and if one with violent contrasts be used a very full exposure indeed must be given in order to obtain a harmonious print.

C. J. W.—1. Try Hetley's also.—2. No definite information can be given, as all must depend upon the subject and the amount of silver reduced to form the image; for example, in the copy of an engraving than, say, in a negative composed entirely of foliage. The developer can be used so long as it acts. —3. Add a solution of proto-sulphate of iron to the toning baths; that will precipitate the gold in the metallic form, which can then be collected and sent to the refiner.

THE PHOTOGRAPHIC CLUB.—Wednesday, July 2, *Matt-surface Printing*; July 9, Report of Delegates to the Photographic Convention. Saturday, June 28, outing to Pinner. Tea at the "Queen's Head" at half-past six.

MR. T. SCOTTON, of Derby, sends us two views of the eclipse which he photographed on Tuesday last, as he hears we had not very bright weather in London, and therefore thinks that the enclosed will be of interest, which it is.

THE Photographic Society of Geneva has been testing the dogma of gradual and growing conjugal resemblance. It took photographs of seventy-eight old couples, and of an equal number of adult brothers and sisters. On careful inspection it was found that the married couples were more like each other than the brothers and sisters of the same blood. Thus matrimonial approximation beat family likeness.

PHOTOGRAPHY PROSTITUTED.—Talmage in thirty-nine attitudes.—One of our Sunday papers, says the *Christian Register*, has recently published thirty-nine pictures of Dr. Talmage, taken by instantaneous photography—taken in all the attitudes of prayer, spiritual ecstasy, devotion, inspiration, exaltation, fervour, and frenzy, which he exhibits in the pulpit. This five-cent. show is one of the most extraordinary uses to which photography has ever been put. The worldly laugh over it, the judicious grieve, the pious mourn. The editor of our religious evening daily has heretofore rather gloried in Dr. Talmage; but he is out now in a lengthy article, in which he solemnly takes the doctor to task for profaning the Sabbath. If the doctor allowed himself to be photographed in the pulpit in the full swing of his eloquence, it was awful; if he posed for those theatrical pictures in cold blood, who can characterise the deed? This aspect of the affair is, however, lost sight of by the religious daily, which regards the doctor's sin as monstrous in swelling the receipts of a sensational Sunday newspaper. But one of its secular rivals harps on a different string, as witness the following:—"Ye gods and little fishes! Is the preacher's art a sham and a humbug? Is your pulpit pathos a simple matter of arching the eyebrows, and your eloquence a mere trade? Can you show how you make your congregation weep by putting on the proper expression before a camera? Is it all mechanism, all acting, all hypocrisy?"—*Christian World.*

ROYAL CORNWALL POLYTECHNIC SOCIETY.—Fifty-eighth Annual Exhibition, 1890.—Special Exhibition of Printing Appliances and Processes.—The Committee of the Royal Cornwall Polytechnic Society have arranged to make printing appliances and processes the special feature of the exhibition of 1890, which will open at Falmouth on Tuesday, August 26, next. The remarkable advance which has been made of late years in the development of the art of printing, the number of new processes introduced (particularly the varied uses made of photography in connexion with pictorial reproduction and illustration), and the universal interest and importance of the typographic art, assure the Committee that such a department will be equally attractive and valuable. It is intended to give the display an historical as well as a technical character by bringing together a number of examples of early typography, of rare and curious works, manuscripts, and various miscellanies associated with the art; to this end contributions of all kinds are invited. It is also intended to give the various branches of the art practical illustration so far as circumstances will permit. With regard to the many new modern processes of pictorial reproduction, embodying photography or otherwise, it is earnestly hoped that the proprietors and workers of these various inventions will contribute examples, and where professional secrets are not involved, supply practical illustrations also of the methods employed. There will be a section devoted to the more important works connected with the county of Cornwall, particularly embracing first editions, and, so far as possible, examples of the first-fruits of the printer's art in the various local towns. In order to prevent the accumulation of duplicates, and to enable the collection to be made more complete, ladies and gentlemen who intend to contribute under this head are requested to intimate their intention and the nature of their contributions to the Sub-Committee, a month, at least, before the exhibition opens.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1573. Vol. XXXVII.—JUNE 27, 1890.

LENS FOG.

It is scarcely needful to define the meaning of fog in this connexion, but all effects whereby a certain portion or portions of the image is acted upon by light from the lens other than that which forms part of the pencils of rays necessary to the production of an image may be classed under the heading of lens fog. At a recent meeting of the Photographic Society of Great Britain a very important practical paper was read by Mr. Dallmeyer, which, with the discussion that followed, provides thinking photographers with a fund of information, and hints on an important subject almost wholly neglected. It was shown that the image on the plate was capable of being reflected from the lens back again to another part of the plate where it was not required, and so, as may well be imagined, fog was easily produced.

It might be argued that if so potent a factor existed it would have been discovered long ago, as with all plates the evil must exist. But such is not the case; in a vast number of instances the reflection would be so faint as not to be noticeable; and where the reflection was strong it is not essential that it should fall on a portion of the image where its effect would be evident. Any one who has had experience of photographing subjects with white drapery or surroundings is aware of the difficulty of obtaining negatives free from fog, no matter how accurately the exposure was adjusted; and, again, is the same difficulty experienced in taking portraits with a white or light background. In outdoor work there are few who are ignorant of the effect on the clearness of the shadows when a very bright sky, especially when it is near the sun, is perforce included in the view. The same thing happens when machinery, for example, is photographed, as is often the case, with a large white sheet or other such arrangement as background. Unless special precautions are taken, the picture is bound to be fogged. All these instances must be put down to reflection upon the plate of its own image by means of some of the surfaces of the lens.

As to how it is to be cured, opinions will differ, but it cannot be doubted that a diaphragm at the back of the lens will arrest many rays that might be reflected from the lens to the detriment of the image.

But this is not the only source of fog the optical arrangements are answerable for. Let any one take up a lens and look through it at a white object, and he will see a number of images of that object of various sizes. These images are, of course, reflections and re-reflections from the various surfaces of the lenses of which the instrument is composed. Let the lens be in the camera, and the eye placed where the plate would come and the reflections will again be seen; every one of these images is a fog producer, for any light perceived by the eye would be received by the plate. When a great blaze of light like a strongly illuminated sky was in front of the camera, the eye placed where the image would fall would see very strong reflections, and these cannot but be expected to produce fog. It is obvious that a diaphragm placed in a position exactly the reverse of that required in the first case discussed would have a somewhat similar effect. "Somewhat similar" we say, because the view itself includes a wider field than that presented by the plate, and, hence, permits of a larger number or extent of reflections.

To reduce the area of the view presented to the lens is, it might be thought, so obviously a necessity, that every camera would be provided with some means for readily carrying out the idea. We need scarcely say, however, that such is not the case. A number of workers have screens or shades above the lens, still fewer shades to sides and top, very few indeed all-round screens. The majority of photographers either use their hat, or most frequently nothing at all, to keep the light from the lens, and so illuminating it, that no matter how carefully the inner part of the tube is blackened, an amount of light is sent into the camera that renders foggy images inevitable. A word to the wise, the proverb tells us, is sufficient: If the lessons of the paper and discussion we have described are attended to, lens fog, instead of being of every-day occurrence, will quickly become a thing of the past.

THE OBERNETTER NEGATIVE FILM.

Apropos of recent remarks on the subject of the protection of film negatives, we have received for trial samples of the new Obernetter negative film, which, it is claimed, is free from some of the objections raised against celluloid. Having submitted the films to a careful and exhaustive trial, we are able to lay before our readers a statement of their character, from which they will be able to judge for themselves the justice of the claim.

We may premise that the new films, though closely resembling at first touch the ordinary celluloid films, are perhaps a trifle thinner, and certainly more flexible, and appear, so far as the support of the sensitive emulsion is concerned, to consist of insoluble gelatine. When we say insoluble we use the word advisedly, for even in water at nearly boiling temperature they show not the slightest tendency to dissolve, or even soften; on the contrary, such treatment appears rather to toughen the substance, which shrinks considerably in area, and becomes thicker without, at the same time, much distortion or curling.

The contrast, indeed, between the behaviour of these films

under the influence of moisture, and of the earlier kinds having gelatine as their basis, is most remarkable, for, as those who used them will remember, though, strictly speaking, quite insoluble, they were so affected by the developing solution that it was almost impossible to manipulate them. Curling up into a light roll on the first contact with the developer, they required subsequently to be either pinned or glued down to a rigid surface in order to get them into anything like proper form for the printing frame. The new films, however, are scarcely more affected by the solutions employed than is celluloid. The substance certainly becomes soft and flaccid when wetted, and perhaps swells a little in size, but it is quite correct to say that it is as easy to manipulate, and as free from tendency to curl, as either celluloid or glass, and when dried assumes its original character.

So far as the properties of the emulsion are concerned we have here nothing to say, beyond that it is precisely similar to that used in the manufacture of the well-known Obernetter plates, and appears to be equally amenable to pyro, eikonogen, or hydroquinone development, though in our hands it answers best with the two first. In the manipulation of the films we are indebted to Mr. Gotz, the English agent, for the following directions:—The films are developed and fixed in precisely the same manner as glass plates; they may be soaked in water first, or, if preferred, the developer may be poured directly on to the dry film, or the latter immersed in the dry state, since it exhibits no tendency to curl, nor does it, like celluloid, show an inclination to float on the surface rather than remain covered by the developer. After fixing and careful washing, the negative is immersed for a short time in the ordinary alum bath, or in one of chrome alum, and after again washing, is allowed to soak for about a quarter of an hour in a solution of seven and a half parts of glycerine in one hundred parts of strong methylated spirit, or an ounce and a half of glycerine to a pint of spirit.

In this solution the hitherto soft and elastic film assumes a tough, leathery feel, and shrinks to its original proportions; it is now drained and blotted off between clean blotting paper, or better, soft linen, and thence transferred to folds of smooth paper and placed under gentle pressure, as between the leaves of a book, and in about an hour's time it will be dry enough for use. In this condition it is peculiarly soft and pliable, suggesting the idea of being still scarcely dry, but without any perceptible tackiness. We have, however, failed to find any evidence of want of dryness, even when left for some time in the printing frame with both silvered albumen paper and gelatino-bromide. In neither case has toning nor development shown the slightest sign of want of regularity.

We have followed out this course to the letter, and have no doubt it has been decided upon as the best under general circumstances, though we have satisfied ourselves that such precautions are not absolutely necessary. For instance, the glycerine bath we not only find not to be necessary, but we have always looked upon this application under similar circumstances as decidedly objectionable. A negative film that has to come into close and prolonged contact with the surface of albumen paper containing a large excess of free nitrate of silver cannot surely be too dry, that is to say, in the sense of being quite free from hygroscopic matter; and therefore, though the quantity may be infinitely small, the glycerine introduced into and left in the film must be matter in the wrong place. Where the nature of the film absolutely requires the softening influence of glycerine or other such material, it should, we think, be invariably protected by some sort of varnish capable of thoroughly isolating the hygroscopic matter from every chance of contact with silver, otherwise the negative will soon be ruined.

That the flexibility of the dried negative is not dependent on glycerine thus added we have proved by omitting it from the alcohol bath, with the result that the film when dry, and even after the application of a fair amount of heat, was perfectly pliable, and, as far as need be wished, from showing any signs of brittleness. In fact, a film that was purposely exposed to such a degree of heat as to cause it to shrivel—not, let it be understood, to actually singe or injure the gelatine—was perfectly restored to printable condition by soaking for a quarter of an hour in water and redrying. This result, we must say, surprised us considerably, for the same degree of heat applied to celluloid would have hopelessly "buckled" it, if it had not set it on fire.

The alcohol bath is, of course, desirable, since it so materially hastens the drying, and by shrinking and toughening the film causes it to dry more evenly, and prevents its sticking to the drying pads. Still, we have proved that it is not an essential to success. We should, however, always recommend it to be used, whether glycerine be added or not, for after its employment, if the negative be carefully blotted off and exposed to the atmosphere for a few minutes, it may be dried by gentle heat without the slightest danger. In careful hands this will be found very useful when a negative is required in a hurry.

As a preventive of frilling or blistering, the use of the alum bath is entirely unnecessary, as the cohesion between the emulsion and its support is so strong that there is not the slightest danger of such troubles, even in the hottest weather. But as an additional safeguard against the action of damp on the finished negative it is of undoubted use, especially if the latter is not to be protected by some sort of varnish.

This brings us to the question of protection. Of course, the objection raised to the employment of spiritual or ethereal varnishes in the case of celluloid does not exist here, but looking at the extreme pliability and softness of these gelatine films, we scarcely think the ordinary spirit varnishes would prove applicable on account of the great likelihood there would be of their cracking, unless the utmost care be taken in handling the negative. Gold size and similar preparations possessing greater flexibility are objectionable on account of their slow drying properties, and also because they so frequently remain tacky for a very long period after application, but neither of these objections holds good in connexion with collodion, and this, we think, should always be used on both surfaces, in spite of the difficulty urged by many against its application.

When any such difficulty is experienced in coating with collodion, we will suggest a method of drying and varnishing that actually simplifies the process, though, as will be explained, it may slightly lengthen it. Instead of treating the negative after washing with alum and alcohol, let it be squeegeed film side downwards on to a sheet of collodionised glass, the usual stripping precautions being taken. These consist in polishing the clean glass with talc, collodionising, and after the film has thoroughly set, washing until every trace of ether and alcohol has disappeared, when the glass is ready for the film. The latter should not be treated with alum, as its surface will then be in a better condition to adhere to the collodion film, and the same may be said of the use of alcohol. The latter, again, must not be applied to the film after laying down on the glass, as in shrinking the gelatine it causes it to come away from its support. The only plan is to allow the whole to dry sponta-

neously, which it will do in a very short time in a current of air. When apparently dry, heat may be applied to drive off the last traces of moisture, and after cooling, the negative may be again coated with collodion, and when that is dry, the whole stripped from the glass.

This occupies a little longer time, owing to the necessity for spontaneous drying, but it is, perhaps, less trouble, and gives a better result than the other method. Both sides of the negative, too, are protected, and if a proper sample of collodion be used, both its strength and flexibility will be improved without using any hygroscopic material whatever.

The solar eclipse last week, so far as photographic operations were concerned, proved a failure, at least from an astronomer's point of view. What they aimed to secure was a series of photographs taken in regular succession, at certain intervals, during the obscuration, or rather, partial obscuration. This unfortunately they were precluded from doing owing to the state of the weather, for at each of the observatories in this country, except for a very brief period, the sun was obscured by clouds. At Greenwich thirteen negatives were, however, secured with the photo-heliograph, though fifty had been prepared for. With the new photographic refractor, owing to the longer exposure necessary, only three negatives could be taken. This was very disappointing, as great preparations had been made; and as the season of the year was favourable, much was anticipated. At Paris the light appears to be very similar to what it was here, while at Vienna and Berlin observers seem to have been more fortunate. Several correspondents have sent us some capital photographs they managed to obtain with their ordinary long-focus lenses during the short time the sun was unobscured by clouds, and very good they are. Several of them would, however, have been even better had the plates been backed, so that halation would have been avoided.

A short time ago we advised those who wished to secure photographs of lightning to keep their slides always charged with plates, so as to be ready whenever the opportunity occurred. There is another point in connexion with this subject to which attention may be directed, namely, to have the camera ready marked to focus. Few, we imagine, who are unprepared would be able to set up a camera and adjust it in focus at a moment's notice at night. Any attempt to focus by the aid of the lightning flashes would prove abortive. A vast number of the photographs of lightning we have seen were taken considerably out of focus, which has much detracted from their interest. This may be easily avoided by the plan suggested.

It is always advantageous to have the camera marked for the different lenses used at the point at which all objects beyond a certain distance are in focus, then the camera can be set up and used on many occasions without the trouble and delay of focussing. Several tables have been published giving the distance at which this occurs with lenses of different foci when worked with various apertures.

Apropos of the article last week on the effects of bichromate of potash on the skin, it may be well to give a word of caution to those who are in the habit of powdering the salt to facilitate its solution. In the operation of pulverising, the finer particles are liable to become disseminated through the atmosphere and then to settle on the hands and other exposed parts of the body, when of course they may prove hurtful. Some often gets inhaled through the nostrils, when they produce great irritation. It has been asserted that bichromate of potash used to be added to snuff to increase its pungency; anyhow, its inhalation should always be avoided. The diffusion of the particles may always be avoided by sprinkling the crystals when placed in the mortar with a few drops of water before commencing to pound them.

Particles of bichromate of potash floating in the atmosphere of the workrooms often give rise to trouble. If any, for example, happen to settle upon a wet print the result will be spots. Such would also be the case with plates. In some of the photo-mechanical processes it is recommended to pulverise the bichromate before use. Now, if any of the dust produced settles on the prepared paper or plates it will cause increased insolubility at those points, which will then take the ink and retain it, and so cause spots in the prints. We have known spots on carbon pictures to have been produced by floating particles of the bichromate salt, though for a long time the cause was unsuspected. However, as we have just said, the trouble may be obviated by the simple addition of a few drops of water to the crystals.

The Council of the Society of Arts has awarded this year's medal to Dr. Perkin, F.R.S., for his discovery of the method of obtaining colouring matters from coal tar, and the establishment of an entirely new industry. The Albert medal, it may be explained, was struck as a reward for "distinguished merit for promoting arts, manufactures, and commerce."

The coal-tar colours have been largely employed for different purposes in connexion with photography. They are used in photo-mechanical printing to warm up the tone of the ink, to tint albumenised paper, and as a pigment in some carbon tissues, and sometimes added to varnish for dark-room windows, and, perhaps most usefully of all, in orthochromatic photography. Unfortunately, however, they are not all of such a permanent character as could be desired. Every one knows how quickly the roseate tint on most albumenised paper disappears when the prints are exposed to light; also how rapidly the colour is sometimes discharged from dark-room windows coloured with aurine, particularly if exposed to a southern aspect. Last week we alluded to the discharge of the crimson element from some carbon pictures we had seen in Jersey. This pigment, we assume, was artificial alizarine. All commercial alizarine is now made synthetically from coal tar and not from madder. It is very questionable if genuine madder colour would, under the circumstances, prove more permanent than the artificial.

It is a curious circumstance in connexion with many of the coal-tar colours that on some materials they are to all intents and purposes permanent, while on others they are fugitive. Aurine, for example, on silk and wool is said to be durable, while those who have applied it to dark-room windows, dissolved in varnish, are aware that, under these conditions, it is far from being so. Alizarine, when used as a dye stuff, is lasting, as witness Turkey red, which is one of the most permanent of all colours. Just now we insinuated that the really most valuable application of the coal-tar colours is in orthochromatic photography. Here, curiously enough, the most fugitive ones of the whole series appear to be those best adapted to the purpose. Eosine, erythrosine, &c., are extremely fugitive colours.

A correspondent last week sent us an example of the rapid discolouration of paper by exposure. Common paper, made with some kinds of wood fibre, discolours very quickly when exposed to light and the atmosphere. Many papers, such as those employed by the daily press, are tinted with one or other of the fugitive coal-tar colours, the object of this being to disguise the common quality of the material. Some years ago, we remember, Mr. E. W. Foxlee showed at one of the meetings of the South London Photographic Society, and at a subsequent meeting of the Photographic Club, a copy of the latest edition of the previous night of an evening contemporary upon which he had printed a design by a few hours' exposure to light. Any one can repeat this simple experiment with any of the pink-tinted "dailies."

A contemporary, commenting on the outcry raised by certain amateurs on the prices charged for apparatus of the higher class, mentions that a well-known maker recently bought some mahogany, and "the price paid for it was at the rate of three shillings and sixpence per square inch." Mahogany at over twenty-five pounds per

superficial foot, it is manifest, cannot be profitably employed in the manufacture of guinea sets of apparatus. Possibly, however, the figures have been misquoted.

THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM.

The fifth meeting of the Convention is now being held at Chester.

The opening ceremony took place on Monday evening, when a brilliant *conversazione* was given by the Mayor, who welcomed the members to the city in a manner so hearty, and with a hospitality so generous, not to say lavish, as no doubt will cause the Chester opening meeting to be a red-letter day in the annals of the Convention.

The proceedings were formally opened by Mr. G. Watmough Webster, Chairman of the Local Committee, presenting to the Mayor the President and Council of the Convention. His Worship, in a brief and cordial speech, gave welcome to the Convention.

Mr. A. Pringle, the retiring President, after thanking the Mayor, introduced the President-Elect, Mr. C. H. Bothamley, F.I.C., F.C.S., who delivered the following address:—

PRESIDENTIAL ADDRESS.

By C. H. Bothamley, F.I.C., F.C.S.

At our meeting last year we were celebrating the jubilee of the photographic negative, and my predecessor in this chair very fitly devoted the greater part of his address to a summary of the history of photography during the past fifty years. Although, as you will remember, that address had a somniferous effect on the delegate from the Leather Bellows Club, the rest of us listened with much interest to the admirable account of the rise and development of photography which was laid before us. The events of a year usually require much briefer treatment than the events of half a century, and a review of the progress of the past twelve months is unfortunately made easier by the fact that little, if anything, of first-rate importance has been done. No discoveries or inventions of far-reaching influence have startled the photographic world.

Much interest has been excited by the announcement that an Austrian, Herr Verescz, had made a decided step towards the solution of the problem of producing photographs in natural colours. It is understood that the method is based on Carey Lea's researches on the photo-compounds of silver, and that it differs from earlier methods in that the sensitive material is used in the form of an emulsion. How far the results are in advance of those obtained by previous experimenters is a point on which there are differences of opinion. It seems practically certain that, at any rate, some improvement has been made in the permanence of the images, and we shall look forward with much interest to the results of further experiments by the same worker.

This problem of photographing objects in their natural colours is of very great interest. It seems to be the one thing on which the non-photographic public has set its heart; nor are photographers lacking in enthusiasm. How far these desires are likely to be realised we cannot tell. More or less imperfect photographs in colours have often been obtained, but they are not capable of multiplication in the way in which we make hundreds of prints from one and the same negative. Whether we shall ever obtain a chromatic negative process is at present merely a matter of conjecture; we can only say that the direction in which the solution of the problem is to be looked for is not yet apparent.

In dealing with another difficulty—the proper monochromatic rendering of coloured objects—we have made much greater progress. No marked advance, however, has been made since last year, and the general adoption of orthochromatic methods is impeded by the facts that their successful employment, especially for outdoor work, necessitates certain modifications in well-established methods of working; that the preparation of the plates involves some manipulative skill and acquaintance with the selective sensitisers to be used; that it is not at all improbable that a sensitiser with a similar name, but of greatly inferior power, will be used unless great care is taken in purchasing the materials; that the commercial products upon which many have to depend do not at present represent the maximum possibilities of the methods. Nor is this true only of this country. Examination of many reproductions of pictures shows that some Continental workers have not obtained complete mastery over the capabilities of the processes, even for the particular class of work in which their advantages were most quickly recognised. The whole question of colour, physical and physiological, scientific and artistic, is very complex and difficult. Accurate knowledge and conceptions are comparatively recent acquisitions, and it is therefore not surprising that in the practical treatment of its various problems progress is somewhat slow.

Development and developers have, as usual, attracted much attention. Eikonogen has gradually obtained a firm hold as a useful addition to our developing reagents, its special value lying in the fact that it enables us to obtain well-gradated negatives where other developers would be very liable to give excessively strong contrasts. It follows that in dealing with very short exposures eikonogen is of the greatest service. In portraiture also it gives very fine results.

Catechol or pyrocatechin has not been fully investigated, partly on account of its high price. Quite recently, however, Dr. W. H. Perkin, jun., has described a ready method of preparing it from guaiacol, an allied substance much lower in price. In this connexion it is interesting to note that Colonel Waterhouse has recently shown that guaiacol itself is a developer, though it does not possess any exceptional powers.

One very important fact in connexion with the principles of development has been established by Mr. Lyonel Clark in the course of his elaborate experiments on different developers, and has been confirmed by later experiments of my own made for quite another purpose. It is that the maximum sensitiveness that a plate will show, in other words, the maximum detail obtainable for a given exposure, is the same for all developers and for all variations in the composition of one and the same developer. Different developers differ, however, very considerably in the time required to make the maximum detail visible, and it follows, of course, that the gradations of the resulting negatives are very different. That, in a word, is the nature of the difference between developers—a difference in gradation and not in the maximum detail obtainable, provided that the action of the developer is continued for a sufficient length of time. Recent papers contributed to the Photographic Society by Abney, and to the Society of Chemical Industry by Hurter and Driffield, are worthy of careful study in connexion with the question of development.

Photo-mechanical printing processes have made no remarkable new departure, but their applications continue to increase. Cheap illustrated papers, and a great increase in the number of the illustrations in magazines of all kinds, constitute unmistakable evidence of the usefulness of these processes. Without photo-mechanical printing a paper like the *Daily Graphic* would be impracticable.

Chromo-typogravure, which produces the fine results seen in *Figaro illustré*, and chromo-collotype, which as yet is not often seen in this country, produce results in many respects superior to those of ordinary chromo-lithography. They are at present our furthest advance in the photographic production of coloured pictures. Colour printing with photogravure, I may perhaps remind you, will reproduce water-colour drawings with a fidelity so great that it may deceive even the artist of the original drawing.

The applications of photography to scientific purposes become every day more numerous and varied, and I do not hesitate to say that it is in this direction that photography has won, and probably will win, its greatest triumphs. Here it is without a rival or competitor, and does services which nothing else is capable of doing. As a method of fine art it occupies, and probably will always occupy, a subordinate position.

In no branch of science have the photographic results been of greater importance than in astronomy. Mr. Ainslie Common, encouraged by his great successes with his big three-foot reflector, has constructed and set up in his observatory at Ealing a magnificent five-foot reflector, in almost every respect the most powerful and most perfect telescope that has ever been made. It was designed and erected especially for photographic work, and its performances will be watched with great interest. You will, I am sure, share my pleasure in knowing that Mr. Common has very kindly promised to give us at our meeting next year an account of the later developments and results of astronomical photography. Mr. Isaac Roberts, with a much smaller reflector (twenty inches) at his private observatory at Maghull, near Liverpool, has produced some of the most remarkable photographs that have yet been done. Some of these I am fortunate enough to be able to show you, and I would especially call your attention to the wonderful photograph of the great nebula in the constellation Andromeda, which shows that in this nebula we have a new Saturn in the actual process of formation. The condensed central mass, and the system of long oval rings surrounding it, can be very clearly seen. Of the important bearing of this result on the nebular hypothesis I cannot here speak. It must be a source of great satisfaction to all photographers to know that Mr. Roberts's splendid work, like that of Mr. Common before him, has this month been awarded the blue ribbon of science—the Fellowship of the Royal Society.

A very remarkable recent result is Professor Pickering's discovery that a certain star is really a double star with its components too close together to be resolved by telescopes. The discovery was the result of observations on the variation in the definition of photographs of the spectrum of the star.

Mr. Andrew Pringle will tell us that photography has its triumphs in dealing with the minute as well as with the immense, and some of those triumphs he will bring before us during this meeting.

Amongst other things, photography has been largely and systematically applied to the study of lightning, and by Lieutenant R. Abercromby to the study of clouds and meteorology; by Lord Rayleigh to the study of the effects of electrification on jets of liquid; and by Mr. C. V. Boys to the investigation of falling drops of water. Mr. Friese Greene will describe to us a new form of magazine camera which he has invented, and which is especially suitable for investigations of the kind to which I have just referred. An account of Mr. Muybridge's work we heard from his own lips last year, and this year Mr. Gambier Bolton is to tell us of the results which he has obtained in applying photography to the study of animals

from a different point of view. There is, in fact, no branch of natural science in which photography is not rapidly becoming indispensable.

If the applications of photography to science have been numerous and successful, the same cannot be said of the applications of science to photography. Most of the problems awaiting solution at our last meeting still remain unsolved. The careful experiments of Mr. Chapman Jones have given us accurate knowledge of some aspects of mercurial intensification, but of the real nature of the latent photographic image, of the change which silver compounds undergo when exposed to light, and of many other reactions which underlie some of our most important processes, we are still almost entirely ignorant. The reasons are not very far to seek. The investigators in these subjects throughout the whole world at the present time may almost be counted on the fingers. I say *investigators* designedly; of experimenters of a certain kind we have enough and to spare, but of competent investigators there are very few indeed. The fundamental problems to which I have referred are very complex and difficult, and their investigation requires a knowledge of chemistry and physics much greater than is usually possessed by photographers, and, on the other hand, a better practical acquaintance with photography than competent chemists and physicists usually have. Further, they involve many micro-chemical and electro-chemical changes with which we are at present imperfectly acquainted. In the less difficult questions of *technique* and processes, the relative merits of different modes of treatment and the like, we might have expected to find more satisfactory progress; but here also we have made no great advances. From time to time, it is true, papers appear in the journals recording so-called experimental investigations of the action of various developers, relative sensitiveness of different plates, and similar matters. In not a few instances they leave us just where we were. So far as the advancement of photography is concerned they represent merely so much wasted time and wasted material—wasted because for want of attention to some indispensable conditions, neglect to eliminate important sources of error, want of discrimination between several possible causes and the like, no definite conclusions can be drawn from the evidence adduced. The enthusiasm of the experimenters is undoubted, and if a thirst for notoriety is not always operative, we may take it that a desire to advance photography is their chief incentive. Why, then, do their efforts so often lead to nothing? Chiefly from a want of training in the art of experiment; from want of acquaintance with the scientific method. A really good experimenter is a rarity, an accurate observer must be both born and made, and is a still less common species. With very rare exceptions indeed the scientific method, which includes not only the arts of experiment and observation, but also the power of properly co-ordinating the facts and of making accurate deductions from them, is only to be acquired by careful and long training. Such training, it is a mere truism to say, very few photographers have had, but to it we must undoubtedly look for our future progress.

I do not, of course, mean that good work cannot be done in photography unless a man has a profound acquaintance with chemistry and physics. I see before me a sufficient number of living examples to at once disprove any such assertion; the scientific method lies not in the matter but in the manner. It would be out of place here to attempt any definitions or illustrations of what the scientific method really is. We might define it negatively as that which is usually absent in photographic experiments, but that would not take us much further. One of the most important characteristics of the scientific method is great reserve and caution in making deductions; one of the chief characteristics of not a few so-called photographic experimenters is a fatal facility for making hasty and incorrect deductions from imperfect data. No stronger proof can be found of the fact that photography is comparatively in its infancy, that its fundamental principles are not generally understood, than the rubbish which is sometimes brought before photographic societies in the form of papers—papers which even now and again occupy the waste paper baskets of the photographic journals. This latter catastrophe, of course, only happens when the editor is away on a holiday. Similar productions are characteristic of all crafts or arts which are still carried on largely by rule-of-thumb; they would not be tolerated in societies of a truly scientific character, or in an art which was really carried out on scientific principles.

Photography has an artistic as well as a scientific and technical side, and if I have not unnaturally dealt with the scientific questions first, I do not forget that the majority of photographers regard the artistic aspects as the more important. In the artistic development we may, I venture to think, congratulate ourselves upon steady and well-founded progress. Argument as to whether photography is or is not a method of the art is no longer necessary. Its place has been taken by discussions, often of an animated kind, between the different schools of photographic artists—naturalistic, naturalistic, realists, and the like. Very few who are competent to deal with the matter now refuse to admit that, in the hands of a man of artistic temperament and training, photography may be a method of pictorial fine art just as much as watercolour or sepia. We shall all admit that the possession of a camera and lens will not make a man an artist, neither will the possession of a palette and a box of paints. It is also true that a very large majority of the photographs which we see are far from having any claim to be regarded as works of art; but is that not also true of the bulk of the paintings which are produced? Fine art, I take it, lies not in the method, but in the use of it; in all cases it is the man, not his medium of expression, that determines the result.

In 1873 Mr. P. G. Hamerton, the well-known art critic and editor of the *Portfolio*, very clearly and tersely summed up the case against the claims of photography to rank as a method of fine art. "(1) It is false in local colour, putting all the lights and darks of natural colouring out of tune. (2) It is false in light, not being able to make those subdivisions in the scale which are necessary to attain relative truth. (3) It is false in perspective, and consequently in proportions and forms. (4) Its literalness and incapacity for selection and emphasis are antagonistic to the artistic spirit."

Most of this was true enough seventeen years ago, but we have advanced a little in our knowledge of science and art since then. Falsity in local colour has almost disappeared before the development of orthochromatic methods, the principle of which was discovered in the very year in which Mr. Hamerton wrote. Falsity of light arises mainly from the use of plates of unsuitable quality, and from imperfect knowledge of exposure and development on the part of the operator. Falsity in perspective and the proportion of forms is entirely a question of the proper or improper use of lenses, and need not exist at all. Literalness and incapacity for selection and emphasis are defects in the photographer more than in photography. How far we have advanced in this direction I will bring to witness, if not Mr. Hamerton himself, at any rate Mr. Hamerton's paper. In the January number of this year, speaking of the photographs which illustrate Miss Agnes Giberne's book, *The Ocean of Air*, the *Portfolio* says, "But what it concerns us to observe is that though they are merely literal transcripts from nature, and no other artistic faculty than that of selection has been exercised in their production, this faculty alone has sufficed in several instances to produce genuine works of art. If an artist were to take, for instance, the *Trees in a Mist*, photographed by Mr. Sutcliffe, of Whitby, it is not too much to say that he would find it difficult to improve the composition or to alter a single line for the better."

In their assault on the fortress of art, photographers have already carried the barbican, and many may be found in the outer ward. A few have even forced their way into the inner court, but the keep remains in the hands of the painters and sculptors, and in their hands, I doubt not, it always will remain. Every method of fine art has its limitations, and in the case of photography these limitations are in many respects more severe than in any other method. I for one accept Mr. Ruskin's *dictum*, that every true work of art shows distinctly the method by which it has been produced, and that its character and possibilities are largely determined by the method. I have little sympathy with those whose chief anxiety seems to be to make their photographs look like something else. I believe that if photography is to maintain the position it has already won, and is to make further advances as a method of fine art, we must not only be fully acquainted with and make the most of its capabilities, but we must also quite clearly recognise its limitations. We must be content to admit that there are certain classes of subjects which come rightly within the scope of the painter, but are unfit for treatment by photography. In our appreciation of a picture we cannot forget the method by which it has been produced; and when, for example, you see a photograph professedly of an incident which took place before photography was invented, the unreality and want of truth is too prominent. You are unable to rid your mind of the idea that, after all, it is only a literal representation of a group of models. When, too, we see photographs which profess to represent those human emotions which we commonly hold sacred from intrusion, a sense of unfitness more than counterbalances any pleasure arising out of mere technical artistic skill. All this has been pointed out before, more appropriately, and with much greater force, by the *doyen* of photographic artists, Mr. H. P. Robinson. Latterly in America they have very largely developed the practice of photographic competitions, prizes being given for the best set of photographs illustrating some poem or part of a poem or story; and to some extent the practice has unfortunately, like the potato beetle, spread to this country. If the subjects are properly chosen, with due regard to time and place, such competitions may not do any harm, though it is contrary to experience to expect that any real fine art will be developed in such a manner; but when the outcome is photographs of such scenes as a girl in agony by the deathbed of her father, done, of course, with the help of models—to take only one example out of those which you may see in the American magazines—it is an outrage upon one's sense of the artistic fitness of things.

Even where groups of figure studies of the class to which I am referring are successful, the result is often due to the models quite as much as to the photographer. He has to be content with the best he can make of them; he cannot with his camera alter lines and expressions as a painter can with his brush. In the hands of a few masters pictures of this kind are undoubtedly often successful, but in the greater number of instances they are not at all pleasing to any one but the photographer and the models, and sometimes not even to the models. I hold that in the interests of photography as a method of fine art it is to be regretted that photographers do not chiefly confine themselves to the classes and subjects that photography can deal with excellently, instead of striving after effects and results which, from the essential limitations of the method, are a severe strain on its capabilities. What class of subjects, you may ask, do I regard as proper to photography from the artistic

point of view? I would reply, portraiture pure and simple, with studies of figures in costume and groups, if you like, provided that they are put forward as such; landscape and seascape, in which figures are either subordinate or absent altogether. At the risk of making invidious distinctions, I would cite Wellington's *Eventide*, Mayland's "*There is Sorrow on the Sea*," Gale's *Sleepy Hollow*, many of the studies of Sutcliffe, and many of the landscapes of Green, as examples of the class of work which seem to me to show photography at its best. Some one may raise the old objection that in dealing with pure landscape and seascape you have not sufficient human interest; you can only represent the literal beauty of your subject, and have no opportunity for the idealisation which some hold, though others do not, to be essential to all fine art. I decline to accept the dogma, but even if it were true I would reply in the words of Fra Filippo Lippi:—

"If you get simple beauty and nought else,
You get about the best thing God invents:
That's somewhat; and you'll find the soul you have missed
Within yourself when you return him thanks."

What can be done to promote the advance of photography, scientific and artistic? The development of a desire for better training, and the provision of means to satisfy the desire. Here, as in many educational matters, we are behind our Continental competitors. Germany has long had an efficient school at Berlin, under Professor H. W. Vogel, and there is a well-known school of a more technical character at Schloss Grönenbach, under the direction of Herr W. Crönenberg. Zurich has a new photographic laboratory full to overflowing. Austria has its new and splendid Photographic Institute, with abundant accommodation, and a large staff of teachers under the direction of Professor Eder, and they attract students not only from all parts of the Continent, but also from England and America. Here in this country we have the schools at the Polytechnic and the Birkbeck Institute, and in various science and University Colleges up and down the country instruction is given in the principles and practice of photography, but all of them together are scarcely equal to the Institute at Vienna, and they confine their attention almost exclusively to teaching, doing but little in the way of research. In America they are not even so well off as we are. So far as I can learn there is only one school of any importance, that at Chatauqua, and I am informed, on very good authority, that very little desire is shown to take advantage of the instruction offered, and that the school is only kept alive by the energy and self-denial of its teachers.

It has been proposed to found a Photographic Institute in this country, and we shall all be agreed that, founded on a right basis and conducted on right lines, it might be of incalculable benefit to photography. Founded on a right basis and conducted on right lines—that is the essence of the whole matter, so far as possible success is concerned. An Institute of Photography, I take it, should teach and examine and conduct original research. It might possibly also act as a court of arbibration in disputes involving technical matters, but the advancement of photography in all its branches and aspects, by teaching and research, should be its chief business. It should be thoroughly, though not ambitiously, equipped; it must be free from connexion with commercial interests of any kind; above all, it must be free from the immaturism which so often clings round present-day amateurism.

Whether, when all these conditions were fulfilled, it would attract a satisfactory number of students is a matter of conjecture. We English are slow to avail ourselves of our advantages in matters educational, even where the knowledge to be acquired has a direct monetary value. The experience of existing schools is not altogether encouraging, but the prestige which would attach from the beginning to a properly equipped institution especially devoted to photography would probably do much. The standard of every-day requirements in photography is gradually being raised, and there is little doubt that better instruction will be necessary to produce and maintain the higher degree of skill demanded. One thing is certain, that when the establishment of such an institution comes within the sphere of practical politics, the members of the Photographic Convention will not be backward in their support of it.

After all, the real progress of photography depends no more on institutes than the progress of civilisation and human knowledge depends on Acts of Parliament. The welfare of a community depends on the conduct and character of the individuals composing it; and the progress of an art or craft depends on the skill, the thoroughness, the enthusiasm of the individuals who practise it. We, as a Convention, are banded together to advance the interests of photography and all that appertains thereto. As a Convention we are endeavouring to justify our existence, and in some measure at least we are succeeding; but whatever we may do as a body, we have each an individual responsibility, an individual duty, towards the art which we practise: to see to it that our own work, be it much or be it little, is honest and thorough, the best that it is in us to do. Am I not right in holding that the spirit which should animate every follower of the photographic art is the spirit which inspired the poet when he wrote—

"In after days, when grasses high
O'er-top the stone where I shall lie,
Though ill or well the world adjust
My slender claim to honoured dust,
I shall not question or reply.

"I shall not see the morning sky;
I shall not hear the night wind sigh;
I shall be mute, as all men must,
In after days!

"But yet, now living, fain were I
That some one then should testify,
Saying—'He held his pen in trust
To Art, not serving shame or lust.'
Will none?—Then let my memory die,
In after days!"

A musical entertainment, vocal and instrumental, followed, and later, by means of the optical lantern, a display of views taken on former occasions was given.

The exhibition department is well stocked, mainly with novelties in apparatus, of which the following synopsis will afford some idea:—

The Eastman Company have a very large selection of their new Kodaks and their belongings. They also exhibit some admirable enlargements on their permanent bromide paper. Their exhibition is the most imposing in the room.

Of hand and other cameras, the number and variety are very great:—Fallowfield's Facile; Beck's Pecrops hand cameras; Swinden & Earp's Prize Medal Detective; Humphries' Perfect Quadrant; the Guinea hand camera; Samuels' patent; Perken, Son, & Rayment's; Pearson & Denham's circular and reducing camera; Baker's microscopic camera; Watson's Acme; Griffith's hand camera; Phœnix camera, by Reynolds & Branson; twin lens camera by the London Stereoscopic Company. Lenses in brass and aluminium, by R. & J. Beck; J. J. Atkinson's dark-room lantern; specimens by Spurr's silk printing process; Archer's prismatic lantern; specimens on Scholzig's enamel paper; Newton's scientists', miniature, rotating, and biunial lanterns; Rooke's Excelsior print washer: Beard's miniature lantern; Wood's washer; Lewis & Co.'s adjustable stand; specimens of the Kallitype printing process; burnishers and other exhibits by Holmes, Sadler, & Holmes; Pringle's photo-micrographic apparatus, by Swift & Son; prints on Obernetter gelatino-chloride; Lewis's plate rocker; the Watson exposure meter, and specimens of its capabilities; the Perfection dark-room candle lamp; and several other apparatus.

On Tuesday there were two excursions, to Moreton Old Hall and Llangollen respectively.

In the evening Mr. A. Haddon read the following paper:—

NOTES ON THE REPORT OF THE LENS STANDARD COMMITTEE.

By A. Haddon.

Before submitting the report drawn up by the Lens Standard Committee, I propose to state the history of this Committee and the reasons for the recommendations at which it has arrived.

At the meeting of the Convention held in Birmingham, 1888, a committee of five members was appointed, at the suggestion of Mr. W. Taylor (Leicester), "to consider the adoption of the standard lens fittings recommended by the Photographic Society of Great Britain, or to suggest alterations of that system, and to take or indicate such steps as may be considered necessary for its effective establishment." The Committee thus appointed consisted of Messrs. A. Cowan, A. Gifford, A. Haddon, J. H. Pickard, and S. G. B. Wollaston.

That Committee met twice during the time which elapsed between the Birmingham and London meetings, and the Chairman (Mr. Wollaston) drew up a report, which was submitted to the Council, and it was decided that the same should be read at one of the evening meetings. After the reading of the report Mr. W. Taylor proposed that the report be not adopted, but be referred back to the Committee for further consideration. Mr. Conrad Beck seconded the motion, which was carried.

At a meeting of the Council held in London on February 21, 1890, the Committee was reappointed, consisting of Messrs. A. Cowan and A. Haddon (Mr. Wollaston having previously tendered his resignation as Chairman of the Committee), with power to add to their number. It was thought advisable to increase the number by adding to the list the names of three gentlemen well known to you—viz., Mr. W. Bedford, Dr. J. Edmunds, and Mr. H. M. Hastings, F.C.S.

We discussed the *pros* and *cons* of different methods, so as to formulate a system of standards which should be practical and popular, and as we had only the report of the Photographic Society of Great Britain to guide us, we thought it best to consult those gentlemen, who are daily engaged in the superintendence of this kind of work. In addition to this, so as to ensure a meeting, a few of the leading opticians were called on personally, and their promise to attend obtained.

The Secretary of the Committee made a few remarks on the subject in hand, and then called for any suggestions that any one present might wish to make.

Mr. W. Taylor (Leicester) opened the discussion, and among other things, referred at some length to standard gauges to be used in connexion with the screwing of lens-mounts, and pointed out that, whatever system was finally adopted, is was necessary to seriously consider gauges, as, unless these were absolutely true and of the same size, to the ten-thousandth part of an inch, or even less, the resulting work could not be interchangeable. Mr. Taylor did not mean, as some seemed to have inferred, that the lens mounts themselves should all gauge to anything like the one-ten-thousandth of an inch. It would be impracticable as a manufacturing operation to screw thousands of lens-mounts to this degree of accuracy. Mr. Taylor then showed two sets of steel gauges, such as he had devised for his own factory, in order to ensure as near constancy as possible in the diameter of the screwed portions of mounts and flanges. He also mentioned that steel gauges for the smaller sizes of lenses did not last more than one year, in consequence of the slow but constant wear they underwent during their use. It was impossible to harden them, as during this operation they generally warped to such an extent as to become valueless. He had, however, partly overcome this difficulty by hardening certain removeable pieces which could, after the operation, be replaced in exactly the same positions.

In connexion with the standard unit for diaphragms Mr. Dallmeyer suggested $f \sqrt{10}$, and mentioned that at the recent Photographic Conference held in Paris f-10 had been adopted, so as to introduce the decimal system in connexion with diaphragms. He considered his own suggestion better, as in order to obtain the intensity value of the stops it is necessary to square the denominator, and in his case it would only be necessary to strike off one nought, whilst if the French system were adopted two noughts would have to be struck off in order to obtain the unit area. Your Committee agree with Mr. Dallmeyer that the method he has suggested is extremely clear and thoroughly scientific, although there is much to be said *for* the powers of 2. If they were starting a system anew, they might well recommend Mr. Dallmeyer's suggestion for general adoption. But, as against this, they have to take into account the number of diaphragms that have been marked on the f-4 system, as recommended by the Photographic Society of Great Britain, and, therefore, think that it would be unwise to make an alteration now, more especially as the f-4 system is at present getting to be well understood and widely used.

Messrs. Debenham and Beck also spoke on this subject, and finally, when the question was put to the vote as to which of the three systems should be recommended for adoption, f-4 as the standard unit was carried by a large majority.

The next point for discussion which was raised resulted in a proposition from Mr. Dallmeyer, seconded by Mr. Beck, that a special meeting of opticians be called in order to settle the sizes of the screwed portions of lens-mounts and flanges.

The last subject that was brought before the meeting and voted upon on this occasion was screws for attaching cameras to tripods and for fixing rising fronts, &c. As nothing better was suggested than appears in the report of the Photographic Society of Great Britain, this was put to the vote and carried unanimously.

The meeting was then adjourned till the 9th of May.

Prior to the meeting of May the 9th a circular was drawn up and about 200 copies posted to the different opticians whose names appear in the *London Postal Directory*. This circular embodied the different suggestions that had been made, and contained a copy of the resolution proposed by Mr. Dallmeyer and seconded by Mr. Beck. The response to this appeal for data was very meagre.

As the meeting of the 9th of May consisted almost exclusively of opticians, and was more or less of a private nature, we need not enter into details, but will only give the results arrived at.

On this occasion between ten and twelve opticians were present. Some data as regards diameters of the screwed portions of the mounts of lenses and numbers of threads to the inch were handed in for tabulation, but these data proved to be only approximate, no attempt having been made in any case to measure accurately the diameters, and the necessity for accurate gauging having been apparently not realised.

On discussing these results it was found that the diameter of the smallest lens-mount, where screwed to receive the flange, had been derived from an old gauge prepared by Andrew Ross. This thread has been copied by several younger makers, and it is believed that some 100 to 120,000 lenses of this particular size have been manufactured and are now in use. Upon considering this state of things it was proposed that this size should be adopted in the future. This was carried unanimously. Mr. Dallmeyer thereupon very kindly offered to supply specifications as regards exact diameter, thread form, and thread rate for this screw, which was understood to be 1·5-inch in diameter.

The next larger size, 2 inches about, was then discussed, and for the same reasons as given above with regard to size No. 1 this was put to the vote and carried by a majority (six for, two against). Thereupon Mr. Dallmeyer promised to supply data for this screw also.

It was then proposed that the standards of the Photographic Society of Great Britain, with the above modifications, be accepted; this was lost by three voting for, five against the proposition.

The Photographic Society of Great Britain had kindly lent their standard gauges to one of the gentlemen present, and the gauges were upon the table for examination.

With regard to the form of screw to be adopted in connexion with lens-mounts, it was proposed and carried that the thread form known as Whitworth should be adopted.

It was then proposed, seconded, and carried, that as the present was not a sufficiently large representative meeting, another meeting be called, and that all opticians be invited to send in to the Secretary of the Committee exact measurements of lens-mounts and flanges, with their thread rates for all the classes of lenses which they manufacture.

The meeting was then adjourned till the 21st of May.

As soon as possible a second circular was sent out to all opticians, as on the previous occasion, and as a result eight statements were received, and these were tabulated.

From the data thus tabulated it appears that Messrs. Newton & Co.; Reynolds & Co.; Suter; Taylor, Taylor, & Hobson; and the Stereoscopic Company, have been for some time past manufacturing lenses in accordance with the specifications of the Photographic Society of Great Britain.

The tabulated results also showed that what had been supposed by Mr. Dallmeyer to be 1·5-inch gauge, and which had been adopted as one of the standards by the previous meeting, was in reality 1·513-inch. The screw which had been supposed to be a 2-inch also turned out to be 1·98-inch. It also appeared that there was some considerable divergence between these mounts and those issued by the younger houses, who had copied the Andrew Ross mount without access to the Andrew Ross gauge, and now manufactured these screws of such various dimensions that there was no certainty of interchangeability of these so-called 1·5 and 2-inch mounts, among some half dozen makers, who all considered they were making the same screws. Upon these facts becoming clear, the whole subject of the resolution which had been adopted at the last meeting had to be reopened.

In the discussion which followed, Dr. Edmunds was the first to speak, this being the third meeting, and he told those present that in considering standard screws they had three things to bear in mind—1st, the diameter of the screw, and that in all cases this should be measured on the outside of the male screw, full diameter; 2nd, the form of the thread; and 3rd, the screw rate or pitch, *i.e.*, the number of threads to the inch; and that it was absolutely necessary to keep each one of these points separate and distinct. As regards the diameters of the screws, he would advise the English inch as the standard, as any one who wishes to make standard gauges can easily turn up a ring or plug gauge, and then compare it with the standards kept by the Board of Trade for this purpose, and in that way ensure uniformity of manufacture and complete interchangeability. He would therefore most strongly advise any odd fractions of an inch that might occur in any of the sizes as at present manufactured to be abandoned, and the inch and simple submultiples, as 1¼, 1½, 1¾, 2, &c., to be taken in their stead. In olden times, before the screw-cutting lathe was invented, Mr. Holtzapffel originated certain forms of threads, and though these at the time were as perfect as could be expected under the circumstances, yet now that we have a more scientific method for originating screws, we should use it and put aside these old forms. For brass work, where the maximum of strength is required, he had no hesitation in saying that an angle of 60° was preferable to any other, and that the top of the thread should be flat. The work could be turned down to the exact diameter and then screwed up; if the original surface between the threads was left so as to form the flat when finished, the screw would be of the required diameter. The form of thread recommended by the late Sir Joseph Whitworth was an angle of 55° rounded at the top and bottom. This form of thread could not be surpassed for cast iron, but was not the best for other metals where the greatest strength was required. The number of threads was not so important so that it was uniform.

In answer to these remarks of Dr. Edmunds, it was pointed out that a flat top thread, in the case of photographic lenses, would be more likely to bind if it were bruised, and therefore the rounded Whitworth angular form of thread would be preferable on this account. Shot chasers of the Whitworth form can be obtained all over the world from any respectable tool maker, whilst if an angle of 60° were adopted the chasers would have to be specially made, which would considerably increase the cost. Dr. Edmunds agreed that these were very good reasons why the Whitworth thread form should be adopted, especially as the maximum strength in the case of photographic lens mounts was not required.

It was then proposed and seconded that since, from the statements supplied, the diameters of the lenses adopted at the last meeting were not exactly 1·5 and 2 inches respectively, but a small fraction larger in the one case and smaller in the other, those resolutions be rescinded in order to clear the way for further discussion and suggestions. This was put to the vote and carried.

It was then proposed that in all cases the English inch be taken as the unit of measurement. Carried unanimously.

It was then agreed that, in consequence of the difficulty of measuring internal diameters of flanges, &c., all terms of measurement be regarded as made upon the outside diameter of the male screw thread.

The next point discussed was whether the present smallest size of the Photographic Society of Great Britain standards, viz., 1·5-inch, was not too large for the mounting of lenses for hand cameras. The majority were of opinion that it was, and that a smaller size was necessary, and finally it was agreed to start with the smallest diameter, 1-inch, and the next, 1·25-inch.

It was next proposed, seconded, and carried (by nine for, and five against) that 1·5, 1·75, and two inches be the next sizes, and that the others rise by half an inch up to four inches, and then by one inch, as prescribed by the Photographic Society of Great Britain.

It was then stated by some that certain lenses look over-mounted with a mount of two inches in diameter, and, in addition, it would enable those opticians who have up to the present issued lenses a little over 1·5-inch to make adapters which could fit 1·75-inch without increasing to any serious extent the weight or bulk of the lens mount, and this new intermediate size would be very useful for the double purpose.

It was then unanimously agreed that the form of thread should be that known as the Whitworth angular thread.

The last matter to be settled was the rate or pitch, and it was agreed that for the smallest sizes up to 3 inches inclusive, the number of threads to the inch should be 24, and for the 3¼ and upwards, 12 to the inch, these being the two thread rates recommended by the Photographic Society of Great Britain.

Mr. W. Taylor (Leicester) then proposed a series of standard adapters to carry any lens one size larger, and that these should be numbered; also that lenses, adapters, and flanges should be so adjusted that when the mount is screwed home in its flange, with or without adapter, the diaphragm, index, or other fitting shall always stand in the same convenient position.

Mr. Haddon followed this by the reading of the following report on Lens Standards:—

Report of the Committee, consisting of Messrs. W. Bedford, A. Cowan, Dr. James Edmunds, Mr. H. M. Hastings, and Mr. A. Haddon (*Secretary*), *appointed to consider Lens Standards.*

The Committee appointed

> "To consider the adoption of the Standard Lens fittings recommended by the Photographic Society of Great Britain, or to suggest alterations of that system and to take or indicate such steps as may be considered necessary for its effective establishment,"

now submit their report as follows:—

We have carefully, with the aid of the leading opticians, considered the subject remitted to us, and we hope that our recommendations will not only receive the sanction and support of this meeting, but be universally adopted by all who desire the improvement and fuller utilisation of photographic apparatus.

1. We have not seen any reason to depart from the existing "Photographic Society Standards," which, as far as they go, we adopt. The modifications hereinafter suggested are either in the nature of explanation or amplification of those standards.

2. We recommend that the English inch be taken as the standard unit of length with regard to all measurements in connexion with lenses, flanges, adapters, and camera screws.

3. That the form of thread for lens-mounts, flanges, adapters, and screws, be that known as the Whitworth angular thread, and in order that there may be no misunderstanding with regard to this, we append the specifications, so that any one, wherever situated, can originate this thread-form for himself.

4. That all measurements where screws are concerned be made on the outside of the thread of the male or plug screw when finished.

As to Lens Diaphragms.

We recommend:—

5. That the aperture of the standard unit diaphragm have a diameter equal to one-fourth the equivalent focus of the lens, and be marked "1," the approximate focal length of the lens or combination being engraved on the mount.

6. That diaphragms with smaller openings should have apertures diminishing in area to the extent of one-half the preceding one, so that the second diaphragm should be marked "2," indicating that twice the exposure is required when this stop is used compared with what would have been necessary had diaphragm "1" been used under exactly similar circumstances. The diaphrams should therefore be marked:—

$\frac{f}{4}$	$\frac{f}{5{\cdot}6}$	$\frac{f}{8}$	$\frac{f}{11{\cdot}3}$	$\frac{f}{16}$	$\frac{f}{22{\cdot}6}$	$\frac{f}{32}$	$\frac{f}{45{\cdot}2}$	$\frac{f}{64}$	&c.
1	2	4	8	16	32	64	128	256	&c.

7. Should a lens not admit of a diaphragm with an aperture as large in diameter as $\frac{f}{4}$, nor exactly any one of the above-mentioned sizes, we still recommend that the largest diaphragm should be marked with a number in accordance with its area with reference to this unit, and that all diaphragms of smaller area be marked in conformity with the above series.

8. In the case of lenses having working apertures larger in diameter than $\frac{f}{4}$, the diaphragm with largest aperture should be marked in accordance with its value, and the next ·25 or ·5, if either of these be admissible, and then according to the series given above.

As to Screws for Attaching Lenses to Flanges and Adapters.

9. We recommend the following to be the external diameters of the screwed portions of the lens-mounts for the attachment of the same to the flanges:—

Diameter of Screw in Inches.	No. of Threads per Inch.	Diameter of Screw in Inches.	No. of Threads per Inch.
1	24	*3·5	12
1·25	24	*4	12
*1·5	24	*5	12
1·75	24	And upwards,	
*2	24	advancing by	
*2·5	24	inches	12
*3	24		

As to Flanges and Adapters.

10. We recommend, in order to provide that all lenses fitting the same flange shall stand with their diaphragm indices or other fittings in the same convenient working position, that every ring or muff screw gauge shall bear a zero mark upon its face, and that such part of the lens mount as is desired uppermost be set to coincide with the zero when the lens is screwed home in the gauge.

11. For convenience and uniformity the zero should be placed where the thread becomes complete, *i.e.*, where the point of a tool cutting such screw gauge would lie in the plane of the ring face.

12. We recommend that standard adapters to carry any lens in a flange one size larger than its own be numbered as follows:—

Number	1	2	3	4	5	6	7	8	9	10	&c.
Inside screw ...	1	1·25	1·5	1·75	2	2·5	3	3·5	4	5	&c.
Outside screw...	1·25	1·5	1·75	2	2·5	3	3·5	4	5	6	&c.

13. The standard adapters to be adjusted in the same manner as the flanges with regard to same convenient working position of diaphragm indices or other fittings of lens mount.

As to Camera Screws.

14. In the case of metal screws used for attachment of camera to tripod, fixing rising front, or any other moveable parts of the camera, we recommend that these should be of the form known as the Whitworth angular thread, and of the following diameters and pitch:—

Diameter	$\frac{3}{16}$-inch	$\frac{1}{4}$-inch	$\frac{5}{16}$-inch	$\frac{3}{8}$-inch
No. of threads per inch	24	20	18	16

As to Lens-Hoods.

15. With a view to convenience and to the interchangeability of lens-caps, time-shutters, &c., we recommend that the outside measurements of lens-hoods be finished off to one or other of the sizes given in paragraph 9, and that for each sized camera all the lens-hoods be, as far as practicable, finished off to the same external dimensions.

Appendix.

The Whitworth thread is constructed as follows:—Two parallel lines are drawn, separated by a distance equal to 0·96 of the pitch P (distance between two threads), these are intersected by two sets of parallel lines inclined to each other at an angle of 55° and meeting at top and bottom, one-sixth of the total depth of the angular thread thus formed being cut off at top and bottom and rounded down. The altitude of the resulting thread is 0·64 of the pitch P.

This, after remarks by Messrs. Dallmeyer, Beck, Taylor (of Leicester), J. Traill Taylor, and others, was referred back to the Committee to take action along with the London opticians.

Mr. Gambier Bolton, F.Z.S., read the following paper:—

ANIMAL PHOTOGRAPHY: ITS DIFFICULTIES, USES, AND ABUSES.

By Gambier Bolton, F.Z.S.

The animal and bird studies from life which I shall show you to-night are generally admitted to be the results of one of the first serious attempts yet made to combine, in however small a degree, scientific and artistic qualities in animal photography.

Commencing in 1872 with a three-guinea set from our old friend Fallowfield, of Lambeth, in the days of wet collodion plates and cumbersome

* Screws thus marked are already the established standards of the Photographic Society of Great Britain.

apparatus, I have off and on, both at home and abroad, continued my work amongst birds and animals ever since, labouring under many difficulties of which the portrait, landscape, and hand-camera photographer knows nothing—a puff of wind moving the mane, tail, or feathers; the slightest sound causing the twitching of an ear, the quick action of the eye and nostrils, or even the movement necessary in breathing, spoiling hundreds of otherwise perfect plates, many of them only taken after hours, and in some cases even days of watching; and, as I shall presently show you, it is quite a common occurrence to use thirty to fifty plates on a single animal or bird; and in some instances nearly one hundred half-plates have been exposed and developed before the one *perfect* negative has been obtained.

From this you will see that a good deal of patience is required—some would call it obstinacy; anyhow, a determination not to be beaten, but to return to the task day after day until the result satisfies you; a natural taste for, and some idea of zoology: and a certain amount of artistic training is also necessary before the proper positions for the various subjects can be selected—positions that will please and satisfy naturalists, artists, and the general public (three rather hard task-masters); whilst to take up this work with the idea of producing only *the best possible results*, throwing aside all others, must mean such a heavy outlay and expense, as to prevent it from ever being made to answer from a financial point of view, at least in our day.

With so many public and private zoological collections around us there is little or no demand at present for animal photographs, except amongst the learned societies and artists; but we must remember that animals and birds that are useless to man have had their day, have already reached and passed their zenith, and the time is not far distant when photographs of many of these will be sought after, and like a really good large photograph of the quagga or dodo to-day, would be almost priceless. For following these we have many, such as the bison, antelope, zebra, giraffe, and hippopotamus fast disappearing before the march of civilisation, and it can only now be a question of a comparatively few years before they, too, become extinct and we shall be compelled to turn to paintings and, above all, photographs to show our descendants what they were like.

This, then, I consider the first and greatest use of animal photography, and I am glad to say that it is being rewarded as such at last; for, as some of you know, the British Museum authorities have lately ordered a set of these studies to be framed and hung in the Geological Section at South Kensington; and if, as I feel sure there are many here who naturally fond of zoology, have taken up photography as an amusement, I would urge them, especially if they travel, to lose no opportunity of getting good negatives of the more scarce varieties of animals and birds, as they will be invaluable for future reference. Do not waste your plates on such childish, easy subjects as swans, deer, cattle, and sheep: our exhibitions have swarmed with them from time immemorial; they have been taken in every conceivable position years ago in the old days of wet collodion and long exposures, when there was some difficulty attached to the work. But I urge you to aim somewhat higher. Read up the habits and peculiarities of the animal or bird you propose taking, and endeavour to show them plainly in your finished print, and you will not only be giving yourself real pleasure, but also benefiting the generations to come.

Let me here pause for a moment to answer a question that I am continually being asked: "What is a *perfect* animal photograph?" First and foremost it should have had sufficient exposure to bring out all possible detail in the hair or feathers and in the shadows, detail being necessary in this branch of photography almost more than in any other. It follows from this that the perfect photograph, though taken in sunlight (which should be avoided if possible), should not be an instantaneous one, but should have had a fair exposure. I know that this means hours of watching and waiting, when a snap-shot might be obtained in a few moments, but the resulting negative is very different: one is of little or no use to anybody, the other may be of use to naturalists and artists for all time. The perfect animal photograph, then, should be free from heavy shadows, full of life, yet unstrained and natural in position and expression; *all four legs and the tail* should show distinctly; and the mane (if any), nostrils, ears, and eyes, and *hairs round them*, should be microscopically sharp.

I would urge these things particularly upon those who are called upon to take animal studies, as this is the real test of the *perfect* one; and may I also add a word of warning? Take care that the photograph was not from a *stuffed* subject, as taxidermy has been brought to such a pitch of perfection (especially abroad) that unless a very careful examination is made, in many cases, one may be taken in.

Animal photography is not only useful to the scientist, as I have endeavoured to show, but also to the artist. There are still some, I am sorry to say, who deny that they ever use them, and, as the dealers tell me, slip in and out of their shops looking as though they had committed an unpardonable sin; but from what I have seen and heard, I am convinced that all use them, and many openly admit their indebtedness to photography, whilst not a few possess cameras of their own, and may be seen using them constantly. It was the need of an artist in the country requiring a special position of a tiger to sketch from, that first induced me to publish my series as going the round of the London dealers. I found that, though one or two had made an attempt to bring out some large-sized photographs of animals, they were taken so small or clumsily as to be worthless, and of no use whatever to the artist; and I was convinced then, as I am now, that no one can hope to succeed in this by occasionally working with a hand camera, but he must use a large camera, and devote his whole time—in fact, his life—to the work.

I have touched on some of the difficulties and uses of animal photography, let me now speak briefly of its abuses.

I am sorry to say that the professional photographer has a good deal of blame to bear, for he is, I fear, hopeless in this respect. Take a walk round any city and look in at their windows, and you see rows of dogs' *heads*, lacking expression as much as they do bodies, dogs and cats lying down in sleepy positions or sitting up looking like wooden dummies, horses and cows with three legs and a smudge representing the tail or ears, all with the scared look that tells of the assistant not far off, waving a handkerchief or clapping his hands, or taken at such an angle that the heads are large enough for elephants, whilst the bodies fade away into the distance, "fine by degrees, and beautifully less." It is amusing to enter with a dog and say in a quiet way that you wish him taken *standing*, and above all with his tail *up*. The innumerable excuses that will be invented, the old, old story that heads are so much more fashionable and artistic, that they look so natural when lying down or sitting up, anything but standing, and above all without that exasperating caudal appendage *raised*.

I have heard photographers lament the waste of time and plates used over a child's portrait, but when they have heard of the hours of watching and hundreds of plates thrown into the waste box before good negatives of the dogs standing and with their tails up can be obtained, they have thanked their stars that *their* lines have fallen in more pleasant places.

Of course there are very rare instances where it is right to take only a head—for instance, when the body is badly shaped, deformed, or injured; but these are very exceptional circumstances, and I would therefore urge the professional photographer the wide world over to look to this matter at once, and try to introduce a little more life and expression into his animal photographs, particularly into those of the horse and dog.

But professional photographers are not the only ones to abuse this branch of our art science. There are amateurs, I regret to say, men high up, in fact at the very top of the tree, whose pictures (for they are nothing else when the animal portion is left out) have won and are still winning medals at every exhibition, and whose work is pointed out to the rising generation as a model for them to aim up to. They rightly introduce animals into their work, but using a wide-angle lens, get such hideous distortion as to become perfectly painful to those who have to sit and gaze upon these "masterpieces" day after day, as many of us are often compelled to do, during a club or "one man" exhibition.

Others, too (and here many of our very oldest workers are the chief offenders), rather than lose some picturesque group will take a negative with a horse, cow, or donkey's tail or ears blurred from movement, thinking probably that the charm and beauty of the whole composition will draw off the attention from such a trivial fault. But surely even our friends the (photographic) naturalists would not strain their theory so far as this, and endeavour to make the blurred ear or tail the starting point for the out-of-focus portion of their picture.

But there are, I regret to say, far worse offenders than either of these. Amongst the changes which I have seen during my photographic life is that of a school of men which has sprung up during the last three or four seasons calling themselves detective-camera animal photographers. Now there is no harm in using a hand camera occasionally for animal photography, especially if it is made to focus and show exactly what is being taken at the moment of exposure, on the twin-lens principle, for by this means many very valuable negatives can be obtained with a slowed-down shutter, and by working on cloudy days, but the school of which I am now speaking will have none of this. With box cameras and a rough scale for focussing by, they rush about in blazing sunlight, taking snap-shots at every conceivable living thing that comes within their reach, and in every possible position; in fact, as we have seen with regret at several exhibitions lately, they simply prostitute this branch of scientific photography by showing us hideous caricatures of some of God's noblest works—animals taken at such an angle as to be all head or hind quarters, minus one or two legs, an ear, or a tail; lions yawning and scratching themselves, dogs climbing up trees, giraffes all body and no head—things done for the sole purpose, as they often admit, of raising a laugh at the unhappy animals' expense. How, I venture to ask, would one of these so-called artists of the funny school like to see themselves on show in a shop window, taken when suffering from influenza, a bad toothache, or when they have just trod or sat down upon the business end of a tin tack? Surely our aim should be a higher one than this; and if we are going to devote our time to zoological photography, let us at least try to show our subjects in the most artistic and natural positions.

Forgive me if I have spoken too strongly on this subject, but when we see signs all around us of animals fast dying out, and being rapidly exterminated as civilisation advances, it is surely time for some one to make a stand, and in endeavouring to point out the uses of animal photography not to pass by in silence its glaring and manifold abuses, which not only scientists and artists have condemned, but which the good taste and better education of the rising generation have taught them *are* abuses; and I trust sincerely that those who have perpetrated them will leave this branch of photography alone for the future, and turn their attention and *talents* to something a little less ambitious than the endeavour to win for themselves the proud title of *the Landseers of photography*; for this cannot be laid claim to by any precocious aspirant after a few months of practice at animal photography, but can only be hoped for after

years of hard work of head and hand; and beside such a title as this' all those vapoury names of kings and princes of hand-camera work which they have arrogated to themselves, must fade into insignificance, for there may be many kings and princes, but we have at present no Landseer.

I propose showing you, first, two slides as an instance of *how not to do it*. The first is that of a lion (?) standing behind the bars of his cage. This slide, I am told by the maker, has been sold by thousands, and is used all over the civilised world with lectures as an example of what the king of beasts looks like. Beyond a nose and a few hairs there is absolutely nothing but a very fine study of iron bars. The hand-camera school are particularly fond of these negatives, one of them observing last year that he thought the bars gave a greater idea of the animal's ferocity and strength; he forgot to add that he could not possibly photograph them *without* the bars, as he was not permitted to get inside the outer enclosures at the Zoological Gardens.

The second slide that I propose showing you is that of a bull-dog, bought from a shop window in London last week. This is rather a good specimen of its kind, but he is strapped down in the long grass apparently to a rock, and, as a study of a collar, strap, grass, and stone, is good, but there is very little bull-dog; and how any one could ever be tempted to waste a plate on such a really good subject in such a hideous position as this, is one of those things that will probably never be revealed till later on.

I shall next try to show you what I hope you will agree in saying is *the way to do it*. Commencing with the *Carnivora* (taken standing, in dull light, and without the bars), we will pass on through the *Ungulata*, leaving the birds and dogs till the end.

I would mention that all these studies were taken with an ordinary whole-plate camera and Ross lens, rarely instantaneous, but most on dull days, the majority having had exposures of from one to two seconds.

Mr. Gambier Bolton then exhibited about fifty slides, which he mentioned had this season been exhibited at the Royal Society, Burlington House; Royal Institution (twice); and before the Zoological Society, London; and had been awarded medals at the Crystal Palace two consecutive years.

At a business meeting on Wednesday forenoon, it was agreed upon to alter the laws, so as to ensure a more powerful representation of provincial members upon the Council than had been previously the case. The number of members of Council was increased to forty.

It was determined that the Convention for next year should be held in Bath.

A group of the members was taken at Eaton Hall by Mr. G. Watmough Webster. It was unfortunate that the rain fell closely, heavily, and unintermittently. Notwithstanding this, we learn that a good negative was obtained.

Wednesday evening's programme embraced Mr. Bothamley's address on *Rhodamine*, which will appear next week, and the following paper by Mr. Newman, on *Imagining and Imaging*.

IMAGINING AND IMAGING.

By Philip H. Newman.

I suppose it is pretty generally admitted now that photography, within certain well-defined limits, is a legitimate means of artistic expression, and in spite of mutterings and echoes heard from time to time to the contrary, statements that the various scientific processes by which light becomes an image maker "only serve to degrade nature," are not seriously maintained in the face of demonstrations that such results, when they occur, are due to the want of ability on the part of the photographer shown in the selection of his subject or the choice of his implements. A further proof of the alliance between fine art and photography is the increasing desire of photographic societies and conventions to leaven the purely scientific with the purely artistic, the materialism of lenses and chemicals with the emotional and the æsthetic. And here I may be permitted perhaps to acknowledge the great compliment that has been paid me in being asked to address you on these latter subjects. I am the more stimulated to do so, however, from feelings of gratitude as an artist for the benefits and assistance photography has conferred upon me. It has been argued that scientific studies and the exercise of optical and mechanical processes are not expected to be found side by side with that divine afflatus which should pervade the artistic nature—in a word, that photographers have no imagination. I can only conceive of this as a jest, and must treat it as such.

It is true, personally, I can only allude to my photographic capacity as of the humblest, although I have succeeded in imaging now and then all I have focussed, yet I am entitled to bear witness to a phenomenon of the dark room which makes it at once a great school of imagination. I know of no exercise of imagination my mind has undergone equal to that experienced when developing a plate as to how the latent image would turn out; and I will even confess, although I never thought to do so even to my bosom friend, in the dark room, that my imagination has begun to develop the image when no chemical formula would do it. I need not tell you, who have doubtless in your time undergone this hallucination, that no hypo would ever fix the picture. But to be serious, we have all of us imagination, and it will grow and bear good fruit if we will allow it, enriching the gardens of our minds, and making pleasant avenues for art to linger in. Our great danger is, undoubtedly, that science and dry fact will tend to dwarf and kill our imagination, especially if, moreover, we encourage that pernicious vice of looking at everything *only* through the camera.

Photography has been working amongst us, as Mr. P. H. Emerson says, "for fifty years for better or for worse," and I am afraid, if I believed in everything or much which he has written, I should have to admit "for worse." I should have to say to you to-day, gentlemen, when Daguerre addressed that meeting of the French Academy on the 19th of August, 1839, and showed it the hitherto fugitive image fixed in a picture of silver, he sounded the death knell of fine art; but I do not believe in all Mr. Emerson has written, and fine art is reprieved.

It is not my intention to drag you page by page in a review of the book I allude to—*Naturalistic Photography*—or that portion of it which relates directly to fine art, most of which you have doubtless read; I shall only have occasion to touch upon it here and there. My only reason for mentioning it at all is, that enthusiasm for one branch should be without prejudice to the whole tree. One aspect of fine art does not necessarily cover the entire field, though the solemn and authoritative *dicta* of this book would imply that it did. Nothing that comes within Mr. Emerson's purview that is not naturalistic in art is to be tolerated, and unless you focus the subject, so to speak, with his lens, you must be wrong. As tastes for ever vary without being necessarily bad, this contention is surely inartistic and illiberal.

In a chapter devoted to "Naturalism in Pictorial and Glyptic Art," Mr. Emerson careers through the schools, from Pharaoh in Egypt to Reynolds in Leicester-square, from China to Bouverie-street, from Japan to the Royal Academy; with the touch of a magician's wand, with the stroke of a pen, with a few dozen pages acutely sensitised to the true impressions of art at all periods, this book disposes of the whole question. The *cognoscenti* and the *savants*, the art critics of ancient and modern times, have indeed lived in vain; their writings, with little exception, can be shown by the fierce light of naturalism to be so much waste paper, that ought, of course, at the earliest opportunity, and in the eternal fitness of things, to crumble into dust, that dust which has been cast in the eyes of an hitherto misguided world. Mr. Emerson falls into ecstacies, however, over Egyptian lions, and discriminately tolerates some Assyrian ditto. Touching Greek art with a light hand, he points out with satisfaction that Appelles' greatness was due to his imitation of nature, and that previously Apollodorus was the first true painter, but "that the innovations made by him in the relation of foreground and background cannot be compared to the improvements effected by the Brothers Van Eyck in modern times." This is a far cry, and I dare say the Brothers Van Eyck and Apollodorus would be as astonished as we are at the comparison. Mr. Emerson recommends the frieze of the Parthenon to our notice, and lingers awhile among the Romans, admiring particularly the heads of Nero of Commodus in the British Museum; riding his hobby of naturalism at a canter through Pagan times, he pulls up with the horse of Selene, bowing his compliments to the Greeks for the height of their horizon, and whom it is refreshing to find he considers "very advanced."

We then find ourselves with Mr. Emerson loftily surveying early Christian art in a tolerant spirit; but he is very intolerant when art was tied and fettered by priestly domination in mediæval times, and he shall not be blamed, excepting that he does not dwell sufficiently on the protection the Church afforded art, and the loving naivty with which it was inspired. We will not follow him across China and the East, but watch him running *amok* against everything and everybody in the Renaissance who does not fulfil his standard of naturalism. Such men as Dürer get off by the skin of their teeth, and the only artists standing out as worthy of the greatest commendation are the Van Eycks and Holbein. Something, however, has to be said for Andrea del Sarto, but Michael Angelo, Raphael, and Corregio are swept away like chaff before the wind. Benvenuto Cellini, the author of the *Perseus*, is not recognised as a sculptor, but as a goldsmith, and as to Rubens and Vandyck, &c., the less said the better. Hogarth stands out among the English school of painters with Crome and Gainsborough, and perhaps Constable as an associate; but Reynolds, Turner, Nasmyth, Stanfield, Linnell, and Maclise go by the board. I will not weary you further, or twice kill the killed; it has been reserved for Mr. Emerson to convert the Temple of Fame into a slaughter-house, and I would rather he held the entire monopoly; but as his book speaks so authoritatively on a subject with which you desire I shall have something to say, it is necessary for me to do something towards clearing the ground, and it shall be my task to show you where I consider are obvious mistakes.

Mr. Emerson's battle cry, or rather his killing cry, is nature! nature! nature! go to nature! Well, I am with him—we are all with him, being sane men; but *what* nature? He says the Greeks went to nature, many sculptors have told him so; truly it needed not that, he might have evolved that from his inner consciousness, if he could not see it. How, then; *what* nature did they go to? Was it the nature of a labour-stunted physique, a brain-killed body, a factory-degenerated virility? Did they study arms from a sewing-machine girl, legs from a ballet dancer or a cyclist? Where would Mr. Emerson image his legs from to-day, even

with the help of all the rectilinear lenses he possesses? Of course, I mean that the legs should be artistic legs, such as a Greek would have modelled. I think we should find Mr. Emerson rather at his wits' end if he had to draw such legs unless he is well grounded in anatomy, or happened by a fluke to be visited by an exceptional model whom he could photograph. The general type of images of legs he could get would not come up to the standard of what Mr. Emerson's imagination would dictate, and I should not be surprised if, after all, we did not find him, having put the camera on one side, assisting his imagination by taking a look at that Elgin frieze we all so much admire; not to copy, oh, no! but just to see how the old fellows did it. Then, if he had to get a whole body, say a *Venus de Milo* without a trace of stays, how then?

But I forgot Mr. Emerson cares for none of these things, but would rather have a peasant woman from nature than a Venus, Virgin, or Saint from imagination and cultured ideal. Well, there is no accounting for taste; but it is hard he will not permit the freedom in others he takes himself. There are still those equally earnest men in art who prefer the Saint, the Virgin, the Venus of ideal and refined culture to the peasant woman. By the way, I should like to know how Mr. Emerson is affected in relation to this subject by that exquisite remark of Balzac's?—"*L'une des gloires de la société c'est d'avoir créé la femme, là où la nature à fait une femelle.*" Freely translated: "One of the glories of society is that it has created woman, where nature has only made a female." Surely, Mr. Emerson, the ideal is not so hopeless after all, and it is just possible that a great intellectual effort to attain an ideal on a reasonable substratum of nature might be partially successful and not altogether Utopian; at least, even if for argument's sake we demolished the old masters to a man. Mr. Emerson should surely know it is no reproach to photography that though the camera can do much it cannot do impossibilities; the intellectual effort in its use must to a great extent be subject to the model it focusses. You cannot make a silk purse out of a sow's ear in photography, much as you may do in that way in painting; but, on the other hand, are you always sure of making the best of the sow's ear as such. Not at all, unless you bring considerable artistic ability to bear upon the treatment of your subject; and when, instead of the sow's ear, you have, say, a very beautiful woman to photograph, the difficulty and the intellectual effort becomes infinitely greater, and you will be glad of some hints from Sir Joshua, to say nothing of Raphael and Rubens, besides Holbein, Titian, Gainsborough, and the favoured few Mr. Emerson tolerates.

That is an ingenious idea of Mr. Emerson's where he compares art with the barometer, rising towards naturalism and falling to the abyss of conventionality; and he tells us that if we map it out we shall find on the apices of the ascending curves the masters of sculpture of the Egyptian and Assyrian Lions, Phidias, Van Eyck (a long jump that), Durer, Holbein, Da Vinci, Titian, Velasquez, Donatello, Rembrandt, De Hooghe, Corot, Millet, Gainsborough. Now I don't suppose he will in the least mind which of these we examine, so let us take Van Eyck, and see what the celebrated *Arnolfini and his Wife* (Mr. Emerson's favourite picture) will prove for him. Now, please, believe me, I should be unworthy the title of an artist if I did not admire this painting intensely, and it may be granted at once that you need not be an artist at all to admire it, or to realise its extraordinary merits; they are patent at a cursory inspection, also that it was unquestionably painted from nature; but with Mr. Emerson we will look deeper. I had a tolerable recollection of the picture—as who has not; but I have been to the National Gallery on purpose to study it since reading Mr. Emerson's book, and what did I find? As he says, "It is wonderful in technical perfection, in sentiment, in truthfulness of impression. Note the reflection of the orange in the mirror, with what skill it is painted; in fact, the whole is full of life and beauty, the beauty of naturalism. It is a masterpiece good for all time, and yet it is but the portraits of a merchant and his wife. No religious subject here inspired John Van Eyck, but a merchant family, yet in many ways the picture remains and will remain unsurpassed." Quite so. But there is something more, something that is as apparent to the student as its naturalism, or any of the qualities we have enumerated, something that needs no searching analysis, something any one may see, something John Van Eyck would have been the first to admit, but which Mr. Emerson has not referred to.

This something, what is it? It is conventionality, style, and without which this picture would not, in an artist's opinion, be the magnificent work of art it is. The folds of the drapery in the wife's robes denote careful arrangement and conventional treatment and drawing, indicative of the style of the period; that due ordination and sub-ordination of parts of magisterial line and breadth of effect discoverable in this school, and manifest in this and other important works of the accomplished master. Undoubtedly this, as in many works of the period in the Low Countries, is wonderful to have been done without the aid of photography, and it would well serve Mr. Emerson, or any one else, as a text to enlarge upon, as to how photography can be made useful to painters; but he has only chosen to use this illustration to show how Van Eyck went direct to nature for his models; but this needs no insistance. Raphael, and many other painters whom Mr. Emerson abuses, did precisely the same thing, and conventionalised no more than Van Eyck has done (*for pace* Mr. Emerson) I must maintain the picture is brimming with conventionality and style, a style that was carried on among the Flemings to Holbein's time, and is conspicuous happily in his best work. But why does this painting at the end of the middle age period attract our author's notice so much? Is it because he thinks that it at all shows what might be obtained if photography could ever be done in colours? If such is his idea, let me tell him at once that he would be dreadfully disappointed, for he would miss that added charm of individuality, without which no work, pictorial or glyptic, appeals to us or retains our sympathy; that charm that comes of art which is based on a study of nature, but which is a totally different charm to that of *nature*, excepting now and again in her rarest moods, or where man has meddled with, but not marred her.

But if a man photographs a field or sea, and paints up to his transferred outline from colour memoranda, and many studies, and never so well, Mr. Emerson is horrified at what he calls a counterfeit, howbeit landscape and sea painting based upon such counterfeiting has reached a higher standard of excellence—as mere painting—than at any time in the world's history.

Then what about imagining and imaging? Where may the two combine, and where, from the camera point of view, must they be friends apart? Mr. Emerson has cut the Gordian knot, but he has not solved the difficulty; he ridicules an ideal, excepting what may come of itself out of nature, so the art difficulty, as far as he is concerned, remains precisely where it was. The fact is, each of us must solve the difficulty for himself, and in his own way. If he be a genius, he will have little trouble; if he is not, he will save himself many plates, much chemicals, and more disappointment if he looks up some of the authorities our author affects to despise; and whether the photographer be a genius or not, it will be just as well for him to see where others have succeeded and where failed. Amongst these he will, of course, come across Rejlander, and will see that he kept imaging and imagining together to a very wonderful extent indeed, and he only failed because of his models. If he could have obtained some of the models Phidias and Apelles could get, the history of photography would have been as great in æsthetics as it is in science.

Photography is not to blame for this, she must be content with the models she can get, and do the best she can with them; and very much she can do, if the artistic faculty is cultivated (if not native) by a searching study of the old masters of form, sentiment, and composition, and especially if the photographers will abstain from short-focus lenses, and can be persuaded to burn all their small stops Bad photography has a great deal to answer for in the multiplication of copies of inferior work, leading our attention to detail rather than to breadth and simplicity, which should be the characteristic of all art, pictorial or glyptic. False notions of taste must of necessity be encouraged by such multiplication, especially in those less cultivated minds which look upon every photograph as a picture. This alone should stimulate every photographer to strive for the best from an art point of view.

The matter of detail has affected the arts of design and picture painting alike, and very importantly; its influence is discernible in every exhibition, and is distinctly a bad one in the true interests of art. I am glad to think that my views coincide with Mr. Emerson's on detail in art work, and agree with him as to its limitations to that which is fundamentally necessary. I have alluded to this question of detail in another lecture, but I feel its import so greatly as to dwell upon it with renewed emphasis here.

The tendency of artists to paint bits, and amateurs to purchase them, was never so great as in the present day. Nothing could be said against it were these bits looked upon (as they should be) as merely a means to some great and legitimate artistic end, but when one is deafened by the parrot cry of "Nature, nature, nature!" one is apt to lose patience and ask, Why is this aimless sort of thing going on? this painting of elaborate passages in nature with subtle reflections and interminable detail that tell us nothing but that in competition with the camera man's eye and brain are inferior instruments, if the product is to be looked at as the true end of fine art. Well, I do not believe it is, or ever will be. We are passing through phases of change; if the camera has stimulated some of our younger painters to study nature lovingly and searchingly, they must look upon it as a means to an end; and while they may be congratulated on escaping the far more dangerous Charybdis of a tricky impressionism—as demoralising as it is false—they must avoid the Scylla of sacrificing breadth to detail. The image should on no account content them unless it bodies forth their highest thoughts and aspirations and most poetical ideas.

People talk of realism and idealism, impressionism and naturalism, fashionable verbiage that only conjures up the ghosts of things in art; they seem quite to forget, or to ignore, that these *isms* are but the robes of art, the fanciful draperies with which the goddess coquettes with all but her true votaries, or illusory fires with which, like a will-o'-the-wisp, she leads a purblind and bungling *dilettanteism* into the bogland of cant and empty phrases. No! art is not got on easy terms, she is ever a coy goddess; but when you can unveil her of these *isms*, and you are really face to face, you will find her the same to-day as she was far back across the dim centuries to your predecessors—fair, modest, truthful, with wide, honest eyes, searching the hearts of man, sounding the intellectual depths of struggling human nature, telling it truths calmly, piously, earnestly, affording her true worshippers most gracious and pleasant consolation, and ennobling them for ever. I warn you that art that does not do all this is not true art, but one of those weird lights that will drown your soul in a quagmire.

Mr. Emerson is exceedingly bitter on the religious side of art. We, of course, must all regret as much as he that priestcraft at many periods did put it in fetters, but without being fanatical it is possible and just to be grateful to the religions of the world—heathen or Christian—for creating and preserving to us the monuments that exist. It may be weakness, but I am none the less proud of it, that when I stand before the Cathedrals of this country or northern France I am thankful to be alive to see them, and to know that the Bishop builders have formulated for me a prayer in stone. Am I, are you, to put these things by as toys of a puerile age, and say, all sentiment, my dear sir? Art teaches us better now; the Bishop builders were all very well in their way, but the French Revolution, plus the Zolaciples gives us a truer gospel, don't cher know; you'll see it through the camera if you'll only stick to nature. I often wonder if men who practically say or think this sort of thing know anything about art at all; they certainly don't expect art to say anything to them or teach them anything. One says to you, I don't want the story at second hand, I know the page of Lemprière the artist got it from, and so, forsooth, because he has not invented a legend he is not to paint it; because he has never seen a hero he is not to imagine one, and give pleasure and instruction to a less imaginative brother by a picture for fear the brother should ask, "Are you sure it all happened just so?" or say, "Of course you photographed the hero, dear boy."

Fancy a painter being commissioned for a picture or fresco of *Prudence* for the adornment of a town hall or law courts, and being prohibited from using the admirable and instructive subject of *Ulysses and the Syrens* because the painter—let him be able to paint ever so poetically—did not invent the story and could not get a photograph of the Syrens. Again, and for similar reasons, I am not to buy a *Perseus* and *Andromeda* to hang upon my walls, do I want a lesson in chivalry never so much. Some of the rising painters have laid these teachings somewhat to heart, and to their cost, for instead of boldly taxing their imagination they have tried to make a compromise between nature and art. A most ludicrous instance of this is present to my mind, where the subject painted was this very *Perseus* and *Andromeda* naturalistically treated; the figures were fairly painted, as paintings, and undoubtedly extremely like the models, but these, of course, were of such a poor and unheroic type as to suggest that they had by some means been deserted by their bathing machines. The monster was too flabby to describe. Another *Andromeda* occurs to me; here the painter had exercised all the imagination he was capable of, and had used his model so judiciously as to obtain a fine figure, yet his mistake was as grave as in the former case. This *Andromeda* seemed, excepting for her silver handcuffs and chain, to be sunning herself after the bath, while the emerald waves and purple islets suggested a strand where monsters never came, and chivalry was scarcely needed. The poetical insight wanting in these instances might serve to support Mr. Emerson's argument against painting such subjects did we not know that it has been painted worthily more than once in our own time; and, above all, remember that while painters are many, artists are, and ever will be, few.

There never was so much good painting as there is now; the present Royal Academy Exhibition is full of most admirable work; the *technique* gets higher and higher annually. But now go and ask the general public what they think of this exhibition; the answer is, "The dullest we remember." The general public are not artists, but as usual they are very keen critics, and can generally tell when they see a good thing without the inspiration even of a newspaper. I walked through the rooms of the Academy the other day with a highly cultured girl—no painter, but knowing our National Gallery and some of the galleries of Europe, who could trace the influence of Veronese and Rubens in Makart, and Velasquez in Munckaksy, and could tell a Fortuny as well as she could tell a line of Shakespeare, or a bar of Beethoven.

"Well, my dear, how do you like the exhibition?"

"Not at all; there is only one picture I would buy: I should like that."

It was a single figure, full of repose, and worthy of Greek art; the nature in it, like that art, had filtered through the passion of the painter. Here, at least, there was imagining as well as imaging.

Mr. Emerson has written other books besides the one I have been talking about, and published many photographs from original negatives. It would not be fair to him, having said so much, if we did not say something about these, and it is only fair to see how his wholesale repudiation of book teaching in art, and his leaning entirely on nature, has helped him. In one of the books devoted to the Norfolk Broads, Mr. T. F. Goodall is a collaborator, and writes, in an article on landscape: "The roughest sketch, in which the ground and the objects against the sky are painted in a mass in right relation to it, is really more finished than the most laboured work wherein the essential truth is wanting." This may be granted at once, but then one looks to see it illustrated by the accompanying photographs. Unhappily for Mr. Emerson and Mr. Goodall, photography seldom gives objects against the sky in right relation to it; certainly examples are sadly wanting in the book in question: this may be the fault of the copy, or processes of printing may have improved since. Let us pass on to another book, and look into the *Idylls of the Norfolk Broads*, plate 6: *Bathers*. Here we have no question of printing but of simple composition. The backs of two bathers rise out of the water side by side, one a little in advance of the other, however; the nearer one spreads his arms a little to lead up the angle of the bank and take away from the verticalness of the arrangement, the other bather keeps his arms down, one being partially hidden by his body. Now all artists will admit that the human back is a beautiful object, delightful to draw and model, in its leading lines and subtle undulations, and Mr. Emerson missed a great opportunity here of showing himself both a photographer and an artist; anything more commonplace and less idyllic than the arrangement of these two backs it is difficult to conceive. I refrain from making fun, any one may do that where they cannot make sense; but one leaves the picture with a sort of suspicion that Mr. Emerson is making fun of us. We should like to ask him if the idyllism of the picture is supposed to lie in the backs or in the background. I cannot determine; neither smudginess nor backs like these are idyllic to me. Plate 9, in the same collection, represents something going on with a hay waggon, which at first sight seems to be part of a tree; on the right-hand side of the picture a man is leading the horse towards us, and this emphasises the right angle made by the side of the waggon and the ground cut clean against the sky; a little bunchy tree is near the horse and towards the horizon, while another man is near another small tree on the opposite side of the picture, and serves only to enforce the emphasis of the right angle already mentioned. I can only suppose that this arrangement is done in wilful defiance of any rules of composition whatever, and pass on to *Pictures in Field and Fen*. "Ah!" you say, "how charming Mr. Emerson can be when he chooses!" This "spring idyll," for instance, a girl peeling potatoes; note the turn of the girl's head in relation to the line of the shoulder, and its continuity in the branch of the tree—the very pail is ordered in its arrangement with the rest of the picture. But is this accident or design? It would be pleasant to give Mr. Emerson credit for this and several other pictures—*Ploughing* and the *Stickle-back Catcher* are excellent. But what are we to say when we find them in company with such wooden compositions as the *Dame's School* (which might have been so easily corrected, by the way), the atrocious *Winter's Morning* (look at the vaunted values here), and the hideous *Going to Market*? Well, there is nothing to be said but that if art is to be got by simply going to nature, Mr. Emerson does not show us enough of the way; at least, in the works I have referred to. Is there no sunshine ever in the fen country that most of these photographs have such leaden skies? or does our author belong to a school that enunciates the dogma that sunshine is unpaintable and brilliancy vulgar? if so, Fortuny, and some of the work of some of the greatest living painters, might teach him better. This last book I mention, *Pictures in Field and Fen*, is prefaced, so to speak, with these lines from Browning:—

> "So British public, who may like me yet
> (Marry and Amen), learn one lesson hence
> Of many which whatever lives should teach:
> This lesson, that our human speech is naught,
> Our human testimony false, our fame
> And human estimation words and wind.
> Why take the artistic way to prove so much?
> Because it is the glory and the good of art,
> That art remains the one way possible
> Of speaking truths, to mouths like mine at least."

A more unfitting quotation to head such a book as this was never seen, save that it is capable of a double application, rich in its condemnation of the author. If Mr. Emerson had as much reverence for art as he pretends to for nature, we had been spared many of these so-called pictures, because many of them were not worth the taking. Many he would have rearranged, and could have done so quite easily. One slight reference to the *Soldiers Bathing in the Arno* might have corrected those woeful backs; and many of the landscapists he has slighted would have saved him from the stumbles he has had elsewhere. I trust, for the sake of photographers, that his advice on technical matters is more reliable than his artistic guidance. As to his hints on art, I cordially agree with the man who called them "Tupperisms." His pictures, at least as printed in his folios, do not bear out his standard of excellence or teaching. Let us dismiss this disciple of nature as quickly now as he has affected to dismiss time-honoured names in art, and let him know and bear in mind that while in characterising a learned reverend, if oft enthusiastic criticism, as "splendidly false," his own has too often the latter quality, but never the former. I unhesitatingly say that he has written on art without adequate knowledge and reflection, as he has frequently imaged nature without refined taste or imagination.

There has been much discussion lately on the subject of beauty; it may be difficult to exactly define it, or how much of it is necessary in the constitution of a work of art: it is too wide a question to more than mention now. It may be worth saying, however, that beauty lies more in order and consistency than is often allowed, and works that do not possess these qualifications proportionately fail to charm us. Beauty, moreover, is an individual perception, more or less, but it is distinctly capable of wider appreciation, the more apparent is the consistency and order I allude to. Thus, in a picture or photograph of a group of figures there must be a principal figure or a principal group, and it is essential for our satisfaction that that principal figure should be principal in every respect—force of light and shade, mass, &c. If there is a story to be told it gains immensely in directness by such means. These things are exceedingly difficult to talk about, but beauty in composition is so dependent upon them that they must not be passed over. I am the more sensible of this because of some recent terrible examples of photography that have come before me, where there were several women in white aprons; and some

that were smaller in size and more in the background were as white as that which should have been principal. Perhaps I am rather urgent on this point of ordination and sub-ordination. I fail, however, to see good composition without it; it is my aim or idiosyncrasy. One artist of our own time is accused of this shortcoming and one is accused of that. One artist of the greatest poetical insight and refinement, a very Achilles equally in his retirement as when he is moved to put out his strength, is accused of soft, waxy texture. The public and the critics seem quite oblivious of the fact that his aim is not to imitate nature in his textures so much as to move us with his design. It would be heart-breaking to think of the future of art in this country were it not that one knows the tide of fadisms is at its flood, and while it rushes on, the poet painters who see art, and beauty, and consistency, are as firm as the rock they rest upon, until the tide has turned and when their voices will again be listened to. The young men who have any real art feeling in them will have made their studies from nature, and will have been as dissatisfied with them as were their great predecessors with theirs. It may be that the foundations laid will be the more solid from the long continuance of the realistic and naturalistic craze, so good coming out of evil; for certainty of draughtmanship and knowledge of light and colour will be at the facile command of those who, ceasing to make unsatisfactory images, will develop their imagination and give us works of art. We will at least hope so.

But you ask, What has all this to do with the Photographic Convention of Great Britain? Much, everything, because it is to you that art looks in the present day to be in the van of this desirable movement; to you who, having many sins of omission and commission to answer for in the past, whereby you have in a great measure been responsible for this unstudied naturalism which is sapping the foundation of the finest taste, you, by your multiplying processes and waistcoat pocket cameras, who have been tempted to photograph everything you have seen—good, bad, and indifferent. I am speaking plainly but generally *but* of course, there are grand exceptions. It is to you I say—artists, photographers, and photographic artists—in the cause of art I appeal; you have a great future before you if you will only exercise a dignified reserve that a dignified profession demands, and never photograph anything, under any circumstances, that shall not, when it is printed, be a joy because of its beauty.

I am certain that in the present all who have the real interests of art in England at heart will uphold me in this appeal, as I am equally persuaded that Reynolds and the greatest names in the past, and those who are yet in the future, will approve of your doing your utmost with these high Aims in view. Pray believe me, I am not ignoring much, very much, good work that has been done, and I know is being done. I should like to mention names, but must not do so for fear of invidious comparison. If I have been unjust in anything I have said, it has not been with intention, and I beg forgiveness. The book I have so often alluded to was put into my hands for the first time just as I was asked to write this paper, that I might have some knowledge of some of the things that had been said on the art side of photography. I was amazed when I had read the book at its audacity, and more amazed when I heard that its teachings were gaining ground. I was told that photographers, however, would be glad to be spoken to on the art question, naturally standing. I have spoken to the best of my power and belief. If I have spoken loudly, I may be pardoned for art's sake at finding its temple shattered and its gods dispersed; that Mr. Whistler or Mr. Anybody else should occupy the site. Not a word against Mr. Whistler, who has shown himself often and often a great artist. All I contend for is, that "Naturalism" is not the only nor the highest art in the land. Let us, indeed, be termed Philistines and rejoice in the honour thereby conferred on us; the rather keeping to our own gods than falling down and worshiping stocks, and stones, and nature; unanimated by the divine gift, the soul of man has the privilege of conjuring up and investing it with. I would rather go back a hundred years and more I say it seriously, it would be better for art, better, far better for us all, to go back to the sickly sentimentality and bathos of the last century, that culminated in the lachrymatory effusion of uncle Toby's recording angel, or more practically, to the primary artistic principles of our great grandmother's samplers, than read the logical bourn of naturalism, whose motto must be in imagine and over whose portals might well be written, "Abandon hope all ye who enter here."

The proceedings terminated with a descriptive lantern display of Norwegian scenery by Mr. Paul Lange, President of the Liverpool Amateur Photographic Society. This exhibition was a great success, and was much appreciated.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 8458.—"Improvements in the Construction of Developing Baths for Photographic and other Purposes." J. B. Brooks.—*Dated June* 18, 1890.

No. 8474.—"Improved Means and Apparatus for Exposing Transparent or other Photographic Films on Receipt of Coin." J. S. Foley and L. C. H. Mensing.—*Dated June* 18, 1890.

No. 8507.—"Improvements in the Construction and Arrangement of the Adjustable Parts of Photographic Easels, Masks, Reading, and other similar Stands, and in the Means of Securing the same." F. A. Walton.—*Dated June* 19, 1890.

No. 9498.—"An Improved Combined Tray and Cover for Photographic Plates and other Sensitive Materials." H. Wilkinson.—*Dated June* 19, 1890.

No. 9507.—"Improvements in the Construction of Printing Frames for Photographic Purposes." J. B. Brooks.—*Dated June* 19, 1890.

No. 9511.—"Improvements in Photographic Shutters." J. Parkinson, S. Fawcett, and C. F. Parkinson.—*Dated June* 19, 1890.

No. 9542.—"Improvements in Photographic Apparatus." L. Koch.—*Dated June* 19, 1890.

No. 9542.—"An Improved Photographic Shutter." H. Ransom.—*Dated June* 19, 1890.

No. 9568.—"Improvements in Photographic Cameras." C. B. Skinner.—*Dated June* 20, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 1	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 1	North London	Wellington Hall, Islington, N.
,, 1	Hounslow	
,, 1	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 1	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 1	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 2	Coventry and Midland	The Dispensary, Coventry.
,, 2	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 3	Leeds	Leeds Mechanics' Institute.
,, 4	Glasgow Photo. Association	Royal Exchange, 177, Buchanan-st.
,, 7	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 8	Sheffield Camera Club	Whateley's Institute, New Surrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

June 24.—Technical Meeting.—Mr. Leon Warnerke in the chair.

Mr. H. Chapman Jones said that at the January technical meeting of the Society he had brought forward two plates that showed patches of different degrees of sensitiveness corresponding with different parts of the dark slide. He had then suggested that the sensitiveness had been enhanced on portions owing to vapour of some kind being given out by the part of the slide in proximity to the part showing the most image, but others had suggested that the sensitiveness had been diminished on the other parts. He had placed fresh plates in the slides, and kept them there for some months; on developing them now he found no trace of any difference of sensitiveness. The dark slide was one that originally had leather hinges, and opposite these hinges fog developed itself on plates placed in the slides. He had had the leather removed and replaced by a kind of woven material. His opinion was that the sensitiveness, whatever it was, had produced fog and continued to a slight extent in the material enough to fog a plate, not sufficient to exalt its sensitiveness—and that that exhaustion had exhausted itself before the last two plates were placed in the slide.

The Chairman referred an experience in which a dark slide had produced fogging on a plate. He had a slide in which there was no hinge, but the shutter was made to know not entirely; in a certain part, however, the springs that were used for the purpose scraped the wood of the shutter and removed the black varnish with which it was coated. He noticed plates in this slide became fogged all over except opposite to the scraped portion. He then scraped out a figure on the inside of the shutter, and found that a plate left in the slide reproduced this figure as a clear space, with the rest foggy.

Mr. W. E. Debenham asked whether the Chairman could say what was the composition of the black varnish that caused this fog.

The Chairman could not say.

Mr. H. D. Atkinson said that he had been trying flexible films with roller slides, and found a difficulty in getting them to lie flat, both in the camera and in the printing press.

The Chairman said that it was necessary to use much greater pressure in printing from collodion films from other negatives. He had the back of the printing press cut nearly through in several lines, both lengthwise and across, and was pressed opposite the centre of each square thus left; in this way contact could be obtained. For a plate 12 × 10 he had twelve screws.

Mr. Atkinson said that it had been stated that there was no good varnish for collodion films; he had, however, found Mawson's varnish, prepared expressly for the purpose, answer exceedingly well.

The use of gold size as a varnish was mentioned, but the Chairman said that gold size had the disadvantage that it became darker and darker as time went on. Amber, no doubt, would do very well.

Mr. Jones inquired whether linseed oil itself did not darken.

The Chairman said that some samples of tracing paper that were prepared with linseed oil became very dark. Linseed oil boiled with lead darkened, whilst that prepared with manganese did not do so. There was a work of Spon's dealing with the manufacture of varnishes and drying oils.

Mr. E. Sewell said that there was also one of Weale's series, by Field, giving a great deal of information on the subject.

A question was asked as to the durability of celluloid films.

The Chairman had some that were fifteen years old, and as good now as at first.

Mr. W. England thought them to be as durable as glass.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 19.—Mr. J. J. Brigmshaw in the chair.

The greater part of the evening was occupied with settling the nominations of officers and making arrangements for the annual meeting, which is to be

opened *pro forma* this week and adjourned to the following Thursday, July 3.

Mr. T. E. Freshwater showed prints on Pizzighelli platinum paper from negatives taken at the recent Saturday outing of the Association.

Mr. P. Everett also showed photographic *souvenirs* of the same occasion printed on platinum developed paper and on albumen.

Mr. Freshwater showed prints from a number of negatives, all of which had a faint dark patch traversing the centre of the picture from top to bottom. No satisfactory explanation could be arrived at.

A question from the box was asked:—"Is there any advantage in printing through green glass on silver paper?"

Mr. F. A. Bridge said that he had recommended it for thin negatives a great many years since. It was of advantage when the negative was of a colour that did not give sufficient contrast when printed in the ordinary way.

Mr. F. W. Pask inquired whether Mr. Bridge thought that yellow glass would do as well.

Mr. Bridge replied that yellow acted just in the same way.

Another question as to what was the meaning of the expression "bone dry," elicited the opinion that it was intended to convey that the substance of which it was used was so dry that to the senses it gave no evidence of having any moisture.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

June 17,—Mr. Dando in the chair.

This was a technical evening and the last meeting of the Society in Myddelton Hall.

Mr. Hudson showed one of Abraham's latest Ideal cameras, with new shutter for time and instantaneous exposures, and with arrangement for focussing by a lever underneath the camera.

An interesting discussion took place upon the materials from which sheaths might be made. Celluloid, vulcanite, and vulcanised fibre were among the materials suggested for lightness, but various objections were raised to all these.

Mr. Grover said he often got scratches on his plates whilst changing them in his Victor hand camera, and asked if any one could suggest the reason, as he had microscopically examined his sheaths, but could find no roughness.

The Chairman suggested that it was simply owing to Mr. Grover not holding the plates at a sufficient angle whilst passing them to the back.

Mr. W. Few said he wanted to see a hand camera from which the plates could easily be removed altogether after only two or three exposures had been made, so that the camera could be used for focussing upon interiors, &c.

The Secretary showed Abraham's changing bag, in which he thought this might easily be done.

The Chairman said that he preferred carrying double backs when out making pictures, and thought that if lightly made the weight was no great objection.

Mr. W. T. Coventon asked if any of the members had tried developing with eikonogen without sulphite. He found that when he dissolved eikonogen, even in distilled water, he got a dark, coffee-coloured solution, so dark that in developing you could not see what was going on, but by the addition of sulphite he got the greenish colour. He also asked if eikonogen did not give a black image. He showed two negatives, one of which he had given four seconds' exposure and the other forty. He developed the first with eikonogen, and found it was about the right exposure; he, therefore, gave the second a bromide bath and then developed with pyro, and there was very little difference between the negatives.

An interesting discussion then took place upon development.

The Chairman said he much preferred the soda developer to the ammonia, the fumes of which were so deleterious. His formula was:—

Chemically pure carbonate of soda	3 ounces.
Carbonate of potash in crystals	1 ounce.
Water	10 ounces.

He never had any green fog, and could develop all brands of plates with this, whilst some would not stand ammonia. The plate should be kept well rocked whilst using this developer, but with a circular motion, and not with the simple up-and-down motion. Always use the clearing bath of alum and hydrochloric acid.

Mr. Grover said that he found that a board suspended by four strings made a very good rocking table, and gave just the rotatory motion required. He always used Edwards's clearing solution of alum, citric acid, and iron.

The Chairman suggested that a board suspended by a roasting jack made a very good rocking arrangement.

Mr. Few said that he had been developing some plates lately, and in pouring on the normal developer of pyro and ammonia without bromide he found that the plates fogged; he then soaked the next in the pyro solution without bromide, and then upon adding the ammonia they were all right. He asked the reason for the fogging.

Mr. Hart said no doubt the plates were over-exposed, and if Mr. Few had used bromide in the first instance he would have had no fog. In the second case the pyro, as it were, tanned the film, and thus acted as a restrainer.

The Chairman said that he used citrate of potash as a restrainer, and much preferred it.

Mr. Hart said this was a very powerful restrainer, and required great care in its use.

At the request of the Chairman, Mr. Hart gave his method of developing plates with unknown exposures. Mr. Hart said that he had three developers ready: 1st, the normal developer diluted three or four times; 2nd, one with excess of pyro and ammonia; 3rd, with excess of pyro and bromide. He flooded the plate with No. 1; then, if the image flashed up quickly, he poured off the developer and poured on No. 3. If the image appeared slowly he added No. 2. He was generally able to judge of the exposures of a batch of plates by the development of the first. With respect to exposures, he said that all real photographers should throw exposure meters, &c., to the winds, and learn to judge of the right exposure of each plate by the appearance of the picture upon the ground glass.

The Chairman said this was impossible in photographing such places as the Catacombs in Paris, &c., as you could not see much upon your ground glass; you must in such places expose by your own judgment and by chance. He always rubbed vaseline on his ground glass, and to the centre of his focussing screen he had attached a small microscopic cover glass with Canada balsam. By this means he was enabled to focus with the greatest degree of sharpness. In outdoor exposures even the direction of the wind should be studied. In a west wind the exposure was quicker than a north-east in Paris. A north wind was perhaps the best here; but it was marvellous what a degree of latitude there was in exposure if one knew how to develop properly. A small tablet should be attached to each side of a double back, whereon all particulars of exposure might be placed.

Mr. Walker having asked the Chairman how he would reduce or locally intensify a negative, Mr. Dando said that he used cotton wool and methylated spirit for local reduction; and, as he never varnished his negatives, he covered all the parts he did not want to intensify with Mawson & Swan's retouching medium, taking care that the negative had been thoroughly well washed of its hypo first; he then flooded the uncovered part with the Platinotype Company's intensifier, which was a splendid intensifier, and could be used over and over again. Having poured this off, he then gave the whole negative another coat of the retouching medium. His objection to varnish was that you generally got dust or hairs upon your plate before you had finished, whilst the retouching medium gave you a nice surface to work upon if you wished to retouch any part. Be sure before intensifying any part that the negative is left in the alum bath for at least half an hour to clear any fog from the shadows. The Chairman added that if in developing you wished to bring out detail locally, slightly warm that part over a very small gas flame, and it was wonderful what could be got out.

A member having asked what was the best mountant for prints upon Indian tints, the Chairman suggested that the large sizes should be painted over with oxgall, and then the ordinary starch or gelatine mounters would answer very well.

The next meeting of the Society will be upon the evening of July 3, in the Wellington Hall, behind the Myddelton Hall, when there will be a discussion upon *Lenses and their Uses*. The Secretary will open the discussion with a paper on *Photographic Optics*.

HOLBORN CAMERA CLUB.

June 20.—Mr. Luxton gave a lecture on *Lighting the Subject in Portraiture*, and passed round examples showing the difference which could be made in a face by suitable lighting.

June 22.—Seven members went by train to St. Albans, and thence walked to London Colney, where several very pretty bits for the camera were found; after dinner going on by trap to Radlett and Brickett Wood. Forty-two plates were exposed, and a very enjoyable time spent.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

The sixth ordinary meeting of the twenty-seventh session was held at the Association's Club Rooms, 3, Lord-street, on Thursday evening, June 19. Mr. Paul Lange presided, and there was a numerous attendance of members.

The following gentlemen were elected members of the Association, viz.:—Messrs. Albert Procter, Alexander Connon, William T. Philp, J. N. Stoltenfoht, and James D. Paterson.

The President reported on the excursion to Rossett and Gresford on Saturday, the 7th instant, when about thirty members and six ladies were present, and two hundred pictures were secured. He mentioned that the next excursion would take place on Saturday, July 19 (whole day), to Bolton Abbey, with Mr. C. W. Reader as leader. He also entered into a detailed explanation of the Chester Convention, and recommended the use of the Mawson backed plates for taking the interior of Eaton Hall. The Hon. Secretary had been successful in securing Mr. J. W. Wade, Vice-President of the Manchester Amateur Photographic Society, for the next meeting (July 31), when this gentleman would give a paper on *Landscape Photography*, with illustrations in charcoal, and he would also introduce a chapter on architectural photography. Later on, in August or September, the Britannia Company would give a demonstration with their Alpha paper.

A very fine mounted print was presented to the Society by Mr. Friese Greene, of London, per Mr. J. Norman Thomas, of the Convention members' group of 1889, taken on 24×20 glass plate, slightly cut down.

The late Mr. J. W. Robinson, jun., a young member of the Association, who died last month, had bequeathed his camera and outfit to the Association for use of the members.

Mr. Beaton (J. J. Atkinson's) then exhibited Fallowfield's Facile camera.

The evening concluded with a demonstration and detailed explanation of the new Kodak camera, No. 4, 5×4, of the Eastman Company. Mr. H. M. Smith was the demonstrator, and on the motion of Colonel Ellison a hearty vote of thanks was accorded to him.

SOCIETY OF FRIENDS OF PHOTOGRAPHY IN BERLIN.

June 2,—Professor Dr. H. W. Vogel in the chair.

After the election of new members and other purely business matters had been gone through, the Chairman announced the decision of the Committee to offer two prizes for competition: (1) for the best interior; (2) for the best enlargement of at least three times the linear dimensions.

Professor Rietschel then read a paper on *Enlargement*, exhibiting at the same time a camera, size, 50×50 cm. The general upshot of Professor Rietschel's remarks was to advocate the use of daylight in preference to artificial means of lighting.

Dr. Miethe then gave a communication of some length on *The Qualities of Photographic Objectives*, commencing with the observation that the subject was too wide to permit of exhaustive treatment in the limited space of time at his command, and that he would consequently confine himself mainly to those points on which most misconception prevailed. He proceeded to discuss the

action of diaphragms, and pointed out that the majority of objectives are corrected only for certain distances, i.e., that a point at this distance appears as an actual point in the image, objects at all other distances being more or less indistinct. The newer objectives are generally corrected for infinity, though it is possible to correct a lens for all distances. Diaphragms, it was stated, had a limit, and it was usual for the maker to attach the largest size immovably to the objective. If the objective were too much stopped down, the result was rather to increase the definition than to increase it, owing to the effects of diffraction and other causes; good lenses, however, would permit of stopping down to 1/150. The question of light spots formed the next portion of Dr. Miethe's paper, the origin of which, by reflection from the front and back lenses, he explained by means of drawings. He also pointed out that the observation of the light spot affords a means of testing the perfection of the lenses, good objectives showing only one when directed against the sun, imperfect lenses showing several indistinct ones. In conclusion, Dr. Miethe made some interesting observations relative to the depth of objectives, showing that it always depends mainly on their light intensity, and as a consequence the want of definition due to too great depth is rather a drawback than an advantage.

The meeting then passed a vote of thanks to Mr. Miethe for his paper.

In replying thereto Dr. Miethe dwelt upon the great importance of establishing a uniformal system for testing objectives, and suggested that the Society should furnish itself with a testing apparatus.

Dr. Jaumann then had an interesting series of exhibits before the meeting, illustrating the experiments in the practical application of photography, and showing the manner in which, by the application of glass screens of different colours and orthochromatic plates, he had succeeded in rendering evident differences of tint in the ink in forgeries of cheques and postal orders, which were quite imperceptible to the eye.

A number of views of the Malekulon and Lakeleven Coral Islands and their inhabitants, taken by the celebrated traveller, Herr Rosset, were then exhibited, and the proceedings terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

DR. EMERSON'S PICTURES OF EAST ANGLIAN LIFE.

To the EDITOR.

SIR,—It is proverbially ungracious to look a gift horse in the mouth, therefore I concur in the vote of thanks that "every English photographic society" has passed to Dr. Emerson for the copy of his *Pictures of East Anglian Life* he has presented to each. This book, the author tells us, is thus widely distributed, so that the results of his views on the practice of artistic photography as laid down in his *Naturalistic Photography* might be seen. Dr. Emerson, doubtless, means this as a sort of educational movement, and as I, an earnest student, feel sure he will follow up his gift by the still further one of additional explanation or elucidation to that he gives us in his "Address to the Student," I am also certain that this would be appreciated by the members of "every photographic society," for I can assure Dr. Emerson that there is not a member of the society to which I belong that understands, as their author would have him do, the illustrations to his amusing book, and this is possibly the case with other societies. To further this educational end I will venture in all humility to make a few remarks on the plates, and hope to have removed the diffident doubts that trouble me of their being true representations of nature. At present I feel that instead of being natural they are conventional to a degree, in some cases mere suggestions of nature produced according to a fixed formula. We all know Dr. Emerson's formula by this time, which, as I understand it, may be shortly stated as "everything out of focus in varying degrees."

Dr. Emerson apologises for some of his plates on the ground that an artist is not always able to get exactly what he wishes. I will pass over these defective plates and only refer to one or two which he considers "as perfect as he could wish." The author thinks *A March Pastoral* the best of the perfect ones, and considers this plate to possess "every naturalistic quality he would seek." He says, "Here, perhaps, my views on focussing are better illustrated than anywhere else. Look at the distant sheep on bank, they are quite out of focus, yet not fuzzy, as I understand it. The judiciously selected focus for various parts of pictures as desired can be studied here." Let us turn to the plate and study it. *A March Pastoral* represents some sheep and lambs. In the foreground, and being certainly the principal object, is an immense sheep suckling a lamb, both badly out of focus. Bits of the head and back of a sheep that appear over the back of the principal object are in good focus. These bits would, in my humble opinion, have been better away, instead of being emphasised by sharp focus. Question for Dr. Emerson. Why call attention to these obtruding parts by putting them into sharp focus while the principal object is neglected? Is the sharpness of the bits of the head, &c., part of that which Dr. Emerson says in this picture possesses "every naturalistic quality he would seek?" Is it an example of what he calls "judiciously selected focus?" The distant sheep, as Dr. Emerson truly says, are quite out of focus, and I do not see how, with a large principal object in the near foreground, they could have been got into better focus with any lens; and to a simple-minded ordinary photographer it would seem that the cause of the principal object being partly neglected, and the bits, &c., behind it being in focus, is that the photographer has endeavoured to reach these distant sheep and get them into better focus, and that the artistic excuse had to come afterwards. Now comes the greatest puzzle to my stupidity. To the extreme left is a lamb and some brambles, these are by no means principal objects, yet they are in the sharpest focus, in fact, as sheep as they could be made. Now I thought that nothing should be in sharp focus, not even the principal object, yet here are subordinate objects sharp almost to hardness.

I have dealt so fully with this photograph that I feel I ought not to occupy much more space at present, but before concluding should like to ask for a little illumination on the atmospheric effects and the truth to nature of these pictures. We have been told often enough that naturalistic photographs represent the truth of the tones and values of nature. There are in this book several photographs purporting to represent spring; let us try one or two of them with nature. We have just come to the end of the brightest and cheeriest time of the year, when nature wakes from her winter sleep. In connexion with spring we think of bright sunshine, flowery meads, buttercups and daisies, and May blossom—not that we get May blossom in March or early spring; but I speak of the brightness of effect and cheerful feeling of the season. All nature seems gay and happy, and teems with life and health, despite occasional east winds. What do we find in Dr. Emerson's impressions of spring? The *March Pastoral* is an example. What could be more dreary, dull, and dismal than the effect? There are cast shadows, but no feeling of sunshine—this I find throughout. Turn to *A Toad in the Path*, *Early Spring in Norfolk*, representing the backs of two melancholy boys, and a landscape that was a good subject enough if it had been properly treated. Why, this is midnight gloom compared to joyous and beautiful spring!

I feel sure that Dr. Emerson's only object is to educate the poor, ignorant, untrained, uneducated photographer he so often mentions in *Naturalistic Photography*, and this letter will, I hope, give him an opportunity. If he will only be good enough to reply, temperately if possible, he will at least lighten the darkness of every English photographic society, and earn the gratitude of— A PROVINCIAL MEMBER.

MOTTLING.

To the EDITOR.

SIR,—I enclose you a sample of mottling that has just come under my notice, and I am glad to say in this instance I find no difficulty in arriving at the cause of the marks. Twelve dozen 12 × 10 plates by a well-known maker of repute had been exposed in India, returned to this country, and after laying by for some time were brought to me to develop. The first dozen I took straight from the slides, where they had evidently been ever since they were exposed. These had no mottled marks, but were more or less spoilt through the leather hinges of the slides marking them very badly. The remaining eleven dozen were packed up in dozens in their own boxes, with sheets of the enclosed sample of paper between them, and the whole being enclosed in a strong wooden box.

As these plates were unpacked in the dark room, I did not notice at the time the quality of the paper until after I had developed the first negative, when I was very much alarmed at the appearance of the plate, as you may well imagine; and on inquiring for the paper that had been between them, I at once felt sure I had discovered the cause of the trouble.

Eight dozen have already been developed, and of these one dozen are spoilt through the hinges of the slides, six dozen have these mottled markings, and, strange to say, one dozen are free from them. Unfortunately, up to the present moment I cannot in any way account for this, for, having developed three dozen myself, I turned the job over to some one else, and I am not able to lay my hands with certainty on the identical pieces of paper that were placed between this dozen. But I can say that after having soaked one of these sheets of paper in distilled water for a short time, and pouring some of this water into a weak solution of permanganate of potash and carbonate of potash, the pink colour was very soon dispelled, which I believe indicates very strongly the presence of hypo in the paper.

You will notice in the enclosed rough print the impression of the paper is very distinctly marked, and the edge where the paper did not cover being perfectly free from mottling; so that in this case I think, Mr. Editor, you will agree with me that the paper is the cause of these horrid marks. I must tell you they were all developed with the pyro-ammonia developer.—I am, yours, &c., CHARLES WHITING.

"*Brentwood*," *Albany-road, Ealing Dean, W.*

LITTLE MORETON HALL.

To the EDITOR.

SIR,—Is not Mr. Keene mistaken in saying that what is being done at Little (or Old) Moreton Hall is an act of "Vandalism?" The old mansion is one of the class called *half-timbered*, or "black and white." The last time I saw the place, about two years ago, there was every appearance of neglect and decay. About twenty years since I made a series of views on 11 × 9 plates of this fine old building. It was then in good condition externally, and probably what is now thought to be an act of Vandalism is merely restoration. The old Hall deserves to be preserved, for it is one of the finest of its kind, and there are not many left. Oak will last a long

time when exposed to the weather, but it will decay if not protected; and in this case the tar or paint is necessary. For the purpose of the Convention and photographers generally, the renovated "magpie" effect will not be advantageous, but the weather in a year or two will have toned down the white, and a new "lease of life" will have been given to this valuable example of an old style of architecture.—I am, yours, &c.,

Manchester, June 23, 1890. A. BROTHERS.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for* "*Answers*" *and* "*Exchanges*," *must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

I. J. K.—Communicate with Messrs. Mawson & Swan.

E. JONES.—We have forwarded your letter on to Mr. Redmond Barrett.

D. D.—We know nothing whatever of the firm mentioned, or even of their existence.

W. BROWN (Paisley), J. WARD, and ASTRO send us excellent photographs of the eclipse, for which they are thanked.

S. B. W.—We do not think that any of the dry-plate makers would undertake to clean off old collodion negatives and recoat the plates.

W. H.—Either will answer. When carbolic acid is used, only a mere trace is necessary. The paste should always be used freshly made.

MARY B.—Do not spend money on crystoleum painting as a means of livelihood. You would certainly not get employment amongst photographers for that style of work.

W. METCRAFT.—Seeing that the plates—judging from those developed—are all very much under-exposed, try the effect of eikonogen as a developer, used with plenty of patience.

W. A. B.—Eosine, erythrosine, and cyanine may be obtained from Hopkin & Williams. The two first-named substances may also be had from most dealers in dyers' materials.

A. SIMCOX.—Communicate with the agent from whom you obtained the goods. He is the one with whom you have dealt. The manufacturer resides abroad, and would in all probability send your letter back to his agent here to be dealt with.

J. HEWITT asks: "What is the average price of cabinet portraits in London at the present time?"—This is a difficult question to answer. Some houses charge as much as 2*l.* 2*s.*, and even more, for a dozen, while others advertise them at 7*s.* 6*d.*, or less.

NOVICE (Cork).—If you require practical information on the wet collodion process, you cannot do better than obtain a manual of photography published, say, about a dozen years ago. In this column we cannot spare space to fully describe processes.

R. S. O.—The electric light (incandescent) will be perfectly safe in the dark room, provided the bulb be covered with a non-actinic medium. By all means have it, if obtainable, instead of gas or other light, on account of its steadiness and freedom from heat.

C. NEAL.—The patent, we believe, has lapsed. The specification can be had at the Patent Office for a few pence. This contains all the information on the process that has been published. It is, however, still being worked, but with the strictest possible secrecy.

S. Z. is labouring under a mistake when he says that the manufacture of triplet lenses is discontinued. We note they are, all sizes, quoted in a recent edition of Mr. Dallmeyer's catalogue. Triplet lenses (second-hand) always realise a much higher price than do orthographic lenses.

LANTERNIST.—1. The copyright in both Hogarth's and Bartolozzi's engravings expired long ago; hence you may reproduce them for any purpose you desire.—2. The most suitable plates to use are slow ones, particularly those specially prepared for making negatives for photo-mechanical purposes.

WORCESTER.—In photographing glass and china ware use slow plates, extra thickly coated with emulsion; or back ordinary plates, so as to prevent halation. A good deal of the success will depend upon the lighting of the goods. This should be done in such a manner as to avoid reflection as much as possible.

G. W. writes: "I have just been favoured with sittings by a very popular minister, and have secured several good negatives in different positions; shall I have to make each picture copyright, or will one registration do for the lot, as they were all taken the same morning?"—Each portrait will have to be registered separately, as it is a distinct picture.

W. GEORGE.—The presses most commonly employed for collotype printing in this country are the Albion and Columbian presses used for typographic printing. The latter are somewhat old-fashioned, and consequently cheaper, but they answer the purpose quite well. A copperplate press is not suitable, though a lithographic one may be employed with advantage.

P. O'DONNEL.—Carbon pictures are spotted with ordinary water colours, just the same as albumen prints. Chromotypes which are to be mounted with the high gloss must be spotted while on the glass and before the transfer paper is applied. Oil colour thinned with turpentine is usually recommended in this case, as it is not disturbed by the wetting, as water colour would be.

C. W. S. sends us a print from a negative of an interior in which a window that could not be seen on the ground-glass is shown distinctly, though faintly. He says it has caused much speculation amongst his photographic friends as to the reason, and asks our opinion. The cause of the second image is due to a small hole in the side or front of the camera, which has acted as a "pinhole camera."

W. GRAHAM.—From the print sent, it is perfectly certain that the lens will not cover a whole-plate, even when a small stop is employed. The diameter of a lens is no criterion of its covering power; that depends upon its focal length and the form of the combination. As you purchased the instrument with a guarantee that it would cover the size mentioned, you are perfectly justified in returning it.

B. BRADEN.—As good portraits can be taken in a studio having a south aspect as in any other. But there is no disguising the fact that greater skill is required to work it, and a more complete system of blinds and curtains is necessary than when the studio faces any other direction. If for an extra outlay you could obtain light from, say, the north, it might possibly be well incurred by a novice in professional portraiture.

CHAS. WHEELER says: "In answer to an advertisement in the JOURNAL I sent to a firm in the North specimens and references, and although I have written for their return I can get no reply."—We have made a note of the name and address of the firm. Next week we shall have something to say with reference to this question of obtaining specimens and retaining them, and the steps we propose to take for the assistance of *employés*.

T. SOUTHWOOD.—Some kinds of indiarubber are very insoluble, although they may not be vulcanised. They swell up in the solvent, but refuse to dissolve so as to form a solution. Evidently a sample of this description has been used. Procure some "masticated rubber" from a manufacturer, stating the purpose for which it is required. A good method of making a thin solution is to purchase some of the thick Indian solution, as sold at the shops, and then thin it down with benzole to the consistence desired.

VINDEX writes with reference to the use of bichromates as follows: "Having some time ago been engaged at a works where potass. bichrom. had been made in very large quantities, I found the popular remedy there for the terrible sores produced was a solution of stannous chloride, which I presume acted as a reducer, and so destroyed the special power of this drug as an oxidiser. It is possible, therefore, that a solution of ferrous sulphate, at hand in nearly every photographic laboratory, would be equally effective, especially if kept acidified with a little acid—say hydrochloric or citric, or even sulphuric acid."

ILL-USED says: "One of my fellow-townsmen, a stationer, has served me a dirty trick. He has obtained some of my photographs and sent them to Germany, where they have been copied on a smaller scale and printed by collotype, lithography, or some other process. Now they are issued in a cover and sold, twelve of them, for a shilling. Can I stop the sale? I am told I cannot, because the views were taken by my late operator—but with my apparatus, and made copyright in my name. Will you say if this is correct?"—Unfortunately it is quite correct. If the views are taken by an *employé* the copyright should have been registered in his name, and then properly assigned to the employer. Such is the law as it at present stands.

NOTICE.—Owing to absence at the Photographic Convention, communications to the Editor must unavoidably be left over till next week.

*** *Several correspondents this week have not attested their communications with their names and addresses; hence they are not noticed.*

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 2, report of the Convention delegates; July 9, *Photographing Theatrical Scenery.*

WE hear that Mr. J. J. Foster has purchased the business of Messrs. Sands & Hunter, of 20, Cranbourne-street, W.C., and that, under the management of Mr. Stephen Bicknell, who was with the late firm for several years, he proposes to carry it on under the style of Sands, Hunter, & Co.

DEATH OF MR. BAYNHAM JONES.—The name of Mr. B. Jones has been before the world since the earliest introduction of photography. Mr. Clifford F. Nash, president of Cheltenham Photographic Society, writes us concerning this event as follows:—"He died June 19, within two months of eighty-four years of age. I am sorry I cannot furnish particulars of his career, but he began at the very beginning with the Daguerreotype and worked all the various processes as they came out, and up to the time of his death was quite as devoted as usual to the art. Within the last three weeks I have seen him out with his camera. He was a successful worker with the older methods, but with the gelatine plates he never succeeded quite so well."—We have many kindly recollections of Mr. Jones, who, notwithstanding his great age, was a regular attendant at the Photographic Conventions of the United Kingdom, and we are very sorry to hear of his death.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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DETAINING SPECIMENS.

We had hoped, for the credit of the profession generally, that filching the specimens of candidates for situations was a thing of the past. Unfortunately, however, this is not the case. The number of letters we have received on the subject from those who have been duped shows that the disreputable practice is still rife in many quarters by unscrupulous people.

It may be argued by some that the non-return of the pictures may arise from thoughtlessness or negligence on the part of the advertisers rather than actual dishonesty. This may in some instances be the case, and perhaps is, but the hardship is still the same. Every employer knows quite well that the specimens of an applicant for a situation are about the only means he has of obtaining employment; also, that he rarely has the negatives from which to print others. Therefore, if these are detained the loss to the owner will be very great, notwithstanding that the pictures themselves may be of little value intrinsically. There can be no excuse for retaining the specimens, even if the motive is not a dishonest one.

Some of the cases that have just been brought under our notice have seemed very disreputable, though when pressure has been brought to bear upon the delinquents, the pictures have, in some instances, been returned, but without any apology to the injured parties. The reason for the non-return of the specimen, when one was given, has occasionally been of a most offensive character. Here is a sample from one house, who, after repeated applications, replied on the back of one of them: "We had over seventy applications, and don't keep clerks." That the system should be stopped is obvious, and the point to be considered is—How? Many different suggestions have from time to time been made, one of which is to disfigure the pictures in such a manner that they could not be used for exhibition purposes. This would certainly defeat the object of those dishonest ones who advertise expressly to obtain better examples for their showcases than they are able to take themselves. But few care to mutilate good photographs.

The following suggestions may be useful to those answering advertisements:—Never send specimens when the advertisement appears over initials or a *nom de plume*, or to be addressed to a post-office, until the advertiser shows his *bonâ fides*.

Where testimonials are to be sent, send copies only, and not the originals.

The name and address of the owner should always be placed on the back of each individual specimen; then no excuse can be made, as is sometimes done, that they were returned to the wrong party, or the address was mislaid, &c. Stamps should also be enclosed to defray the return postage.

Supposing the specimens are retained, what measures should be adopted for their restoration? It is quite clear that the value of the pictures could be recovered through the medium of the County Court, with, possibly, damages for their detention. But this entails considerable delay, and it is uncertain if the value of the pictures would be assessed at more than a nominal sum, notwithstanding that they might be invaluable to their owner. Proceedings could also be instituted before a magistrate for illegal detention. Where it can be proved, as is frequently the case, that the pictures (though promised to be returned) are utilised for the showcases, we imagine the offenders could be charged criminally with obtaining goods under false pretences, and if convicted punished by imprisonment. Very frequently a letter to the superintendent of police of the district will secure a speedy return of the pictures.

With a view to protecting the operative class in the profession who are so often being swindled out of the means of obtaining a livelihood—that is, the examples of their work—and checking dishonesty, for it is nothing less, we propose to take a somewhat drastic course. We purpose keeping a register, call it "black list" if you will, in which the names and addresses of the delinquents, together with the circumstances of the case, will be entered. This list will be open for inspection by those interested, and by *employés* before they entrust their specimens to advertisers who to them are unknown.

We invite all who cannot obtain a return of their specimens within a reasonable time after writing for them to communicate with us, giving full particulars, together with dates and a copy of the advertisement, and where it appeared, also their own names and addresses in full. In the event of legal proceedings, civil or criminal, being instituted for the recovery of the pictures, if due notice be given, we will have a representative present to report the case, as well as render what assistance we can.

In the meantime we shall be glad of any suggestions from our readers as to a better method of procedure for putting a stop to what is nothing less than swindling.

MOTTLING.

Of the various causes of mottling mentioned in the discussion that has been proceeding in these columns, the most prolific is, no doubt, stagnation of the developing solution, though probably mechanical inequalities in the film itself may be sometimes to blame. The latter fault is, I think, comparatively rare at the present day, and I do not remember for some years past to have met with a case that could be unmistakably traced to the plate itself.

In the earlier days of gelatine plates, however, mottling from inequality of film was a far too common occurrence, and existed in a variety of forms. Perhaps the commonest was the unevenness produced by moving the plates before the gelatine had thoroughly set, an avoidable trouble due to want of care. Another form was caused

by the use of too much alcohol on the emulsion, which caused it to run in an erratic manner over the surface of the glass, and to produce a variety of uneven markings. This, too, was avoidable when the cause was once realised.

The most troublesome kind of mottling, and the most difficult to cope with, arose from causes lying within the gelatine itself, which, under certain conditions, refused altogether to form an even film. Just as in the old collodion days, both wet and dry, photographers had to complain of "structure" in their films arising from the faulty nature of the collodion, so early gelatine workers were troubled by badly setting gelatine. As in the case of collodion so with gelatine, the fault lay with the material of the film itself rather than with the method of using it, and no care in coating or applying a faulty collodion would ensure an even film.

The evil arose, in fact, in the process of manufacture of the pyroxyline, from the employment of an improper strength of acids, or an unsuitable temperature, and though it might be intensified on the one side, or slightly ameliorated on the other by modifying the proportions of the solvents, it could never be wholly cured when once it appeared. So with gelatine the tendency to mottling was apparently set up in the process of manufacture, some samples of the material steadfastly refusing to set in an even layer, while others that behaved tolerably well alone would not bear mixing with other samples.

The faulty kinds appeared to be those hard samples of Continental origin, in the manufacture of which the use of alum had been resorted to, and the real cause appeared to me to arise from the attempted mixture of gelatines of widely different character. Many samples of French and German gelatine of that period would not mix with such kinds as Nelson's without producing mottling, and I was for some time greatly troubled in this manner when using Coignet's gold label in conjunction with a softer sample, also of foreign origin. In such mixtures the separate constituents never appeared to completely mix, and, setting at different temperatures, thus produced the effect of unevenness. In very bad cases I have seen the gelatine, when allowed to set in bulk, produce a viscous stringy mass instead of a smooth and even jelly.

At the present day, however, mottling from such causes is, I believe, seldom met with, though it may unexpectedly crop up from accidental causes. When it does appear, it is easily recognised from the other kind caused by insufficient rocking of the developing dish. How and why this form should make its appearance when a perfectly clean solution is being employed is, as has already been pointed out, not quite explainable. If any precipitate occurred on the developer being allowed to stand, we could understand that portions of the film might be partially protected from the action of the developer, and irregularity of action so promoted. Mottling of the "ripple-mark" type may, indeed, be produced at will by using a strong pyro developer without sulphite, keeping it mixed with the alkali long enough to permit the well-known coffee-coloured deposit to form. If this be then poured upon a plate evenly exposed to light, so as to fog it, and the dish be rocked gently two or three times, and then left alone for a few minutes, it will be found that the deposit in settling down does not do so evenly, but, under the vibratory motion of the solution as it gradually subsides into quiescence, arranges itself in bands or streaks in precisely the same manner as does the surface sand under the to-and-fro action of the receding tide. A similar result can be obtained with a ferrous-oxalate developer overcharged with iron, and when such heaps or streaks of solid matter are formed there is little wonder if irregular action takes place on the underlying film.

With a perfectly clean solution, however, this partially protective action does not arise, and I have sought to explain the phenomena by supposing them to be caused by the diffusion that occurs in a partially exhausted developer. For instance, we will suppose the solution to be allowed to remain motionless; the exposed portions of the film will abstract from the layer of solution in immediate contact with them a certain portion of the active ingredients, leaving the adjacent parts that overlie the shadows of the negative in a stronger condition, and the solution then commences to equalise itself by natural diffusion. But, unfortunately for this hypothesis, in the case of a perfectly even surface, like a smooth background or an equally fogged plate—under which conditions the mottling is most apparent—the exhaustion of the solution would be quite uniform, and consequently no diffusion of the kind imagined would occur. If it did, moreover, the diffusive action would cause an irregularity in the case of a "broken-up" surface, more or less following the outline of the image, and resembling halation rather than mottling.

Such an effect is very easily produced by alkaline development, and old collodion workers are well aware that this principle of exhaustion and diffusion was utilised in order to modify the action of the developing or intensifying solution. Thus, when it was intended to increase contrast in the image the solution was kept rapidly in motion on the plate, being poured on and off so as to thoroughly mix it; if harmony was desired, then the developer was allowed to remain as still as possible. The *rationale* of the process is as follows:—As the silver in the developing solution is reduced, it is attracted to the more exposed portions of the image, which soon acquire the whole of the metal in their immediate vicinity, and further action stops. Meanwhile, if the plate be kept motionless the shadows have time more slowly to attract their share of silver and begin to gain on the lights; but if the plate be vigorously rocked, so as to constantly bring fresh silver into contact with the better exposed portions, these acquire more than their fair share, and so the image presents greater contrast.

I have now two portions of a gelatino-bromide plate exposed upon a subject comprising trees, some of the branches of which are outlined against the sky. After exposure the plate was cut in two and the halves developed in separate dishes with equal quantities of the same solution. The one dish had its *quantum* of solution poured into it, and it was then covered over and allowed to remain stationary during the period that the remaining half of the plate was being developed by the ordinary rocking method, and when the most had been got out of this, both were washed.

The motionless development produced, as might be expected, a badly mottled sky, the rest of the picture being apparently tolerably uniform, and soft and harmonious in character, with a slight general veil; the other plate was decidedly more vigorous and cleaner in the shadows without any "mackerel" sky. But those portions of the branches of the trees which cut against the sky were almost entirely devoid of detail, though this was present in other portions no better illuminated, whereas in the plate allowed to rest during development the detail was evenly distributed. Here, clearly, the strongly lighted sky had in the one case monopolised the active power of the solution to the detriment of the more feebly lighted portions of the plate in its vicinity.

It is possible, therefore, that diffusion may have, under certain conditions, some effect in inducing irregularity of development, but scarcely of mottling. It seems to me that the latter is more likely caused by the friction set up by the gradually decreasing vibratory motion of the solution when allowed to rest. So long as the rocking is kept up, the motion is general over the whole surface, but when the rocking ceases, the motion of the liquid gradually subsides, and the friction becomes localised in the manner suggested, and so causes the "ripple marks" with which we are so familiar.

With regard to the form of mottling spoken of as the result of "washing the plate under a tap or rose," that can only be set down to want of thought, and is easily remedied. I invariably, after pouring off the developer, fill the dish with water two or three times, keeping up the rocking as before. In this manner the developer is removed equally from the film, and that without in the slightest degree carrying the action too far, even with a case of great over-exposure. The sudden dilution of the developer practically stops its action.

W. B. Bolton.

In the *Contemporary Review* for July (Isbister & Co., London) there is a capital article by Joseph Pennell on "A New Profession wanting Professors," which ought to be read by photographers who aim at acquiring a knowledge of the requirements of book illustration beyond the too often crudities produced for this purpose by the camera. The number of persons of both sexes who have begun to draw for the illustrated papers is something enormous, but as yet scientifically trained illustrators are few. The author considers the standard of illustration deplorably low, and to raise it he suggests that drawing

should be taught universally in every school. In this way, and by educating the educators, the public would ultimately be taught.

It may be remembered that a Committee of the Royal Microscopical Society was appointed to report upon the new one-tenth objective presented by Professor Abbe. At the last meeting of the Society an account of the result of the tests was given, and was of a very interesting character. It had been determined to show at the meeting the photo-micrographs of the various objects used as tests; but, to the disappointment of the Committee, which consisted of Dr. Dallinger, Mr. Mayall, and Mr. E. M. Wilson, it was found that the visual and actinic foci were not coincident. Dr. Abbe was informed of the conclusions arrived at, and asked that the lens might be returned for examination. This was done, and after the lapse of several weeks the Committee were informed that no trace of this non-coincidence could be found, and the objective was returned. The Committee then met, and the same object as before was focussed and photographed, and appeared quite sharp. The railway travelling the objective had experienced was thus followed by the two foci being rendered coincident—an effect never before recorded from such a cause.

At the same meeting was shown the new photo-micrographic apparatus made by Mr. Swift to Mr. Andrew Pringle's instructions, the instrument being the one exhibited at the Photographic Convention, where it attracted general interest. It was well discussed, and on the whole received much commendation, several objections to its design that were raised being shown by Mr. Swift to be baseless.

Dr. H. Fol, whose photographic researches on the light penetrating to great depths of the sea have been recorded by us, gives an account in a recent number of the *Leone Scientifique* of his experiences in watching marine animals at moderate depths, one of his observations having an important bearing on photographic work. He states that after the first few yards down the light is so blue that even red objects do not appear red; a non-achromatic lens employed at these depths would obviously show to more advantage than when used under ordinary conditions. In attempting submarine or subaqueous photography, it should be remembered that an ordinary photographic lens would not be achromatic if its anterior surface were in immediate contact with the water, as the corrections are made for an air-medium.

The meeting of the British Association at Leeds is expected to be very successful. It is anticipated that about fifty foreign men of science will be there, and among the attractions of the place a good many manufacturing firms have promised to open their works during the time the meeting is being held. The first *soirée* will be given by the Mayor, and the second by the Executive Committee.

Mr. Aynslie Common's lecture on telescopes, delivered at the Royal Institution, is reported at length in *Nature* of June 19 last, and will be read with interest by all who devote attention to astronomical photography, for he ventures an absolute prediction in regard to the instrument likely to be used in the future. Speaking of the instrument with two plane mirrors used to direct down the tube by the aid of a heliostat the rays from the star or planet under examination, he says, "There is but one objection that can be urged, that is, the possible damage to the definition of the plane mirrors; but this seems, from what I have seen of the wonderful perfection of the plane mirrors made by the Brothers Henry, to be an unreasonable one—at any rate, not an unsurmountable one. In every other respect, except, perhaps, a slight loss of light, this form of telescope is so manifestly superior to the ordinary form that it must supersede it in time, not only for general work, but also for such work as photography and spectroscopy."

A very remarkable suggestion appears in a letter in *Nature* last week over the signature of Eric Stuart Bruce, and referring to photographs of lightning. Pointing out that a statement has been made that the lightning of artists is an impossible occurrence, he suggests that such an effect could be produced if the lightning could be optically projected on to an irregularly shaped cloud. This he suggests could be done by a small aperture in another cloud lying between the flash and the irregularly shaped cloud—after the manner of pinhole photography, in fact.

THE LATE REV. T. F. HARDWICH.

It is with much sorrow that we learn of the death of Mr. Hardwich, which event took place at his residence, Shotton Vicarage, county of Durham, on the morning of Tuesday last week, the 24th ult., at the age of sixty-one years.

Born at Wells, Somersetshire, in 1829, he first came prominently before the London scientific public in 1849, when he was appointed Curator of the Museum, and Demonstrator of Practical Chemistry in Kings College, London. He became associated with photography at the period when the Daguerreotype was on the decline and the collodion process was becoming introduced, and his investigations into the preparations of collodion were of a most thorough nature. He was appointed Professor of Photography in King's College, and he continued to occupy this chair till 1861, when he left London, having taken orders in the Established Church.

Anterior to taking this latter step his name and fame had become universally known, and he had contributed numerous papers (no fewer than sixty-three) to the London Photographic Society, and to The British Journal of Photography, these being mostly of a chemical nature. During this time he also published his work, *Photographic Chemistry*, now in its ninth edition, which was brought up to date by his friend, Mr. J. Traill Taylor, a few years ago.

In The British Journal of Photography for October 15, 1875, we gave a detailed and somewhat compendious account of Mr. Hardwich's labours, to which we refer the reader for much of an historical nature. In this we said what we now repeat, that Mr. Hardwich was incontestibly the most arduous investigator in photographic science of his day, and the most prolific contributor to the serial literature of photography. There is a refreshing smack of originality about everything he has written, and it must be universally acknowledged that he was an unwearied experimentalist. We quote *literatim et verbatim* the following from the article referred to:—"Our esteemed *confrère* is of a singularly mild and undemonstrative disposition. His simple loving, and earnest nature finds congenial occupation in his parochial work, and it is difficult to say whether he is more beloved by the swarthy sons of toil who form the majority of his extensive flock, or by his fellow labourers in the ministerial office. We sincerely hope that his eminently useful life may long be spared. When our friend's life work has been accomplished—he

> 'Whose peaceful day benevolence endears,
> Whose night congratulating conscience cheers'—

and when his character comes to be summed up by those among whom he has so faithfully laboured, it may be done most aptly in those sacred and expressive words—he went about doing good." This was written in 1875; and a fitting corollary is given in the *Newcastle Daily Journal* of the 26th ult., when in course of a brief notice of his death it says, "The late reverend gentleman was beloved by his parishioners in a marked degree. Never was the old adage, 'A friend in need is a friend indeed,' more fully realised than it was in the deceased gentleman."

Of late years, as our readers are well aware, Mr. Hardwich's contributions have been almost exclusively confined to the improvement of the optical lantern, in which he continued to feel a deep interest up to the end. He looked upon the lantern as a great means of education, and he employed it extensively in his parochial work. The rough Durham miners, with their wives and families, used to crowd to hear him, and the Vicar of Shotton was looked upon as a sunbeam who illumined the many dark shadows in their pathway.

ON THINGS IN GENERAL.

From all that can be gathered, the members of the Photographic Convention of the United Kingdom seem to be well satisfied with the result of their deliberations on the one hand, and their inroads into Wales and old Cheshire on the other. There would appear to have been no personal friction during the meeting, and the names of those already before the public show it to have been a thoroughly representative gathering, whose deliberations are bound to be valuable. I have often been interested in the views of the old city, few corners of which are likely to have been unphotographed this last week. If many members went with the various Welsh trips in the programme, they will have seen some of the most beautiful scenery the United Kingdom affords, and their negatives will not fail to still further popularise a beautiful part of the country which already, so far as its watering places go, is well known to the dwellers in the Midlands, for when my wanderings have taken me Welshwards, I have often noted a goodly sprinkling of Birmingham names. The business of the Convention this year seems to have been of a thoroughly practical character, and if the Committee on lens flanges and screws are—as seems highly likely—able to enunciate a scheme that shall be accepted by the leading opticians, they will score a decided success. From the practical interest in the Committee shown by the leading opticans, there appears to be every probability of a successful result by the adoption of the chief recommendations already made; and this would be matter for congratulation alike to the general body of practitioners and the makers themselves.

Every thinking man, too, will be inclined to endorse the recommendations of the Weights and Measures Committee; for of all the illogical, absurd, and misleading modes of conveying information of a technical character, commend me to the usual plan for acquainting his fellow workers with his modes of working that the average formula producer adopts. And at the very top of the tree of absurdity is to be found the dry-plate maker. For evidence, let any one examine the printed instructions sent out with the plates; the chief object apparently being to couch the formulæ in such terms that the difficulty of comparing notes with this, that, or the other maker, shall be so great as to prevent the attempt. Those familiar with these precious instruction papers will be aware that there are some honourable exceptions, to whom my remarks do not apply. I ask the plate makers, is there any valid existing reason why, if they must boil their instructions down to what they deem a mental pap suitable for the sucking photographers, they should not make an addition to all their papers stating the exact ultimate proportions of the various ingredients in solutions mixed in the complex way they recommend? This might be done in grains per ounce, or in decimal parts, and, as this latter is the recommendation of the Committee, the makers would do well to adopt it. It is indeed to be hoped that the outcome of it all will not be a parallel to the result of a great preacher's discourse as described in the antique verse beginning:—

"St. Anthony at church
Was left in the lurch,
So he went to the ditches
And preached to the fishes."

For we learn that after an eloquent discourse, heard by all members of the finny tribe, we are told,—

"Much delighted were they,
But preferred the old way."

There is an old way of another sort which was beginning to get terrible dreary till an enterprising dealer broke new ground. Every one is familiar with the "I have much pleasure in informing you that I use no other plates but yours, and already I have gained half a ton of medals, and last week two hundredweight more were awarded me; please send me two dozen more of plates like the last quarter-gross" style of advertisement. This style of thing, I presume, is getting played out, as I now see a letter, occupying a quarter of a page, sent, not by a half tonner, but by a modest writer, who does not "wish to boast," but states he is "thoroughly satisfied, and could not wish for a better article," for he had "never taken a photograph in his life until he purchased this apparatus *four days* before he penned this testimonial." Evidently such testimony must be very valuable as to the merits of an instrument of a similar class to which the market is flooded with.

Can any of the readers of The British Journal of Photography give information as to the practice of "licking down" prints during the process of mounting as described in a recent lawsuit? It reveals a very extraordinary state of affairs, and one that would produce a lamentable state of perturbation in the mind of that section of the public to whom photographs have an especial interest—need I say the lovers of both sexes, who are the best clients of the photographic portraitist? Picture the dismay that would be felt by Romeo on finding that the picture of Juliet on which he had lavished showers of impassioned kisses had been in still closer contact with other lips than his! No, at all hazards this must be kept from the public eye, and I would venture to recommend that a committee be formed to induce employers to discountenance the practice by all efforts in their power.

Did Mr. Chapman Jones intend his remarks to be taken *au serieux* the other evening at the "Parent Society," when he gravely stated that water was equal to acid in removing yellow pyro stains from gelatine negatives, he having also at the same *séance* stated that backing plates was a retrograde step? Language, we were long ago told, was given us for the purpose of concealing thoughts, and it would be interesting to learn what was the thought here concealed; for to imagine that any plates can be bought that will do without backing under all circumstances, or to state that citric acid solution, for example, would not produce any greater effect than plain water upon a pyro-stained film, is unmitigated nonsense.

Free Lance.

THE PHOTOGRAPHIC CONVENTION.

Resuming our report of the proceedings:—

Thursday, June 26, was devoted to excursions to Conway, Llanrwst, Trefriw, Bettws-y-Coed, and Moreton Old Hall. The weather being fine, all the members, with scarcely an exception, availed themselves of one or the other of these. In point of real, thorough enjoyment, this was perhaps the best day of the whole Convention week.

In the evening the President read the following:—

Report of a Committee consisting of W. Bedford, C. H. Bothamley (*Secretary*), A Cowan, A. Haddon, A. Levy, A. Pringle, *and* G. Watmough Webster, *appointed to consider the Weights, Measures, and Formulæ used in Photography. Drawn up by C. H. Bothamley.*

General Considerations.

The question of Weights, Measures, and Formulæ divides itself into two parts—the system of weights and measures to be used, and the method of using them.

A. *Weights and Measures.*—Choice lies between the English system, or a modification thereof, and the metric or French system.

The metric system is now almost exclusively used for scientific purposes. Its advantages lie not so much in the magnitudes of the units, but in the facts that there is a simple definite relation between the measures of weight and the measures of capacity, and that it is a decimal system, the multiples and submultiples being powers of ten.

It is necessary to point out, however, that the relation between measure and weight is only theoretically exact at 4° C. (39·2° Fahr.), at which point the unit of weight, *the gramme*, is the weight of *one cubic centimetre* of pure water weighed in the latitude of Paris. At the ordinary temperature of 15° C., however, the deviation resulting from the expansion of the water amounts to only 8 in 10,000, and is negligible for all practical purposes. Only in investigations of a very refined character need the divergence be taken into consideration.

With respect to the English system it is necessary, in the first place, to point out that the old "Apothecaries' Weight," with its ounce of 480 grains and its submultiples, the drachm and the scruple, is no longer legal in the buying and selling of chemicals, and it has not been included in the *British Pharmacopœia* since 1864.

The legal units of weight in which dealings in chemicals, and all materials except gems and precious metals, are transacted are the *pound avoirdupois*, the *ounce avoirdupois*, and the *grain*. The pound contains 16 ounces or 7000 grains, and the ounce contains 437·5 grains. The relation between the grain and the ounce is inconvenient.

The English units can be used, and are frequently used, decimally. Quantities are expressed in grains and decimal parts of a grain, and there is no greater difficulty in writing 205·0 grains than in writing 12·96 grammes. Grain weights from 10,000 grains to 0·01 grain can easily be purchased.

The relation between weight and fluid measure is of precisely the same kind as in the metric system. The gallon is the bulk of 10 pounds of water at 62° Fahr.; a fluid ounce is the bulk of an ounce of water at

62° Fahr.; 16 fluid ounces or 7000 fluid grains is the bulk of 16 ounces or 7000 fluid grains, or one pound of water at 62° Fahr. Since the relation is quite exact at 62° Fahr., it is more exact at the ordinary temperature than in the case of the metric system.

Below the ounce, however, such a relation does not exist. The sub-multiple, the *minim*, has no simple relation to the grain, and this arises from the fact that when the fluid ounce was changed from the bulk of the troy ounce, or 480 grains, to the bulk of the avoirdupois ounce, or 437·5 grains, the old mode of subdivision was retained, and we now have the fluid ounce of 437·5 grains divided into 480 equal parts or minims. A minim is therefore the bulk of only 0·911 grain of water, and to take the minim and the grain as equivalent introduces an error of about 10 per cent.

Fluid grains are, however, in use for chemical purposes, and the relation between the grain and the fluid grain at 62° Fahr. is precisely the same as that between the gramme and the cubic centimetre at 4° C. Measures graduated in fluid grains can be obtained without difficulty, and have been used by many photographers for a considerable time.

Whilst fully recognising the advantages of the metric system, we are also bound to recognise the facts that the English system is much more familiar, that the weights and measures of this system are possessed and used by almost all photographers, and that a knowledge of decimals sufficient to enable a decimal system to be used easily and accurately is by no means so widely diffused as is desirable. It follows that the general adoption of the metric system will at any rate require a considerable time, and in dealing with formulæ we recommend a method which is independent of the system of weights and measures used, provided always that the relation of the unit of weight to the unit of measure is the same as that existing between the gramme and the cubic centimetre, or the ounce and the fluid ounce.

Recommendations.

A. *Weights and Measures.*—1. If the metric system be used, weights will naturally be expressed in grammes, and measures in cubic centimetres.

2. If the English units be used, the minim and the drachm should not be employed at all. All weights should be expressed either in grains or decimal parts of a grain, or in ounces and fractions of an ounce; all measures in fluid grains, or in fluid ounces and fractions of a fluid ounce.

B. *Formulæ.*—3. Formulæ should give the number of *parts* of the constituents, by weight or measure, to be contained in some definite number of *parts, by measure*, of the solution. The mixture can then be made up with (*a*) grammes and cubic centimetres, or (*b*) grains and fluid grains, or (*c*) ounces and fluid ounces, according to the unit selected.

4. The standard temperature for making up solutions should be 15° C. or 62° Fahr. No appreciable error will be introduced by the fact that these two temperatures are not quite identical.

5. Formulæ should give the quantities of the constituents to be contained in *x* parts of the finished solution, and not the quantities to be dissolved in *x* parts of the solvent. When a solid dissolves in a liquid, or when two liquids are mixed, the volume of the solution or mixture is, as a rule, not equal to the sum of the volumes of its constituents. The expansion or contraction varies with the nature of the solids and liquids and the proportions in which they are brought together. In making up a solution, therefore, the constituents should first be dissolved in a quantity of the solvent smaller than the required volume of the finished mixture, and after solution is complete, the liquid, cooled if necessary to the ordinary temperature, is made up to the specified volume by addition of a further quantity of the solvent.

6. It is very important to specify in the case of liquids whether parts by weight or parts by measure are intended. The equivalence between weight and measure only holds good in the case of water and liquids of the same specific gravity: a fluid ounce of ammonia solution or of ether weighs less than an ounce; a fluid ounce of strong sulphuric acid weighs nearly two ounces.

7. Whenever possible, formulæ should give the quantities of the constituents required to make up 10, 100, or 1000 parts of the solution.

8. When a mixture (*e.g.*, a developer) is to be prepared just before use from two or more separate solutions, it is desirable that the proportions in which the separate solutions have to be mixed should be as simple as possible—*e.g.*, 1 to 1, 1 to 2, 1 to 3, 1 to 10.

9. When metric units are employed the original French spelling, "gramme," should be used in preference to the contracted spelling "gram," in order to avoid misreading and misprinting as "grain."

Appendix.

Weighing and Measuring.

A brief description of the correct methods of weighing and measuring may be of service to photographers who have had no laboratory training.

Measuring.—The correct reading is the horizontal tangent to the meniscus, that is, the horizontal line which touches the lowest point of the curved surface of the liquid in the case of water and all liquids which wet glass, or the highest point of the curved surface in the case of mercury and similar liquids. When the liquid is so opaque that the meniscus cannot be seen, the reading must be taken at the apparent horizontal surface of the liquid. The measuring vessel should be exactly vertical, and the eye of the observer should be exactly on a level with the surface of the liquid.

Weighing.—To assume that the weights in the two pans are equal when there is a distinct deflection of the index of the balance towards one side is obviously incorrect. To take the weights as equal when the beam is at rest, and there is no deflection at all, also gives untrustworthy results. The balance should be made to vibrate, and the weights in the two pans are equal when the index makes *equal excursions on either side of the position of rest*, which is usually the centre.

This report was unanimously adopted.

The next paper was Mr. Pringle's:—

THE RECORD OF PHOTO-MICROGRAPHY.

By Andrew Pringle.

It may perchance be matter of wonder as well as of interest to some of you that the history of general photography has been to a great extent bound up with the history and record of photo-micrography; not that the special application of photography to microscopy has in any direct way influenced general photography, but rather because the men trained by education, and perhaps fitted by nature, for microscopic study, which is equivalent to saying minute and accurate observation, have found photographic *technique* useful, and have turned their observant minds to photographic wants.

And, moreover, images projected by a microscope are so evidently convenient for the study of any method of graphic representation—the enlarged image can so readily be kept steadily fixed on one plane, the optical qualities of the protected image can be so readily examined, the worker is so wholly independent of weather—that there is not much cause for wonder in our finding some of the earliest experimentalists in photography using the projected microscopic image as the subject for their photographic researches. Last year I had the honour to review before you the progress of photography during fifty years, but this year I take you back, if you will be pleased to accompany me, to a period more remote than fifty years ago. Let us turn to the year 1802, and we shall find—probably in the journal of the Royal Institution—records of the experiments of Wedgwood and the observations of Humphry Davy on "leaves and wings of insects taken by solar light on prepared leather." This surely is early enough in the history of photography. It is well known that both Fox Talbot and the Rev. J. B. Reade used the solar microscope, and many other names famous in the records of photography are also found in the early annals of photo-micrography. Mr. Reade is known to have produced photo-micrographs in 1837, insects being his chief subjects, but in 1839 he produced results greatly superior to his efforts of 1837. About 1838 the prototype of our triple achromatic condenser was brought forward by Dujardin, and in '39 or '40 Dancer used the gas microscope and photographed therewith on silvered plates. Donné and Foucault, in Paris, presented engravings from photo-micrographic Daguerreotype plates in what Moitessier called a "magnificent atlas." The first instance known to me of the use of polarised light for photography was in 1857, when M. Bertsch exhibited in Paris crystals of salicine photographed by polarised light. About the "fifties" a great many names are found, many of them well known to us, as Shewbolt, Diamond, Maddox, Wenham, Viles, besides many *savants* of other countries. Dr. Maddox showed at the Royal Society, in 1867, photo-micrographs illustrating a paper he then read.

Enormous strides were made in our science by Dr. Woodward, an army surgeon of the United States; in fact, his work may be said not only to mark, but to constitute, an era in photo-micrography. His work first claimed notice about 1864, and consisted not only of medical subjects, but of diatoms taken at very high magnifications.

I am not aware of the exact date when Dr. R. L. Maddox first produced a photo-micrograph, nor can he fix the date himself, but I have here a photograph of P. Angulatum × 3000 diameters of superlative excellence produced by my friend in 1838 or 1839. This was by no means his first attempt, as is easily seen from the high quality of the negative now in my possession. It is not within my subject to describe even briefly the apparatus used by these early workers, but I may say that the illumination used by them was either the gas microscope or sunlight, and many ingenious forms of heliostat were used. Dr. Woodward's heliostat was specially admirable, and Dr. Maddox designed one of high quality and moderate price. Still, in this country at least, direct sunlight can never be depended upon, and in the days of wet collodion the photo-micrographer must have had frequently to lie idle. In the present day, with the much more sensitive plates at our command, we can utilise as radiants not only the electric arc, but electric incandescent lamps, such, for example, as Dr. Van Heurck uses with such success; limelight, such as I use myself; and even the light of ordinary paraffin lamps.

Perhaps I may be excused if I dwell with a certain fondness on the photography of bacteria. I believe that Dr. Robert Koch, the eminent bacteriologist of Berlin, was the first to publish photographs of bacteria; this was in 1877. In his paper *On the Investigation of Pathogenic Organisms*, translated by Mr. Victor Horsley for the New Sydenham Society, Koch speaks very strongly in favour of photo-micrography, and even says he would prefer a bad photograph to a drawing, however good;

but it seems that at a later period he found certain difficulties of colour to be almost or quite insuperable, and he was then inclined to make less of photo-micrography than he had previously done. Dr. E. Klein, F.R.S., was also inclined to condemn our science for his purpose, for in *Micro-Organisms and Disease*, third edition, 1886, I find these words:—"Micro-photography, by which microscopic specimens of bacteria are photographed, has hitherto yielded results so unsatisfactory, that even Koch, who first introduced it, has abandoned it in lieu of accurate drawings made in the usual manner." Possibly, when Dr. Klein wrote this his words were true, but certainly he has changed his opinion now, as I have very good reason to know.

I could name a considerable number of books and a very great number of papers which are illustrated by photography. George M. Sternberg not only illustrated a book of his own on bacteria by photo-micrographic prints (second edition, 1883), but has written a book of careful and detailed instructions for the practice of the science. Dr. E. M. Crookshank is in the same position; he has published a book largely illustrated by photographs of bacteria, and he is also the author of *Photography of Bacteria*. A paper read by Dr. Crookshank to the Photographic Society of Great Britain, and illustrated by his negatives, first directed my attention to bacteriological photography. In 1885 both Hauser and Van Ermengen published photographs of bacteria, and after the works of these men the science may be said to have gained a sure footing. The chief obstacle to success, the stumbling block of all these earlier workers, was the difficulty of *colour* rendering, unless the preparations were suitably or deliberately stained for photography. Colour-correct photography, then, forms one of the foundation stones of the edifice of photo-micrography so rapidly rising among us.

My remarks up to this point have been purposely made to lead up to certain stages in the records of photo-micrography, and we have reached the stage of colour-correct rendering of stained objects. There is another photographic matter which has been alluded to in passing, but must now be more particularly treated. I have referred to increased sensitiveness of our plates. Just as Wedgwood, Davy, Reade, and Talbot used photography for microscopic work, and in practising the one elaborated the other, so Dr. Maddox in the search after certain photo-micrographic effects fell upon gelatine emulsion photography. I need not tell you how Bennett revolutionised photography, but I must point out the effect his discovery had on photo-micrography. We are no longer dependent on sunlight, we can work with the very highest powers without undue length of exposure, the developed image is quite fine enough for any purpose, and nearly all the difficulties and inconveniences of wet collodion and silver bath are removed from our path. The advantage in reduced exposure is not by any means a matter of time only, for during prolonged exposure there is imminent danger of movement either from tremor or from alterations of temperature, both of which are fatal to success, but most difficult to avoid. We have, then, at the present day advantages purely photographic which were not within reach of the masters of photo-micrography of past years; we have plates much more sensitive, and so we get results much more rapidly, much more certainly, and with much less expense; but in a large class of cases we get results much better—sometimes, in fact, we get results which without orthochromatic photography we could not obtain at all. The indefatigable Koch was stopped by colour difficulties, as already stated; but it is interesting to know that, so far as I have seen, the very best photographs of bacteria published up to the present time are by Drs. Fraenckel and Pfeiffer, colleagues or assistants of Koch. These bacteriological photographs are so fine that I have brought a few of them for your inspection. They are all, or nearly all, produced by orthochromatic methods, and while I cannot quite agree with all the directions given in the text of No. 1, still there can be but one opinion as to the results these gentlemen have achieved.

I would point out that some of the methods of staining most followed by bacteriologists and microscopic technologists in general would afford excellent examples of subjects difficult to photograph on ordinary plates. *Tubercle bacilli* are usually stained either red on a blue ground, or blue on a yellow-brown ground. Voilet coloured *bacilli anthracis* are very frequently found in preparations counter-stained with bismarck-brown or vesuvin. The fungus of *actinomycosis* shows best stained blue, red, and yellow, and I shall presently show you the orthochromatic results from such a staining. A much valued multiple stain, my own favourite stain for ordinary pathological and physiological tissues, consists of bright blue for nuclear, bright red for connective, and orange more or less bright for protoplasmic tissues; I venture to assert that no ordinary plate will properly render a section well stained by this method, yet with yellow-sensitive plates, and the use of screens chosen for each occasion, I am in the frequent habit of photographing such subjects, and I generally end by getting good results. I could show you bacteria sections photographed repeatedly on ordinary plates, and with the greatest skill and care I could bring to bear, where there is not a trace of a microbe, whereas with a colour-corrected plate the organisms stand out clear and unmistakable. My paper is not intended to be a course of instruction in photo-micrography, but is rather an attempt to point out by how much and by what means our science has advanced, is advancing, and will doubtless continue to advance.

The advances made since the infancy of our science have been simply astounding. Conceive the time and conceive the labour when the principle of "correcting lenses for photography" was undiscovered. Petzval, about fifty years ago, showed the way to this correction in photographic lenses, but not till long after that did photo-micrography become so important in public estimation that opticians were forced to consider the correction for microscopic objectives. Some opticians do not seem to have grasped the subject even yet, but there are others who have done so most successfully.

And again, resolution and definition, which, though perhaps technically distinct, are nevertheless bound together, depend on angular, or rather numerical aperture. The earlier opticians might get their objectives with visual and chemical foci coincident, they certainly did attain to very flat field images; but they were incompetent, and, indeed, do not seem to have been desirous to get large aperture with other qualities good. Resolution, or separation of line from line, depends on fixed laws relating to numerical aperture. A lens having a numerical aperture of 0·30 will in the most actinic part of the spectrum resolve 38,000 lines to an inch; N.A. 1·00 (the highest air angle) gives the power of resolving 127,000 to the inch, while N.A. 1·4 is capable of resolving nearly 180,000 per inch. Now many of us possess objectives having apertures nearly approaching to N.A. 1·4, while lately Zeiss produced a glass having a numerical aperture of 1·63. I shall show you some work done with this glass by Dr. Van Heurck, of Antwerp.

When the system of immersion was introduced an enormous stride was made, and an enormous additional power gained. If we have a dry lens our numerical aperture is evidently limited to the extent of the air angle —180°, or N.A. 1; but when water immersion was introduced, and still more when homogeneous immersion, the numerical aperture was at once increased to a very large extent. It may seem a paradox that we can get a glass to embrace a larger angle than 180°; at first glance this seems to bespeak looking round a corner, but the explanation is simple enough. We do not look round a corner, but in our angular aperture of 180° we include more pencils of light. If, for example, with a dry lens we can include 1000 pencils, we can with water immersion (by virtue of the higher refraction index of that liquid) include 1300 pencils, and with suitable oils 1500, while if we use not only suitable oil, but suitable glass for our condensing arrangements, we can, as already stated, reach to 1600. But beyond this gain, immersion greatly improves the qualities of our objectives, it increases working distance, improves illumination, and mitigates the tendency to diffraction images.

Herein, then, lies one of the great advances made in our optical appliances. We vastly improved the performance and increased the range of our objectives by the immersion system. Amici seems first to have noted the beneficial effect of water immersion, but the system, I believe, was first carried into practical effect by Nachet or Hartnack. Mr. Wenham seems to have suggested but not used the homogeneous immersion system, and the great optician, Abbe, of Jena, worked out the matter and brought Wenham's idea to full fruition. Oil of cedar, in virtue of its refractive index and its dispersion coinciding nearly with those of crown glass, is the oil generally used for homogeneous immersion. But it must be borne in mind that in order to get the full effect of this system the objects themselves must be mounted in a medium of high refraction index, and this process is very apt to lead to error in observation. Mr. Nelson rarely photographs diatoms at any angle beyond the air angle, in order, as I understand, to avoid these errors of interpretation due to mounting objects in these media of high refraction indices. Unstained physiological tissues are often destroyed for observation by being placed in glycerine, and a piece of glass placed in a bottle of water is not in advantageous circumstances for examination.

I have now to touch on the latest and one of the great advances made, and this one affects in a very special manner our science of photo-micrography. On account of the nature of the glass used previously to but a few years ago, opticians found it impossible to correct objectives for more than two regions of the spectrum; lenses were corrected for the blue and yellow regions, or perhaps more commonly for the green and red, and when using such lenses under conditions at all trying, we find fringes of colour bordering our objects; in other words, we have a marked uncorrected residual spectrum. But Abbe and the firm of Schott working together at last succeeded in making glass with different refracting and different dispersing powers from the powers of glass previously made, and as a result Abbe has formulated and Zeiss has made objectives far superior in correction to any we have ever had before. The photographic results are distinctly superior to those obtainable by use of more ancient objectives, and there is, moreover, a marked improvement in the images even for visual observation. Three spectrum regions at least are made practically coincident in foci, and the colour fringes are, if not wholly eliminated, at least greatly reduced. Some English opticians have produced with the new glass—which, as has lately transpired, contains fluor spar—very good "apochromatic" glasses, apochromatic being the term used to describe this new phase of optical achievement. It is claimed that by use of this new glass greater numerical aperture can be obtained in conjunction with equally good or better general qualities, such as flatness of field, illumination, &c.

So far, I have mentioned *special* advances that have been made, I may now say *broadly* that the optical improvements consist of the attainment of larger angle without loss of general quality. I think I may say that the history of microscopic optics has been the history of numerical aperture. There always was, and there ever will be, a limit to the aperture possible

with a given focal length, but now more than ever we are getting long focal length and large aperture conjointly. In microscopic optics the word penetration must creep in sooner or later. Penetration or "depth of focus" is the supposititious power of focussing on two planes at right angles to the optic axis simultaneously, sufficiently accurately to prevent visible blur. It is manifestly impossible to focus on two such planes equally sharply, and the question is simply, How much blur is permissible? In artistic photographs it is a matter of taste; in scientific micrography it is a matter of mathematics. Penetration decreases directly as aperture increases, but decreases as the *square* of magnification. It is therefore beyond argument that the more the aperture—and consequently the more the resolution—we can get with the least magnification the greater will be the penetration we shall obtain; and therefore what we have to search for is an objective of low power, with as wide a working aperture as can be achieved without damage to the corrections and general qualities of the objective. With a given focal length opticians reach a point of aperture beyond which they cannot go without injury to the quality of the objective, that is where we shall always stand. But our standpoint will from year to year be pushed onward, and our optical appliances will from year to year improve.

Speaking for myself, I am well satisfied with the optical contrivances we have to-day, but I look with eagerness for some advance in photographic power—particularly I long for greater power to cope with certain colour effects and colour combinations frequently met in my experience. I have no spark of doubt that in process of time every candid investigator of microscopic objects who wishes a graphic representation of his objects of study will employ photography as his delineator, and I maintain that the scientific investigator of scientific facts is bound to use for delineation the only scientific method of delineation—photography.

APPENDIX (*Objects shown in Illustration*).

(1.) *Books.*—*Bacteria*, by G. M. Sternberg. Second edition. 1885. *Photomicrography of Bacteria*, by E. M. Crookshank. 1887. *Mikrophotographische Atlas der Bacterien Kunde*, by Frankel and Pfeiffer. Nos. 1 and 2. 1889. *La Chambre Noire et le Microscope*, by Jules Girard. 1869.

(2.) *Prints, &c.*—Collection by Dr. R. L. Maddox from 1868 and onward—diatoms, insects, silica films, &c. Diatoms by Thomas Comber. Diatoms &c., by Dr. Clifford Mercer, Syracuse, U.S.A. Various objects by Mr. Rafter, U.S.A. Scrap-book of Bacteria, by A. Pringle, 1878 and onward.

LANTERN SLIDES.

Proboscis of blow fly (lowest power to N.A. 0·90), four slides.

P. Angulatum „ Silica film	(× 3000)	Maddox 1868 or 69.
Navicula Aspera	(× 1000)	Comber.
P. Angulatum	(× 1000)	
Cymbella	(× 1000)	
Isthmia nervosa	(× 1000)	
Coscinodiscus ocellus	(× 1000)	

Triceratium (× 60), (× 375), and (× 750). A. Pringle.

P. Angulatum	(× 670)	N.A. 0·7	⅛"	0·9.
„	(× 1200)	„ 0·5	„	„
„	(× 600)	„ 0·65	¼"	„
„	(× 1050)	„ 1·9	⅛	„
N. Lyra	(× 234)	back ground	1"	„
C. Asteromphalus	(× 2000)	N.A.	⅛"	

E. M. Nelson.

A. Lindheimerii		N.A. 1·38	⅛ Spencer
P. Angulatum	(× 600)	„ 1·4	⅛ Apo
A. Pellucida		„ 1·6	
P. Angulatum		„ 1·6	
„		„ 1·6	
S. Gemma		„ 1·6	
A. Lindheimerii		„ 1·6	
A. Pellucida		„ 1·6	

Van Heruck.

A. Pellucida	(× 750)	N.A. 1·4	⅛ Apo	Pringle.
P. Angulatum	(× 2000)	„ 1.	⅛ „	

Collection of bacteria, including actinomyces, cholera, typhoid, anthrax, &c.

APPARATUS.

(1.) Designed for the Royal Veterinary College. Made by Swift.
(2.) Baker's apparatus.

Mr. Friese Greene followed with the following paper, entitled *Suggestions*, of which, however, he read only the opening sentences, and introduced his camera for taking a series of photographs in rapid succession. Negatives taken by its agency were shown in the form of a long ribbon of celluloid, or something very like it, impressed with quite a large number of negatives. The apparatus or lantern by which these were to have been thrown upon the screen having suffered some derangement in course of its transit to Chester, the audience were deprived of the opportunity of witnessing the full effects intended to be produced.

SUGGESTIONS.

By FRIESE GREENE, F.R.MET.S.

I HAVE taken the title of *Suggestions* for my paper to-night, as I am anxious to begin by suggesting that the motto of this Convention might be "Co-operation and Suggestions," our purpose being the advancement of photography by co-operation in working out the ideas and following the lines of direction suggested by members of the Convention at these meetings. From what I have said you will not unreasonably conceive that I have something to further suggest. Now do you not think there is much to be discovered in photography? I do; there appears to me a large field open which requires careful investigation, quiet thought, and practical working out, and if the results are often failures, bear in mind they must be, but something may still be achieved by perseverance and unflagging energy. Remember always it is better to "wear out than rust out," keeping ever in mind the attainment of the end sought. You will often find things give different results from those anticipated, and fresh ideas arise which may turn you from the original path; if you follow the new path, do not forget to return and carry out the first idea. Simplicity shows the greatest power, for complication is poverty of knowledge. I am about to show you a complicated piece of mechanism which will fully exemplify what I have said about poverty of knowledge, but it has suggested, and may still more suggest, a new field for more poverty of knowledge. The next thing I'll show you is this camera, to prove how one thing grows out of another, or is suggested by another. This camera would never have been thought of but for the lantern, a necessity having arisen for taking rapidly moving objects from one point of view. This can be done with this camera, which has been constructed for taking these pictures, and which, by merely turning a handle, will make a series of negatives on a band of sensitive material at the rate of 600 a minute. There would be no difficulty in doubling or trebling that number, but at present there is no occasion to take pictures at shorter intervals than one-fifth of a second, which corresponds most nearly to our persistence of vision. The sensation of sight is not limited to the duration of the mechanical action of the eye; it is known we do not see a sudden flash, an electric spark for instance, until a measurable, though very short period has elapsed; this depends on the rate at which our excitation is propagated along the optic nerve. Hence, instantaneous photographs sometimes give pictures such as the eye cannot see in nature; for instance, waves breaking on a beach when photographed too rapidly appear to us different from the waves we see, because we obtain an impression which is made up of different views rapidly presented in successive minute intervals of time, whereas the photograph gives only that which takes place during one of these intervals. Now, I have made a digression, and been following a path which presented itself in a most attractive form, but I must go back to my first and show you the camera with the results, some long bands and some short ones, and if you examine them carefully you will find them very interesting, even a short one with six negatives upon it, No. 4, where three gentlemen are walking towards the camera. They are all keeping step in the first one—three feet are turned up; in the second the hind legs are up; in the third you will notice how much faster they are walking than the people behind them, and so on. To prove to you how deceiving moving objects are to the eye, look at this star as I rotate it. What do you see? Sometimes it appears to be moving in one direction, sometimes in another, and yet I am turning it always the same way.

The familiar experiment of whirling a burning stick in a dark room shows that the sensation of sight lasts for a short period after the mechanical action which produced it has ceased. This period is probably different for different eyes, and for different amounts of excitation even in the same eyes. I hope to prove, at some future date, by the pictures taken with the machine camera, that some people see them perfectly on the screen when they are produced at the rate of three a second, that others see them perfectly at four, five, and six a second; of course, the size of the picture upon the screen, and the amount of light which the lantern can give, has something to do with it, too. If the light be very intense the effect lasts much longer, so that you can run them through slowly. For the present purpose it may be assumed that a speed of from three to seven per second will be enough to show lifelike effects to any audience, or to represent nature in motion as we see it. The duration of visionary impression varies with the powers or structure of the eye in different individuals, just as the time necessary for the recovery of the tone of the retina varies in passing from brightness to darkness; it can be measured by seconds, indeed, much more exactly than it can be by causing a red-hot stick to revolve rapidly, as mentioned before, so as to appear a circle.

Now, I do not think I ought to leave off without giving a few suggestions for oceans of experimenting. Can we not find a new sensitive salt cheaper than silver? Again, of what is celluloid capable in connexion with photography, not only for negatives, but block printing, too? I hope shortly to show before one of the photographic societies an automatic printing machine, when you can have a paper printed so many a minute, photographing all results from the celluloid blocks, as well as a dark, rapid, sensitive emulsion, by which halation can be avoided. Now, to wind up, as a final conclusion, kindly give me your opinion of the two

glasses which I pass round. I may say one is a safe one to develop by, and the other is not, and you must all know how necessary it is for us to test our ruby glass now that such rapid plates are used. I will therefore prove to you, by the aid of my spectroscope, how necessary it is this should be tested, as good work depends so much upon it. I may mention that two thicknesses of bad glass would make a good one, thus giving an instance of two bads making a good.

This closed the technical proceedings of the Convention.

On Friday, several members visited Birkenhead and Liverpool, and quite a number went to Hawarden (pronounced *Harden*) Castle, the residence of the Right Hon. W. E. Gladstone, M.P., which is in the neighbourhood of Chester.

In the evening the Annual Dinner, which took place in the Grosvenor Hotel, was the great feature. By this time, however, about a hundred members had left for their respective homes, and there did not appear to be over threescore present. But it was very enjoyable all the same. The President was in the chair, and the *menu* was good. There were, of course, the usual toasts. "The Convention" was responded to by Mr. J. J. Briginshaw, Hon. Sec., Mr. G. Watmough Webster, the Chairman, and Mr. F. Evans, the Hon. Sec. of the Local Committee. "Chester, its Mayor and its Institutions," was coupled with the name of Mr. W. P. J. Fawcus, a member of the Local Committee. "The Photographic Press" was responded to by Messrs. J. Traill Taylor, W. H. Harrison, and H. Sturmey. "Photographic Societies" was fittingly responded to by Mr. B. J. Sayce, while Mr. C. H. Bothamley could do no less in response to the toast of "The President." Many humorous speeches were made, songs sung, and recitations delivered by Messrs. A. Pringle, George Mason, A. Cowan, A. Werner, and quite a number of others whose names we omitted jotting down at the moment. *Auld Lang Syne*, with which these Convention dinners invariably terminate, was sung with all the honours and hand-shaking accompaniments a few minutes before the midnight hour. A local band played during dinner, but after that Mr. F. A. Bridge, who is a very skilful musician, presided at the piano.

A business meeting had been held on Wednesday, at which certain alterations of the law, felt to be desirable, were unanimously effected. This had reference mainly to having a better provincial representation on the Council, and at the meeting of the General Committee on Saturday proper effect was given to this alteration of the law by the election of a council in which (1) provincial representation is in excess of that of London. The following officers and Council were elected :—

President: William Bedford.

Hon. Secretary and Treasurer: J. J. Briginshaw, 128 Southwark-street, London.

Auditors: E. Clifton, and T. Charteris White.

Council (London members): A. Cowan, H. M. Hastings, A. Haddon, A. Pringle, Friese Greene, J. Traill Taylor, F. P. Cembrano, F. A. Bridge, G. Davison, C. Phipps Lucas, C. H. Benham, W. H. Walker, A. Levy, A. Mackie, J. B. B. Wellington, R. P. Drage. (Provincial members): O. Berry, Wrexham; A. A. Carnell, Plymouth; J. Martin Harding, Shrewsbury; W. J. Harrison, Birmingham; R. Keene, Derby; W. Lang, jun., Glasgow; Paul Lange, Liverpool; Major J. Lysaght, Cork; E. Marlow, Birmingham; George Mason, Glasgow; T. S. Mayne, Liverpool; W. W. Naunton, Shrewsbury; J. B. Payne, Newcastle-on-Tyne; J. Porritt, Leicester; B. J. Sayce, Liverpool: A. Seaman, Chesterfield; J. M. B. Smith, York; John Stuart, Glasgow; H. Sturmey, Coventry; A. Tate, Belfast; W. Taylor, Leicester; J. M. Turnbull, Edinburgh; G. Watmough Webster, Chester; and A. Werner, Dublin.

A vote of thanks to the Mayor and Corporation of Chester for the use of the Town Hall was ordered to be formally embodied in a letter to be presented through Mr. G. Watmough Webster, and thus ended the Convention of 1890.

Our notes and jottings respecting this highly successful meeting must be held over till next week.

THE ART OF RETOUCHING.

Chapter XII.—A Lady's Head and Figure: their Treatment.

I hope I have been successful in my endeavours in the last chapter to place satisfactorily before the student the necessary instructions for the artistic treatment of a man's head. It is naturally very difficult to depict in words a head with all its many natural, yet sometimes strange, peculiarities and imperfections, and then proceed to remedy them and make a harmonious and pleasing portrait by means of retouching. In the head I have just treated, vigour and broadness predominated, and, of course, these qualities must be fully retained, and not in the least be diminished by the work we place upon the negative. We may *soften* generally, but when our work will have been completed, the *balance* of light and shade should be unaltered. Of course, this only holds good in cases where the subjects are more or less correctly and artistically lighted. If, on the other hand, there be a false balance in the lighting, we should do whatever lay in our power to get back to nature and its truthful representation. In our treatment of men's heads, therefore, always let our work be characterised by plenty of vigour and broadness. *Softness* need not mean a lack of these qualities, but rather a correct balancing of them.

In the case of *ladies' portraits* we may, without indulging in any very serious wrong-doing, exercise a greater amount of freedom and license; in other words, we can without danger impart to ladies' and children's portraits a certain degree of softness which in the opposite sex would be simply absurd. Under these circumstances, as there is such a marked difference in many of the details of the treatment necessary to make a lady's portrait successful, I will endeavour in this chapter to give the student such instruction as will enable him to successfully undertake and carry out the same.

In this case I have selected a panel portrait of a lady in evening dress, as it affords most opportunity for showing the retoucher's skill, and, at the same time, exercising to the full his general knowledge and judgment while carrying out the necessary work which will secure artistic finish for our work. In portraits of this class, too, every point must be attended to, as they are generally rather expensive, and are expected to be really carefully finished, and in every respect a first-class portrait and photograph.

The lady under treatment is posed for a three-quarter view of the face, and is about twenty-five to thirty years of age, with a handsome as well as pleasant expression. Of course, being in evening dress, her neck and shoulders are exposed, also her arms; and all these various points will be found more or less to require the retoucher's help to render them thoroughly acceptable and satisfactory. By this may be understood that we have to produce a pleasant and attractive picture in order to secure the unqualified approval of the original. As in the case of the gentleman's head, I will first lay down the faults and various points demanding treatment, we can then more easily proceed to work out the changes and modifications necessary to secure an artistic as well as a successful and pleasing portrait.

The hair is very full and bushy, stretching over the brows, but not lying closely upon the forehead. There is, therefore, a goodly amount of shade on the forehead, owing to the hair intercepting the light, and so very naturally producing a shadow. There is a delicate marking between the eyebrows—not at all a frown, but simply a slight shadow caused by a tendency to fatness over the eye, and which, through a slight over-balance in the lighting, is more or less exaggerated. It is not exactly objectionable, but it may with advantage be removed, as it would not be at all observable in nature under the ordinary conditions of life. The markings under the eyes, too, are unduly strong; more especially the lower ones, which define the shape of the socket of the eye, and run down into the cheeks. The furrow running downwards from the side of the nose is a little heavy, and somewhat inclined to be *straight*. There is also a line or wrinkle which leads the eye from it down to the shadow, which is also rather forcibly marked, falling from the near corner of the mouth. The mouth itself requires but little, a slight touch of light on the lower lip being sufficient to bring it to a balance with the rest of the face when retouched. The chin has a slight shadow in the centre, but *not* a dimple.

The line of the jaw is delicate, and does not require our help, but there is a rather strong shadow on the neck, just under the chin, which must not escape our attention. The neck is round and graceful; still, where it joins the chest, there are three almost upright shadows in the middle, and two others running horizontally, one at each side. This effect may very often be found *prominently marked* in a photograph, although not *absolutely remarkable* in life. Ofttimes the least turn of the head may produce these markings, simply the result of the light striking the muscles of the neck which are brought into prominence by the least strain in turning the head.

The bodice of the dress is rather *low*, but the bust is somewhat covered by lace coming over the shoulders and brought down in front to the waist in the shape of the letter V. The lace is without high lights, and is completely wanting in relief. The bodice, too, has a number of creases, which are objectionable and calculated to depreciate the natural beauty of the figure, which, in this case, is really good. The arms are well posed and lighted, and present but slight opportunity for our skill until we get to the wrists. True, there is a little shadow too strongly marked at the elbow, but two or three touches of the pencil will so soften it as to render it all right. At the wrist, however, we will find a demand for our assistance. The wrist-bone is rather prominent, and throws a very harsh shadow, which is indeed most objectionable. The back of the hand, too, is badly seamed, caused by the direction in which the light strikes it, and thereby exaggerating the natural indications of the veins and tendons. The knuckles and joints of the fingers are also too deeply marked, and would impart, if left untouched, quite a coarse appearance to the entire hand. The skin generally is marked with freckles, but not very badly.

The dress and train are of white satin with elaborate lace trimmings, all of which, in this case, come rather spiritless in the negative. There is a want, generally, of that relief and brightness which are natural to such materials. The ornaments are pearls, also suffering for want of effective lights. I hope the reader will be able to realise from these remarks and picture to himself such a head as I have before me, and which we will now try to retouch.

Beginning as before with the forehead, our first endeavour must be to touch out the freckles, and generally clean off such other imperfections as may be found upon it. As the hair is dark, great care must be taken in order to avoid making a hard line between it and the skin of the forehead. Naturally, the way to do this is to preserve as much half tone as we can. In this study we should start from the high light, which is strongest just above the eyebrow, and working from this point, keeping more and more of the half tone on the forehead as we approach the roots of the hair. There is really no *difficulty* whatever about this; it does not demand any very special manipulation, but it *must* be borne in mind. The marking between the eyebrows must next come away, and little or no trace of it need be left behind. The removal of same will not, in this case, at all weaken the portrait, as it does not truly indicate any essential formation of the skull. The eyes, being somewhat heavy, may have a little brightness imparted to them, but great care must be taken not to overdo it. The least touch, to relieve the pupil and distinguish the iris from it, will be quite sufficient.

We will take the markings under the eyes before we touch the nose. The shadow coming immediately under the lower eyelid will be found to require clearing. This must be carried out with care, and not too far. Sufficient must be retained to preserve the natural expression of the eye, and which will also add considerably towards its brilliancy. The second marking is rather a heavy shadow, and which may be said to indicate the shape of the socket. In the subject before us this is very strongly marked indeed. Let us ask ourselves, "Is it natural?" On thinking the matter over we will find a certain amount for and against. One thing which is very certain, it is *objectionable*; being so, we will decide, if possible, in favour of its *almost* total removal. It *may* be a natural hollow, and therefore one may consider that it should be preserved. But even if so, it must be considerably modified, for we well know it has been very greatly accentuated by the top light increasing its intensity as a shadow. Again, it may be the result of fatigue or even temporary ill-health, and under these conditions should certainly not be allowed to remain. In such cases, a safe course will be to leave it as a *very* delicate half tone, not strong enough to catch the eye too readily, but still be sufficiently observable to be useful in preserving the modelling of the cheek.

The cheek itself requires but little work, simply the few freckles worked away and the skin left clean and even, but, of course, *not puffy*. The nose in this study requires but scant attention. Of course, the freckles and other imperfections must be removed, but that done (which is easy enough), and the light upon the nose adjusted according to former instructions, we can pass to the shadow or furrow running from the wing of the nostril downwards. On the shadow side of the face this is invisible, but on the near or light side it is very strongly marked in comparison. It also, as I before stated, runs rather straight. As the expression of a face can always be improved by raising the muscles, or the shadows caused by them, we can, in this case, prove the beneficial effect of such a treatment by working the lower portion of this shadow so as to give it an outward tendency, and so raise the muscle itself.

There is a line or wrinkle which leads the eye of the observer from this shadow to the one falling from the corner of the mouth, and which may be *totally* taken away; for once having directed the shadow falling from the nose in an outward direction, it would be absolutely absurd to leave such a marking as this, or even any trace of its former presence. One must ever be careful to be consistent, and having made the first alteration for the bettering of the expression, the second must follow as a matter of course. The upper lip above the mouth wants simply clearing, and the mouth itself just a touch of light on the lower lip to brighten it, and so prevent it from looking dull by comparison with the surrounding parts which have been retouched. This is very essential to bear in mind when retouching some portraits, such, for example, as the one now under consideration, for without a little relief the mouth would appear like a black patch, anything but natural, being expressionless and hard.

The shadow falling from the corner of the mouth must be treated similarly to that from the side of the nose—given an outward tendency—and in every way kept in complete harmony with the work already done. In working over the chin be very careful not to take away the indication of shadow in the centre. Much of the nature and expression of the lower portion of the face would be lost if this half tone were to be completely obliterated, as well as the fact of a very different shape being given to the chin itself. Although not even an approach to a *dimple*, it is a marking indicating an undoubted and distinct formation. Sometimes, as is the case at present, a ring will be visible round the neck where the collar or high dress may protect the skin from the effects of the weather; this should be softened away. It is not often observable in ladies, although quite common with men. In ladies, when it is apparent, I should think it is owing to an over-sensitive skin. In all cases such a marking must be softened quite away, and when doing so, see that the shadow on the neck under the chin be not left too strong, but softened so as to harmonise with the rest of the neck. In most portraits of ladies the markings in the neck, where it joins the chest, are more or less strongly indicated by unpleasant shadows. These must be softened away to almost nothing; of course, nature must not be falsified, but no offensive indication must be left. There is nothing ladies have a much greater horror of than "chest-bones," and to leave "the salt-cellars" visible would be a positive barbarity on the part of a retoucher. Flattery on this point will never interfere with success, and there is no loss of likeness possible.

In general work I always give place to flesh before drapery or other accessories; therefore, we will do what is necessary to the arms and hands before working upon the draperies, &c. In the portrait before me the arms demand but little, a few touches here and there to clear it. The shadow somewhat too strong at the elbow joint will require reducing, as in its present state it is much too heavy and dirty looking. We can with little trouble (only clearing up) pass down until we come to the hands. At the wrist—the light having caught the bones at the joints—there are some very objectionable shadows, which must be softened so as not to catch the eye. The objectionable markings on the back of the hand, and also those on the fingers, may be taken away. In doing all this, however, try to preserve as much of the half tone as possible; for although the hands will have to be made nice and round, they must not be brought too much into prominence—they must not in the least draw attention. They are always best when they escape attention; hence a skilful operator always tries to keep them in as subdued a light as possible. I think we are now free to attack the drapery.

In the first place, those creases in the bodice must be taken away, as they materially discount the beauty of the bust; and I may here mention (although it is not required in this instance) that should ever the waist be unduly bulky or shapeless, it is well within the retoucher's duties to alter same and make it presentable. In the present picture the dress and lace, with the ornaments thereon, are completely wanting in force, no contrast of light and shade—a kind of monotone pervades the entire picture. This state of affairs we

must alter. The broad effects of light on the dress and train we must put in with a small stump charged with plumbago; thus softness will be secured. After the broad lights are thus treated, the absolutely high lights can be put in with a rather blunt pencil of a softer grade than the one generally used. The pattern of the lace, too, should be helped out; not minutely followed, but the bright masses strengthened. The lights thus judiciously picked out will make a wonderful difference to any picture not originally possessing these qualities. The pearl ornaments, too, must have their high lights touched on; but care must be bestowed lest they be too hard and crude, for such a result would give the picture the appearance of having been what we call "faked up." I think this will suffice to successfully treat any ordinary negative of a lady, and will form a very useful study of a companion picture to the one of last chapter.

REDMOND BARRETT.

REVERSED NEGATIVES ON GELATINE PLATES.

IN a recent number I described some experiments in making a negative from a negative. The positive being developed, the plate was well washed, subjected to the action of a solution of tannin, and again washed, when the metallic positive was dissolved away with nitric acid, and after the film of unaltered salt remaining was exposed and redeveloped, the reversed result appeared. As not alone for the reproduction and duplication of negatives, but also for their enlargement, would a perfected one-operation method be of service, perhaps a few particulars of an alternative plan with which I have also been experimenting will prove acceptable.

Although to those who have the slightest acquaintance with the chemistry of photography the plan about to be mentioned may appear as obvious as it is simple, I do not think—or, at least, I fail to remember—that it has ever been publicly described. At the same time, I lack the temerity to feel any pride in its originality, which is a dangerous claim to make nowadays.

The second plan of reversing a negative at one operation differs from the first to a great extent, as it dispenses with the employment of either tannin or nitric acid, it being unnecessary to impart to the film any added power of resistance to strong acids. Used in the strength of dilution with its own bulk of water, or even weaker, nitric acid, as well as some of the other strong acids, is not the most desirable adjunct in laboratory practice, especially where, as is most frequently the case, a haphazard system of procedure prevails.

The *rationale* of the plan under notice is as follows:—Suppose a developed positive upon an unfixed film of silver bromide, after the plate has been washed entirely free of the developing solution, be converted into haloid salt, the particular solvent of which has not the same action on the unaltered bromide, then, when the converted image has been entirely removed, the film of bromide may be exposed and redeveloped, and the reversed picture will appear. The positive, therefore, may be chlorised—or converted into chloride of silver—and removed by ammonia liquor ·880 in which silver bromide is only very feebly soluble.

The relative difference between this and the nitric acid method can at once be seen; as in the latter case, besides development and redevelopment, two other operations are necessary, but no prolonged soaking, as with the tannin, is required, so that the time occupied is considerably shortened.

If a soluble bromide be treated with chlorine water, bromine is set free; but I do not think that in the case of partly developed silver bromide films, when subjected to the action of a chlorising solution, there is much fear of the slight displacement which might occur appreciably interfering with our proceedings. At the best it is doubtful whether in the case supposed such a reaction really takes place, and all consideration on the point may therefore be safely dismissed. Assuming that we are about to reverse a negative, and have thoroughly washed the developed positive, there are several ways in which the picture may be converted: firstly, by application of chlorine water; secondly, by cupric chloride; thirdly, by employing a mixture of bichromate of potash and hydrochloric acid. Chlorine water is rarely found in a photographer's developing room, although it is cheap enough, while to the use of the copper compound there are objections which to my mind are perfectly fatal.

In the autumn of last year I contributed a few notes on a possible method of adding to the density of a negative by bleaching it with cupric chloride and then redeveloping. As an illustration of the recurrence of ideas, it may be interesting to note that Mr. W. B. Bolton had gone over the same ground fourteen years before me, but it is only recently that I came across an extract from his writings containing a description of this method of intensifying negatives, which was shortly afterwards said by the editors to be "a great favourite with many photographers, who had discontinued all other methods of intensification." Perhaps Mr. Bolton will pardon the unconscious plagiarism.

Now, although when a negative is bleached with cupric chloride and thoroughly washed I believe it is theoretically wrong to suppose that cuprous chloride remains in the film, yet it is probable that considerable traces of it are left behind. It was only upon that supposition when recently redeveloping some reversed negatives, to secure which I had used the copper method of converting the positive, that I could account for the muddy appearance of the completed negatives—an appearance entirely at variance with that obtained by methods subsequently employed; for that reason I was led to reject the copper compound as the chlorising solution. Even when conducted with the most scrupulous attention to details, I have found the reversal of a negative by the redevelopment method so delicately difficult to work with even fair success, that the use of any reagents which are likely to cause the deposition of foreign substances in the film seems to me specially to be avoided.

I much prefer to convert the positive with the bichromate-hydrochloric solution already noticed. It was Mr. Carey Lea who, in 1865, first discovered how to convert the metallic image of a collodion picture into silver chloride. The formula he then gave still survives in its original shape. Take three fluid drachms of a saturated solution of bichromate of potash and one drachm of hydrochloric acid in six ounces of water. A solution so composed, or in larger equivalent proportions, keeps well. Its action upon the picture is energetic and rapid—far more so than cupric chloride. About five minutes should suffice to effect the conversion; although, as it cannot be seen when the change has thoroughly taken place—the plate looking as if the film had never been altered—it might be given a minute or two longer.

After thoroughly well washing the film to remove the chlorising solution, I employ the solvent of the chloride, ammonia ·880, diluted with its own volume of water. This may appear very strong, but I have never experienced any ill-effects from it; the only danger lies in the possible instability of the gelatine under so strong an alkali, but no more solution than is just sufficient to cover the plate need be taken. It is impossible to tell by mere ocular inspection when the solvent of the chloride has done its work, but it may easily be put to the test. After removing the surface ammonia, reapply the original developing solution, and if, as will most likely occur, the positive image, considerably weakened of course, reappears, it will be necessary to repeat the process of reconversion and dissolution. Indeed, it will generally be found that it is next to impossible to entirely remove a positive image without a repetition of these two operations.

The advantages and disadvantages of the two methods I have detailed seem to me to be about evenly balanced. The use of tannin undoubtedly carries with it some risk of staining the gelatine film, which is already submitted to the colorific vagaries of the developer, and it is hard to say whether such a compound stain as here seems possible could be quite satisfactorily removed. I have not been troubled much in this direction myself; nevertheless, the danger is present more or less.

To get rid of the positive, an intelligent use of the nitric acid seems to be superior to dissolving it off as haloid with ammonia, as it is possible that by prolonged and repeated application of the acid to obviate the recurrence of the impression under the developer. I am doubtful whether a negative may in its absolute entirety be converted into chloride, and consequently be removed by the solvent at one operation, inasmuch as the chlorising solution attacks the deposit in layers, and may therefore fail to reach a thin ultimate substratum; but on the face of it there is no reason to suppose that the solvent of silver should not remove the image in successive layers, and so work right through to its total removal. The reappearance of the positive under development, when to all outward seeming it has been destroyed, can only, to my mind, be intelligibly traced to the insufficient time allowed to the nitric acid, or to the incomplete conversion of the deposit into chloride.

If the difficulties attending the persistence of the developed positive were overcome, the simplicity and ease of either of the two plans I have sketched would, I believe, after a little practical experiment, provide a good method of taking reversed negatives upon gelatine plates at one operation. For enlarging negatives it would possibly be found just as valuable.

THOMAS BEDDING.

THE SALTING AND EXCITING OF DRAWING AND OTHER COMMERCIAL PAPERS.*

WE now arrive at our third and last stage—namely, the exciting of the paper. The salt we generally use for this purpose is the nitrate of silver. The salt is very soluble in water, and we can therefore prepare solutions

* Continued from page 378.

of almost any strength. As with our salting bath, the question arises, What amount are we to use to get the best results? Experiment will best answer this for us. It would appear at first sight that the strength of the silver bath would have no effect, because only as much chloride of silver will be formed as there is chloride in the print, but when we reduce the strength to below thirty grains per ounce, we shall find that the prints take longer to darken, and never attain anything like the same blackness that the stronger baths give. The cause of this is explained in the following manner:—If we pour some solution on to a piece of salted paper, some of it will be absorbed by the paper, some converted into chloride, and some, the excess, remain liquid on the surface; but there is a limit to the quantity that will remain on the paper, and any beyond this will drop off when the paper is hung up. Now, if the liquid that remains on the surface is poor in silver, when it dries out but little free nitrate of silver will remain; if, on the contrary, this liquid be rich in silver, some considerable portion will be left, and we see, therefore, the necessity of using a strong bath, for we have established the fact that we must have nitrate in excess; and experiment further shows that, within limits, the darkening of the print varies as the quantity of free nitrate present. Although there is no special attribute in the exact figures, yet a strength of somewhere about sixty grains to the ounce will be found a good all-round exciting bath.

Such a bath will, of course, be prepared by simply dissolving the amount of silver in the purest water obtainable. Pure water is not absolutely necessary, but it is advisable, as any impurities in it will destroy so much silver. The nitrate of silver bath itself needs no protection from light; indeed, in some cases it is advisable to expose it to the brightest sunshine. I must refer my readers to the numerous handbooks for the best methods of preserving or rectifying a disordered silver bath. For my own part, I do not consider a bath to be a necessity—at least, not for an amateur, who only prepares at most small quantities of paper. I myself make up my silver solution as I require it, and do not float the prints on a bath in the usual way, but brush the silver over the face of the paper with a special kind of brush. And I should advise amateurs to avoid the large initial cost of an exciting bath, and the somewhat troublesome manipulations it requires, and follow the plan I have myself found perfectly efficacious.

The operations of sizing and salting the papers, it is needless to say, will have been carried out in any ordinary room, as the action of light does not affect the papers in the least, nor does time, so that any quantity of paper can be prepared and stocked. But the operation of sensitising or exciting can only be carried on in a suitable *locale*, perhaps nothing is better than a room lighted by a good paraffin lamp or gas light, but at the same time a certain amount even of daylight, during the operation of coating the paper will do no harm, although during the drying of the paper this should be excluded. To give an idea of the amount of light the paper will stand, I may say, then, that any ordinary room with the blinds down will do no harm. My own practice is to coat my paper as I require it in the dark room, and dry it there over a paraffin stove in one corner where the white daylight does not fall directly, and I have never experienced any loss from light-struck paper. Under these conditions I find that, in ordinary weather, it is perfectly practicable to sensitise and dry the paper and have it in the printing frame within fifteen minutes.

The operation of coating is of the simplest: say we are using a sheet of paper 18½ × 10 (the eighth part of a sheet of double elephant); lay it face downwards on a board, and place a sheet of glass 12 × 10 over it, and double over the two overlapping ends. The sheet of glass and paper is then turned over and laid on the board, the ends tucked in under the glass, keeping the paper from shifting. I then pour about two drachms of the silver solution on to one end of the paper, and with this modified Blanchard brush, spread it rapidly and evenly over the surface of the paper. Care must, of course, be taken to see that every part of the paper is covered with nitrate, moreover we must not forget to leave an excess of it. When we look on the coated paper by reflected light, the whole surface ought to glisten with an excess of the liquid, and I like to see, when the paper is hung up to dry, a few drops trickle off. I know of no failure more likely to happen than that of an insufficiency of nitrate having been applied. With the strong salting baths I recommend, there will be found a tendency for the nitrate to be all converted into chloride, in some places at least, though it may still be in excess in others; and the print, on exposure, will show patches of great intensity, surrounded by regions where the image is of a pale bluish colour. The examples I hand round show this fault, which generally arises from a desire, by lessening the quantity brushed on, to economise silver.

I do not, however, recommend twice sensitising the paper, although no less an authority than Mr. Burton has done so in a very recent paper of his on sensitising rough drawing papers. I think, however, that I can point out the reason of the discrepancy between us. Burton recommends the soaking of the prints in the sizing solution. If this be done, then I freely admit that double exciting will be necessary, or it will be impossible to apply enough nitrate to compensate for the very large quantity of chloride and organic size that will be in the very texture of the paper.

I cannot, however, agree with Burton in recommending the soaking of the paper; the operation is perhaps easier and quicker, but I feel sure that the majority of the silver formed is simply wasted—never even being affected by the light—and, therefore, on the score of economy of time and money alone, I prefer my system of floating heavy drawing papers; and I am sure the many examples I hand round produced in that way will show that a success can be obtained, even with a single application of the sensitiser.

The brush I employ for applying the solution is, in reality, a Blanchard brush that I have slightly modified to suit my tastes. I found the ordinary form hardly rigid enough, and therefore I now strengthen the swansdown calico by a sheet of celluloid. The celluloid is laid down on the swansdown, and the two together doubled without making a crease, and the two ends nipped between two pieces of wood or glass, sprung together by an indiarubber band. The swansdown gives it softness, the celluloid springiness, and the wood forms a handle. An illustration of this brush will be found in a little work of mine, just published at the office of the *Amateur Photographer*, called *Platinum Toning*, where very full directions for the preparation of silver paper are given.

Now paper sensitised with nitrate of silver differs largely from simply salted paper; the latter will keep indefinitely, but the former, when in its most sensitive condition, if left lying about or exposed to the atmosphere, will hardly keep in summer time to the following day, and not much longer in winter. If packed between sheets of blotting paper saturated with soda carbonate it will keep a week or two, especially if kept under pressure, but at a slight loss of sensitiveness. It is undoubtedly the free nitrate of silver that is the cause of this destruction or discolouration of the paper; this is easily proved by the fact that if we wash sensitised paper, and so free it from the nitrate, it will keep very well, but unfortunately it will then have lost all its printing power, and it will only be by resorting to ammonia fuming that we can obtain a vigorous image. But it is possible to convert the free nitrate into other salts which will have the power of keeping perfectly well; for instance, the citrate of silver. This organic salt of silver also replaces the nitrate very well as a printing salt, and paper prepared with it is fairly rapid, tending to give images of a very red colour, characteristic of the organic salts. It is highly probable that the commercial brands of paper are preserved somewhat in this way, the back of the paper being floated on a bath of citric acid and the same plan may be used; but if moderate powers of keeping only are required, the citric acid can be added at once to the silver nitrate, in the following proportions, thus saving the extra manipulation:—

Nitrate of silver	60 grains.
Citric acid (crystals)	25 ,,
Water (distilled)	1 ounce.

This bath keeps perfectly, but should not be exposed to daylight, as the organic silver salts are affected by light.

The mode of application is exactly the same as for the ordinary nitrate bath; that is to say, it is brushed on. With some brands of paper, however, it will be found to be too acid, and when applied to the paper will sink into the texture, giving the paper a semi-translucent aspect. In such a case the quantity of citric acid may be lessened until the effect ceases to be apparent; with papers sized with gelatine this is less likely to happen than if they be sized with arrowroot.

Paper thus prepared is very suitable for summer work, but in late autumn, when the light begins to get feeble, I usually revert to another form of sensitising bath, which is more easily affected by feeble light. This is the ammonio-nitrate bath, full directions for preparing which will be found in my last paper on *Platinum Toning* (*Camera Club Journal*) November, 1889), and it is a bath I can strongly recommend where vigorous results are sought for.

When the light is so feeble that all ordinary printing-out methods fail, we may then resort to a development process, samples of which I hand round. Paper salted in the ordinary way may be used for this process, and we shall be able to obtain prints, even on the dullest day, with about ten minutes' exposure.

The sensitising bath is composed as follows:—

Nitrate of silver	30 grains.
Glacial acetic acid	30 minims.
Distilled water up to	1 ounce.

This bath is also applied by brushing, and when dry the paper is ex-

posed until the faint details of the image are seen; the appearance of the print should, in fact, resemble a properly printed platinotype—all detail and no intensity. The print is developed on a saturated solution of gallic acid, to which, if over-exposure be feared, a few drops of glacial acetic acid may be added. The prints behave very much as bromide papers do—if they are under-exposed they come up hard and chalky, if over, flat and grey; but when correctly timed, they are, after fixing, of a very agreeable dark slate colour, and require no toning. If it be wished they can, however, be toned, my acid platinum process being the most suitable that I have found for the purpose.

Although the above process is of the highest utility in winter time, I cannot too much recommend it, at least not for prints on rough drawing paper. The rugosities of the paper appear to have a mechanical action on the silver, which tends to be reduced more rapidly on these spots, and cases great granularity and unevenness. With the *not* and *H. P.* varieties of drawing papers it does exceedingly well, and gives some very beautiful results.

I have also experimented with a printing-out process, on the same lines, but in which the protosulphate of iron is the developing agent. I show one example of this; its developing action is very energetic, and as yet I can hardly claim to have it under control, but I should think an extremely rapid process might be worked on these lines.

LYONEL CLARK.

(To be concluded.)

NOTES FROM NEWCASTLE.

THE electric light is making headway here, to the great detriment of the gas companies. The only Newcastle photographer to avail himself of it at present is Mr. J. Bacon. I believe Messrs. P. M. Laws & Son still use occasionally their gas apparatus in the dark days; and Mr. Dickinson, of Grainger-street, makes use now and then of a flash-light arrangement.

The showcases show some signs of refurbishing, not before time in many cases. Mr. Lyd Sawyer's place is always spick and span, and the appearance of his premises is much improved by flowers and plants at the windows. Mr. Sawyer is a believer also in fresh paint, and of artistic colour too, thus comparing very favourably with some "artists'" extraordinary vagaries in this direction. The specimens here are very good indeed. Mr. Bacon has also some very fine specimens of enlargement and studies, some on porcelain being particularly noticeable. Mr. Bacon also shows an interior (drawing-room), which is much less successful than it would have been had the adjustments of camera and lens been made according to recommendations and counsels given in these pages some few weeks since.

Messrs. Auty & Ruddock have all departments full of work, and are continually making improvements and extensions.

Many of the readers of this JOURNAL will be surprised to hear that a simple method of working up portrait prints in black and white is still practised in some quarters. All you have to do is to take the brush and carefully put a line all round the *edge* of the figure, up and down the trousers, coat sleeves, and collar, and so on; this has the effect of presenting the figure in bold relief, and is very easy to do. Any amateur desirous of trying this artistic process may see specimens any day within twenty miles of the Monument.

The local Association, after an interval of three months or so, held a meeting on the 17th to discuss hand cameras, and to arrange outdoor meetings. The hot weather did not prevent a really good muster, which seems to me to point out that indoor meetings might be more successful than outdoor. These latter have invariably been sparsely attended. If outdoor meetings are continued, I should advise the Committee to take the "bull by the horns," and arrange them for *Sundays*, when nearly all the members could attend, and very likely *would* do so. The table was covered with a variety of ingenious apparatus which some people call "Detective." Considering the number of cameras present, the specimens of photography taken with them were conspicuous by their absence.

Mr. Hedley Robinson, however, had some slides of very good quality, and his favourite hand camera for plates $3\frac{1}{4} \times 3\frac{1}{4}$ evidently found favour, the only faults being the necessity for using "dark slides." Many of the members expressed their appreciation of the new Kodak and films, and if there are any of these instruments *to be given* away, the local Society will, I dare say, undertake the distribution.

Mr. Lyd Sawyer brought up the subject of the Photographers', or rather the "Exhibitors' League," and explained the objects desired. Several well-known local exhibitors signed their names. I noticed among the names appended those of two or three gentlemen who have acted as judges, and whose *dictum* has been, judging by correspondence in the journals, far from satisfactory. There are evidently men who cry out when *their own* pictures do not get favourably judged, but who are not so particular when called on to judge other people's. That is a "horse of another colour."

I had a chat with Mr. Gray one day last week, of Gray's plate celebrity. Mr. Gray was one of the first makers of gelatino-bromide plates, and is a great experimentalist. He showed me some specimens of a new paper for positive prints, the chemical used being neither gold, silver, nor platinum; the colours were very fine, and some specimens on opal I took to be carbon, but this is not the process. Mr. Gray gets at will, a fine engraving black, and warmer tones to sepia, also purples and reds. The proofs appear to be absolutely permanent.

Writing of Sunday *Photography*, I happened to be at the Cathedral service one Sunday evening a few weeks back when the preacher, Canon Lloyd, commenced to speak about *cycling* on Sundays. I began to feel rather guilty, as I had ridden about forty miles that day myself; however, the Canon said he saw no harm in it, provided one did not miss the Church services. I thought this rather comforting, and I dare say the same remarks would apply to photography. Now, there are dozens of places round Newcastle where meetings could be arranged, and the above conditions, for those who wish, carried out.

The Y. M. C. A. Club has already had two or three outdoor meetings—Belsay, Holywell Dene, and Finchale Abbey being amongst the places visited.

At the meeting of the local Society, over twenty new members were elected.

D. D.

Foreign Notes and News.

THE death of another of the older members of the Berlin Photographic Society, Herr Martin Dienstbach, took place at his residence in Berlin on the 12th of the present month. The deceased gentleman, who was in his fifty-second year, was carried off by the after consequences of an operation which was performed upon him for disease of the heart. The *Photographische Nachrichten*, from which we gather this notice, states that Herr Dienstbach was a specially able portrait photographer, and a specialist in collotype.

"MAY the earth rest light upon him," the words with which our contemporary ends its obituary notice, though not altogether unusual in Germany, are scarcely, one would be inclined to think, suited to the solemnity of the occasion.

WE have often in these columns had occasion to notice the very funny situations which not unfrequently arise from the excessive zeal for propriety of the German police authorities. The recent meeting of the Berlin Society brought to light a very characteristic instance. Herr Franz Kühn, who, as our readers are probably aware, is not only a photographer, but an artist of considerable attainments, has been making copies in oils of some of the pictures, both by old masters and modern painters, in the Berlin and other galleries. He then made autotypes of his copies and exposed them for sale.

SOON, however, the representatives of law and "the propriety," as it is termed in Germany, descended upon him from the peaks of their Olympus in the Wilhelm Strasse and prohibited the sale of the reproductions on the ground of their immorality. What magnificent inconsistency to find the copies immoral and the originals not! But, after all, consistency is not usually the strong point of the extreme supporters of "the propriety."

HERR KÜHN replied with the very obvious *tu quoque* that the sculpture on the *Schloss-brücke* must be much more immoral. But to what has not officialism an answer ready? Photography, it asserted, has a greater effect than sculpture in exciting sensuality! This is a discovery that might be useful to our own Vigilance Society, but we trust it will be some time before they make it, for when they do photographers are likely to have rather a bad time of it.

PROFESSOR VOGEL has been continuing his experiments on dark-room glass, and has included in his researches the alleged colourless, non-actinic mixture of cobalt and nickel chlorides recommended by Liesegang. We remarked at the time that it was not very apparent to us how a white non-actinic light could be obtained by this means. Dr. Vogel now publishes some spectra curves, from which it is apparent that the mixture cuts off the extreme violet rays only. Albumen paper is mainly sensitive to these very rays, and hence, when exposed behind such a screen, remains white. It is a different matter, however, with bromide plates, whose maximum sensibility is for blue.

SOME remarks were made lately in this column about the much more satisfactory state of the weather in Germany than in this country. These observations were made a little too soon, for it now appears that the projected photographic expedition to the "Giant Mountains" has

had to be postponed for a fortnight, owing to the inclemency of the elements.

The Free Photographic Union of Berlin, therefore, may congratulate itself on the more propitious meteorological conditions which prevail on its spree, and which contributed to render their recent excursion to the island of Pichelswerder so successful. Herr Franz Goerke gives an account of it in the recent number of the *Nachrichten*, possessing considerable literary power, and the description of the varied and lively scene on river and on land forcibly recalls the scene before the gate in *Faust*.

That photography may occasionally be celebrated in verse happens, it would seem, more frequently in Germany than here. A long poem of the comic kind, entitled "He takes Photographs," has recently appeared there by Herr Ernst von Wolzogen. We can only say that we trust that "he takes photographs" better than he makes verses; but the thing is amusing to those who are acquainted with the troubles of the commencing amateur.

The causes conducing to failure when intensifying with sublimate and ammonia form the subject of a communication to the *Photographische Rundschau* by Herr A. Stieglitz. He attributes them to (1) insufficient washing after fixing, which gives rise to the formation of yellow spots which injure the negative; (2) the mercury bath not being acid, an addition of hydrochloric acid dissolves any remaining traces of fixing soda, and for weak negatives a dilute solution of sublimate only should be employed; (3) insufficient washing before treating with ammonia, which causes a precipitation of mercury amide; (4) insufficient washing after treating with ammonia, for if traces of ammonia are left behind they colour the negative in places brown.

The Brothers Detuille, of the *Association Belge*, have discovered that the brown colouration of chloride transparencies, when fixed in an alum fixing bath observed by Dr. Backeland, is due to a sulphurisation of the silver image. They employ the following solution:—

Water	200	c.c.
Alum	10	grammes.
Hyposulphite of soda	15	,,

Five to six hours suffices for the toning, albumen paper behaving similarly to chloride plates. This bath gives a greenish tone, gradually turning into brown and greyish-black. If the toning is continued too long, a less agreeable greenish-black is the result.

L. van Neck recommends the following method of treating double albumenised brilliant paper:—Four grammes of magnesia are added to each litre of the silver bath, which has the effect of preventing brown colouration. The bath is well shaken every time it is used. A bath which has become brown is quickly cleared by warming with magnesia. The silver bath is of the strength of one in ten, or one in twelve; and twelve c.c. of fresh bath are added after each sheet has been toned. The gold bath is composed as follows:—

1. Twice melted acetate of soda	15	grammes.
Crystallised acetate of soda	15	,,
Borax	8	,,
Distilled water	2	litres.
2. Brown chloride of gold	1	gramme.
Water	50	c.c.

An hour before use, solutions 1 and 2 are mixed, shaken, and placed in the sun. The toning is stopped as soon as the prints show a blue tone on examination by transmitted light.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 9715.—"Improvements in Photographic Cameras." Communicated by H. Thresher. A. J. Boult.—*Dated June 23, 1890.*

No. 9819.—"Improvements in Cameras." W. F. Greene.—*Dated June 24, 1890.*

No. 9902.—"Improvements in the Manufacture of Transparent Flexible Films for Photographic and other Purposes." J. W. Swan and J. Leslie.—*Dated June 25, 1890.*

No. 9965.—"The Doubling Shutter for the Production of Two Positions on One Plate of any Size with Fixed Lens." R. Eagen.—*Dated June 26, 1890.*

No. 9999.—"Improvements in Changing Boxes for Photographic Dry Plates, and in Camera Slides to Work with the Same." Complete specification. C. W. Shaffer.—*Dated June 27, 1890.*

No. 10,012.—"Improvement in Vignette Mediums for Photography." G. J. Sedshall.—*Dated June 28, 1890.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 8	Derby	Society's Rooms, Derwent-bidings.
,, 8	Manchester Amateur	Manchester Athenæum.
,, 8	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 9	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 10	Birkenhead	Hamilton Rooms, Birkenhead.
,, 10	Manchester Photo. Society	36, George-street.
,, 10	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

June 26,—Mr. G. W. Atkins in the chair.

The Chairman showed a bottle of a commercial ready-mixed developing solution of French origin, called the Daguerrean developing solution.

Mr. J. S. Teape inquired whether any one had found frilling disappear whilst the plate was in the hypo solution. He had recently had a plate which frilled thoroughly in the alum bath for about five-eightieths of an inch all round, but after rinsing and placing in the hypo for some time the frilling disappeared, and the film lay flat upon the glass. The plate had been developed with pyro and soda.

Mr. T. E. Freshwater mentioned that with some commercial sensitised paper that gave rich results when printed at once, after keeping and before much discolouration had set in he could only succeed in getting very poor prints.

Mr. Teape then mentioned having frequently observed a phosphorescent light proceeding from the plate when placed in the alum bath after pyro development. He had noticed it when the plate was not thoroughly freed from the developing solution by washing before immersion in the alum. He had seen the light flashing around the plate for fifteen or twenty seconds.

Mr. F. W. Fasse had noticed the same effect when he was using a tin dish for the alum solution.

Mr. Teape had seen it when using a wooden dish.

The Chairman had observed a peculiarity about certain plates manufactured for the purpose of making lantern slides. The image appeared to be thin and weak before fixing, but after fixing was very dense. This was very liable to mislead, unless one was prepared for it.

The annual meeting of the Association was opened *pro forma*, but at once adjourned to the following week, as had been previously announced, in consequence of clashing with the Photographic Conference.

HACKNEY PHOTOGRAPHIC SOCIETY.

June 26,—Mr. W. L. Barker presiding.

Mr. Dean showed a negative having traces of fog very apparent, but explained that he poured solution of caustic over it in developer.

The Secretary said that would explain the fogginess.

Mr. J. O. Grant showed some prints taken off negatives in a guinea hand camera by Griffiths, but had found in dark backs light was let in in two out of the three.

A fine platinotype print by Mr. Wesson was shown.

The Secretary handed round some Wormald's masks.

From the question box:—"How can stains by hydroquinone developer on bromide paper be avoided?" Several members complained of this.

The Secretary said he had found by using a few drops of ten per cent. solution of bromide of potassium he overcame it.

Mr. A. Barker had seen cyanide of potassium recommended.

Mr. Crouch then gave his paper on *Lenses*. He described the various forms now in use, and spoke very favourably of single lenses, which many people objected to on account of distortion. He, however, had not found it lately, as used to be the case. The lecturer said lenses were made too rapid, and that *f*-11 was rapid enough for anything. He advocated the use of lenses as follows:—For quarter-plates, lenses of three, six, or eight, and a nine-inch focus; for half-plates, four, eight, and a twelve-inch; 7½ × 5 and whole-plates, five or six, twelve, and a fifteen or eighteen-inch. He objected to portrait lenses.

Mr. W. L. Barker wanted to know why the lens tube of a wide angle was so narrow!

Mr. Crouch said it was being more portable.

Mr. Capell had a lens which was twenty-one inches at front and thirteen at back, and wanted to know whether he must use his lens singly at back or front. The lecturer said always at back.

In answer to the Secretary, Mr. Crouch said he had no doubt that the Iris diaphragm caused very little danger from flare spot. He liked diaphragms in this form as there was no danger of losing them, and you could the more easily use them. Rust on glass was caused by an oxide formed on the surface, and was due to the presence of lead. It should be polished out.

The Chairman then called on Mr. Grant for his paper on *Selection of Apparatus*.

Mr. Grant advised the beginner to get a half-plate camera to start with, as amateurs always got dissatisfied with a quarter-plate on account of its being too small. He, however, recommended a cyclist to get a hand camera, such as Shew's. He disliked the idea of rushing off and buying a second-hand camera, as many were not quite safe to use, not being light-tight. He preferred the back to rack out instead of the front, as there was no danger then of cutting off.

In answer to various questions, Mr. Grant said that with Kinnear bellows it must be quite closed, so as not to cut off. He thought that between the lenses was the best place for the shutter.

The Secretary asked what was the advantage of having both a swing front as well as a swing back.

Mr. CROUCH pointed out that in using wide-angle lenses it was often really necessary through there not being room to use the back alone.

Mr. CAPELL was troubled with jarring with his Newman shutter.

Mr. CROUCH said that Dr. Roland Smith avoided this by leaving the band of his shutter loose.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JUNE 26.—Mr. B. Karleese in the chair.

Mr. G. A. THOMASON gave an epitome of the excursion to Coventry, and gave notice of the whole day's excursion to Wilmcote and Stratford on July 19.

Seven new members were nominated.

Mr. W. J. HARRISON, F.G.S., then gave his paper on *Orthochromatic Photography*, which was illustrated with a large number of negatives, prints, and lantern slides taken by the lecturer, showing the advantages of orthochromatic plates over the ordinary. Prints were also exhibited of negatives taken from oil paintings with screens used of different intensity. He said that ordinary plates could be made to give the proper gradation of shade by soaking them for two minutes in erythrosine, one part; water, seven thousand parts; and then drying in the dark room. And that although great strides had lately been made in orthochromatic photography, yet no satisfactory way had been found for photographing reds. In the developing room it is as well to cover the red glass with brown tissue paper.

The CHAIRMAN said that he found exquisite detail in the shadows of pictures taken on orthochromatic plates.

Mr. E. C. MIDDLETON said that Dr. E. Albert develops with a blue light, but his process is a secret, and he uses no screen. Father Perry used the same process in his astronomical studies.

Mr. LEESON had got considerable atmospheric effects with orthochromatic plates.

Mr. J. H. Pickard thought the Eastman film almost equal to this isochromatic plate.

Mr. TUCKER had photographed the spectrum of steel at a white heat, by placing it between the two carbons connected with the dynamo, with great success. The plates were coated with eosine.

Mr. Harrison exhibited a number of prints, negatives, &c., showing exquisite work on the Vogel-Obernetter orthochromatic plates, these were the work of Mr. Gotz, the English agent for the plates; also some capital landscapes, flower subjects, &c., lent by Mr. B. J. Edwards, and taken on his isochromatic plates.

THE first half-day excursion of the season to Coventry was not patronised by members as it was anticipated it would be. One of the objects of society excursions is to help one another in the field, especially beginners, and surprise was expressed that so few new members took part in what turned out to be a very enjoyable afternoon.

Mr. F. W. Hardy, of the Coventry Society, and Mr. Dew were very kind and attentive, Mr. Hardy accompanying the party to the principal architectural buildings of the city. Cameras had to be packed at five o'clock on account of the rather dull afternoon turning out wet.

The next excursion is fixed for July 12, to Stratford-on-Avon and the Shakespearian villages, and will be for a whole day, with Mr. W. J. Harrison, F.G.S., as leader.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

JUNE 17.—Mr. H. G. Ridgway in the chair.

The HON. SECRETARIES reported upon the recent exhibition, which has resulted in a small balance on the right side of the ledger.

New members, to the number of twenty-two, were then elected, and arrangements as to outdoor meetings concluded.

The subject for the evening was an exhibition of and discussion upon *Hand Cameras*, examples of which were submitted by the local dealers and by various members, comprising the Kodak, Facile, Optimus, Turnbull's, Diamond, Stirn's, Underwood's, The Guinea, and others too numerous to mention.

Mr. J. HEDLEY ROBINSON, in opening the discussion, exhibited a most ingeniously simple and compact instrument, constructed by himself, which was small enough to be carried in the pocket, but at the same time a business-like little affair, taking lantern-size plates. Slides were exhibited by Mr. Robinson, which amply showed its capacity in his hands. Commenting upon the cameras on view, he was inclined to fear that, unless very carefully manipulated, there was danger of shaking the camera when releasing the shutter, and he advocated the principle of holding the camera firmly in both hands, taking a sight along the top at the subject, and firing the shutter off by squeezing the bulb in the mouth, which, if not elegant, is at least practical. The subject of lenses next came under consideration, and he spoke highly of the single form, concluding with a sensible piece of advice—not to use stale plates for work of this kind.

Other members then commented upon the cameras of their choice, and the meeting broke up after an enjoyable and instructive night's discussion.

HACKNEY PHOTOGRAPHIC SOCIETY.—The following is the programme for July and August:—July 10, Demonstration, *Exposure and Development:* Mr. Birt Acres. July 19, Excursion to St. Albans; train leave King's Cross (G.N.R.) at twenty minutes to three. July 24, Discussion on excursion work. August 14, Demonstration, *Intensifying, Reduction, and Varnishing:* Mr. R. Beckett. August 16, Excursion to Carshalton; train from London Bridge at eighteen minutes past two. August 28, *Portraiture and Retouching:* Mr. J. Hubert.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

BICHROMATE OF POTASH AS A COUNTER IRRITANT.

To the EDITOR.

SIR,—When bitten by a gnat or mosquito, I have been in the habit of puncturing the skin at the spot and applying a minute drop of a concentrated solution of bichromate of potash. This allays the itching most materially, though by substituting one poison for another the place is sore when touched. There is no after effect beyond a slight exfoliation of the skin. Do any of your readers know of a better remedy or cure? for in some instances, as I have experienced, mosquitoes are a sad torment to photographers.—I am, yours, &c., F. H. WENHAM.

[Strong ammonia proves an excellent application.—ED.]

THE ART OF RETOUCHING.

To the EDITOR.

SIR,—Having had a number of inquiries regarding the "actual touch" and manner of applying it, and also suggesting that I should fully describe same in my articles on retouching, I beg to say it is, and always has been, my intention to do so. The various methods employed by the many "schools" of retouchers will receive due attention, and, I trust, prove satisfactory to your many readers. I hope you will pardon me for asking you to afford me this means of answering my numerous correspondents.—I am, yours, &c., REDMOND BARRETT.

50, *Kellett-road, Brixton-hill, S.W.*

ARISTOTYPE PAPER.

To the EDITOR.

SIR,—If you think the following information of any value, will you kindly insert it in your paper? *Using Aristotype paper*, I find a very pleasant brown tint may be given to the prints by immersing them after the first washing (which should be moderate) for a second or two in a hypo solution of four ounces to the pint, to which four or five drops of a saturated solution of potassium ferricyanide have been added, then washing in running water for three or four minutes, and toning and fixing as usual in the bath given in the printed instructions for performing these operations simultaneously. Prints to be treated in this way should be *considerably* over-printed, as, of course, the ferricyanide bath much reduces their intensity. If a print has been accidentally allowed to remain too long in the printing frame, it affords a ready way of producing a satisfactory picture, and thus saving what must otherwise be wasted. After the ferricyanide bath the prints seem to tone more readily than without it.—I am, yours, &c., T. CUNNINGHAM PORTER.

Eton College, June 21, 1890.

BRITISH PHOTOGRAPHIC UNION.

To the EDITOR.

SIR,—In reply to Mr. Anning's kindly letter, I wish to thank him, and to say that the Organizing Council is to meet on the third Wednesday in next month (16th July) at the Polytechnic School of Photography, Regent-street, W., commencing at eight o'clock. I invite Mr. Anning to that meeting as representing the photo-mechanical workers, and I shall welcome any other workman who can produce the delegating credentials of three or four of his fellow photographers. I shall give due notice of this Council meeting in all the photographic journals at the proper time, with agenda.—I am, yours, &c., ARTHUR G. FIELD.

EXHIBITION MATTERS.

To the EDITOR.

SIR,—It is evident that the promoters of the exhibition or competition about which I wrote you have nothing to say for themselves; they are clearly in the wrong and know it. Whether the matter will be carried further I do not know, but I hope some other of the exhibitors will take the matter up.

I shall be very glad indeed to co-operate in any movement, such as sketched out in my letter of the 30th ult., for the promotion of a "National Photographic Union." I think that the "Exhibitors' Union" might with advantage take up the title; I am glad to see that the latter has made a start. One of the first things to do will be to initiate, or cause to be initiated, some new and better system of *judging*, and in this connexion, and considering that nearly all (I think I am right) the best known men have appended, or are about to append, their names to the rules drafted by the Exhibitors' Union, it will be interesting to know in what way the

authorities at Liverpool and Edinburgh propose to meet this large and important body of men.

The judges we have had lately have been guilty of extraordinary eccentricities, reminding one forcibly of a game much in vogue last Christmas: "A large presentment of a donkey minus the tail is fixed to the wall. A person is then blindfolded and handed a caudal appendage, which he then attempts to attach to that portion of the asinine anatomy to which it rightly belongs." Great fun ensues, the results being, as a rule, ludicrous, but not more so than the vagaries of some of our judges. The *class system* is greatly to blame. Under this system we see photographs of little pictorial value, and deficient even in *technique*, decorated with a medal label, hanging cheek-by-jowl with a masterpiece by Robinson or Sutcliffe, the latter probably passed over by the judges, or if decorated, with a medal of the same value; *and this, too, in cases where the judges, by the consent of all parties, have been given full discretion.* The evil of decorating a man for this one sample of work need not be mentioned at length; apart from the effect it has on the minds of an intelligent public, it often provides a recruit for the professional ranks in the shape of a man quite unfit and actually unqualified for the work.

In the haste to award medals to the man who has the means of engaging the highest talent, say in the matter of enlargements, and whose own work is confined *to the filling-up of the entry form*, or, at the most, to the taking of the original negative, we lose sight altogether of the man who has honestly and conscientiously done the whole of the work, showing thorough competence in all branches, and who should be correspondingly encouraged.

A judge should, I submit, be a man who has grown old, so to speak, in the profession; not old in years necessarily, but a man of known ability as regards *technique*, and of some artistic knowledge, conversant with all the known processes; he should not be a "faddist." I would rigidly exclude those who think "their own way the best" (it is not necessary to mention names), and have no minds open to see beauties in other people's work; and a judge also should be beyond the "competitor" stage, for such men, as we know, while arrogating to themselves airs and responsibilities for which they are by mental defect quite unfitted, are the first to cry out when their own pictures fail to get awards. I am, yours, &c., A DISGUSTED EXHIBITOR.

PROOFS ON APPROVAL.

To the EDITOR.

SIR,—I ordered of a well-known professional photographer six cabinet photographs of my little girl, paying in advance the price asked, viz., 14s. A proof was submitted and not approved, and at my request a second sitting was given, and a second proof submitted to me. Both this and the last were not *Vandycs*, the negative having been retouched out of all resemblance to the original. I declined to order from either proof, and the photographer now states that I have had more than my money's worth, and refers me to his printed list, wherein it is stated that the price charged is for the *proofs*, the intention being that the prints are given away, and that the sitting having taken place, the photographer has completed his part of the contract.

May I ask whether the above is the usual practice in the photographic profession, and whether a photographer who is unsuccessful in obtaining a likeness can be considered to have earned his fee when he has submitted a second proof, even though—as this one states—he will make nothing out of the transaction?

My alternatives are either to have six prints which do not resemble my child, or to drop my money.

I would, as an ardent amateur photographer, point to the abuse of the retouching pencil, of which the above is an instance, and ask whether it would not be more to the advantage of the profession if they gave us a little more flesh and blood and a little less stipple?—I am, yours, &c.,

7, *Addison-road, Chiswick, June* 27, 1890. WM. S. ROGERS.

[As a rule photographers aim to please their customers, and it is rare now-a-days for one to attempt to force upon them portraits which are not likenesses. Indeed, in these days of keen competition, such policy is suicidal.—ED.]

PHOTOGRAPHY IN CENTRAL AFRICA.

To the EDITOR.

SIR,—I beg to call your attention to an error in Mr. R. C. Phillips' letter in your JOURNAL of 20th inst. He there states, "I have never known ready-sensitised paper that would not darken spontaneously during the outward voyage." Now, I may say that we have been sending ready-sensitised papers all over the world for the last three years, and it is quite an exception for there to be any deterioration. We have even had cases where prints have been sent to us on paper of ours which has been kept in tropical climates for nearly two years before printing. We are sending ready-sensitised paper regularly to Africa, Australia, New Zealand, and India, and never have any complaints. I shall be glad if you will kindly publish this letter, in the interests of those using sensitised paper wh are going abroad.—I am, yours, &c., WM. GOURLIE BLACKIE,

Manager to the Blackfriars Photographic and Sensitising Company.

Photographic Manufactory,
1, *Surrey-row, Blackfriars-road, S.E., London, June* 27, 1890.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

I will exchange a fifteen-inch hot rolling press for a posing table.—Address, MOREL, 26, Goldsmith-street, Nottingham.

Wanted, a good interior background; will exchange an exterior in good condition.—Address, E. P., 105, Union-street, Torquay.

Exchange enlarging lantern, five-inch condensers, front lens, for whole-plate camera and tripod. Cash adjustment.—Address, DAVIES, Troon.

I will exchange my fifty-four-inch bicycle, in sound condition, for a good camera.—Address, F. DAY, 22, Canonbury-road, Essex-road, London, N.

Will exchange McKellen's patent half-plate roller slide, cost 6l. 6s., for half-plate rapid rectilinear lens.—Address, J. GREENSHAW, Photographer, Haslingden.

Will exchange cabinet lens by Lerebours, in excellent condition, for other photographic requisites.—Address, D. BARNET, 6, Weston-villas, Chippenham, Wiltshire.

Ross' wide-angle doublet for 10 × 8 and 12 × 10, in exchange for quarter-plate hand camera with good lens and shutter.—Address, COLES, Photographer, Watford.

Whole-plate camera, slide, and tripod, wanted in exchange for bicycle-steering tricycle, sound and in good condition.—Address, E. BAILEY, 19, Castle-street, Luton.

Lancaster's half-plate Instantograph, with three double dark slides and lens, complete, will exchange (with cash) for Watson's or other first-class half-plate camera. Address, BERNARD, Hotspur-lodge, Shepherd's Bush, W.

Wanted, 12 × 10 or 15 × 12 landscape camera and slides in exchange for Watson's 12 × 10 Premier studio camera, one double slide, and carriers, in perfect working order.—Address, W. H. BAYFIELD, Photographer, Richmond, S.W.

Will exchange 10 × 8 and half-plate portrait lenses for a Ross or Dallmeyer whole-plate portrait lens. Exceptional offer; only the name required.—Address, D. HATTON, Artist, 18, Coleridge-place, Bradford, Yorkshire.

For a modern tourist's 12 × 10 camera and stand will give "air" brush (new and perfect), or 15—12 rack-working portrait lens (modern and nearly new), or hand-somely bound volume of proof steel engravings with descriptive letterpress.—Address, LONSDALE & Co., 45, Strond Green-road, N.

Will exchange 12 × 10 land-scape lens, by Horne & Thornthwaite, rack and pinion, fifteen-inch focus; wanted, a short-focus cabinet or C.-D.-V. portrait lens, time and instantaneous shutter 3-40 and three-quarter inch, background, or offers.—Address, CHARLES R. CHAPLIN, Marine Studio, Colwyn Bay, North Wales.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

E. Martin, Melbourne, Derby.—*Photograph of Hawarden Castle, Flintshire.*

J. Slater, Llandudno.—*Photograph of Ffos Lake, Bettws-y-Coed. Photograph of Menai Suspension Bridge. Photograph of Tegfan. Photograph of Bettws-y-Coed.*

Messrs. Henry & Henry, Haslingden.—*Three photographs of Rev. R. J. Andrews.*

A. L. Knighton, Oakham.—*Photograph of George Dixon.*

RECEIVED.—*Evolution of Photography; The Encyclopædia of Photography*, Part I.; *The Casket of Photographic Gems; The Photographic Reproduction of Drawings.*—These, with other matters on our Editorial Table, will be noticed next week.

CARBON.—Try Squire, King William-street, London Bridge, E.C.

L. M.—In the formula mentioned a pound of sixteen ounces is meant.

COPPERSOP (?)—Kindly rewrite your letter; we are unable to decipher it.

C. ROSE.—You can have carriers fitted to the dark slides to take smaller-sized plates.

R. J. HOWARD.—We have forwarded your communication to Mr. Gambier Bolton.

E. MARTIN.—Mix lampblack with spirit varnish and apply to the holes in the black fabric.

J. B. PAYNE.—You are correct in your surmise. We learnt of the event only when too late to notice it last week.

SECOND HAND.—The firm mentioned is highly respectable, therefore you may rely upon the goods being by their reputed makers.

JAS. ALEX. FORREST.—We think that the matter will be quite safe in Mr. Mayne's hands, it being largely a local affair. Thanks for enclosure.

E. P. I. C.—Many weeks have not yet elapsed since we critically noticed a retouching medium that did not shift when varnished. See our advertising columns of recent date.

JUMBO.—Until we have had the opportunity of trying one of the lenses we shall not express an opinion. Theoretically, the lens promises well, but sometimes practice does not accord with theory.

J. A. X.—1. The lighting of the studio will be much improved by bringing the glass down to the dotted lines on the drawing.—2. Shut out the direct view of the factory by glazing the side with ground glass.

R. W.—It is a question upon which we cannot enter. The vendor, whether he be a patentee or not, has the right to fix the selling price at what he likes. It is quite optional whether the goods be purchased or not.

A. J. CORRIE.—There are several kinds of mottling, some, such as that on the surface, being curable, at least in part; other kinds totally incurable. We shall have the subject thoroughly ventilated before we are done with it.

S. W.—Instead of attempting to restore common frames which have become blackened or tarnished it will be more economical to purchase new ones. Of course, the glass and backboards of the old ones can be utilised in the new.

DENVER.—The only method open now is to take the album to a bookbinder and get him to take out the leaves, and then have them rolled with heavy pressure, or to subject them to hydraulic pressure, leaving them in the press for several hours.

MOUNTER.—A hard gelatine, such as that generally used in the manufacture of dry plates, is not well suited for mounting photographs, for two reasons: first, the solution gelatinises so quickly that the print cannot be coated before it sets; second, this class of gelatine is usually acid, and this may act injuriously on the photographs.

GROVE HOUSE wishes to know "the most waterproof way of fixing glass in studios."—We know no better way than fixing the glass with *good* putty; to this a little white lead may be added with advantage. With this cement and rigid sash bars the studio ought to be made weather-tight. Leaky roofs are due more to slender sash bars which give with the wind, and so cause the putty to crack, than anything else.

A. CLEAREY.—It must not be taken for granted, because some prints fade quickly when mounted while others out of the same batch kept unmounted do not, that the mounts are always at fault. The mountant may be, and sometimes is, the cause of the fading. Unfortunately, as you say, the price paid for mounts is no criterion of the influence they may have on the pictures mounted upon them. Some of the lowest-priced ones may occasionally be the most inert, while the more expensive ones sometimes have a deleterious action on the prints.

LIGHT writes as follows: "I should be obliged if you could give me any idea as to what the cost would be to have the electric light placed in a studio on a scale large enough so that good portrait negatives could be obtained by it on dull days or winter evenings. It is already used for lighting the streets a short distance from where the studio is situated."—Our correspondent's best way will be to get an estimate from the Company who are lighting the streets for fitting up an arc light of from three to five thousand candle power and supplying the necessary current. They will doubtless undertake the whole of the work, except perhaps the reflector. This is a very inexpensive affair.

S. K. writes: "1. Will you kindly say what is the usual method of obtaining so-called 'moonlight scenes?'—2. Is it possible to obtain from shore good photographs of moon's rays reflected on sea? if so, what exposure would be necessary with, say, moon at full, using rapid symmetrical lens at *f*-8 and plates of No. 25 sensitometer?"—1. The usual method of obtaining so-called moonlight pictures is to take them in sunlight with the sun near the horizon, and much under-exposing the negative.—2. It is possible, but only with a very prolonged exposure. The time necessary can only be arrived at by experiment. Of course, with the long exposure the moon will not appear round if it be included in the picture.

C. B. VANDELEUR asks: "1. Is the patent Stickfast paste, sold in bottles for office work, suitable for sticking in photographs? It is warranted not to go bad.—2. I am in the habit of making my saturated solution of sulphate of iron for bromide prints by filling a bottle half full of crystals and then filling up to the stopper with water, adding a little acetic acid. Is this a good plan? Of course, as I use the solution I fill up again with water."—In reply: 1. We do not know the composition of the paste in question. Some cements contain bichloride of mercury as an antiseptic; this, of course, would act injuriously on photographs.—2. The plan is good, provided the bottle is well shaken occasionally until the water becomes saturated with the salt.

X. Y. Z. says: "1. Could you inform me, through the JOURNAL, the cause silver prints are not more clear after being toned this depth? Could you give me any advice how to get them a more clear blue? I use a fairly strong silver bath. Have enclosed a print for your inspection.—2. Could you also tell me where I could get any information how to work carbon tissue for cabinet transfers on opal?"—1. The degradation of the whites appears to be due to the paper being exposed to light either in the toning bath or before printing, or, perhaps, when the prints are examined while in the frames. Blue tones can only be got by deep printing from strong negatives and a free use of gold in toning.—2. Procure a copy of the *Autotype Manual*, that will give the desired information.

A. Z., writing from a Midland town, says: "A young fellow who was in our employ for about seven years as an errand boy and porter has just started in business for himself, and has on the facia of his shop and on his circulars that he was seven years with me. Can I put a stop on him, as he never worked in the studio, and only occasionally assisted a little in the printing. Surely he is not entitled to use my name without my permission."—If the young fellow was in the employ for seven years, in whatever capacity, there is nothing to prevent him announcing the fact over his shop or in his circulars. If, however, our correspondent's name is used in such a way that the impression is conveyed that the new business belongs to him, or that people would be misled into going to the new establishment, thinking that it was connected with the old one, the case would be different. From the communication we gather that this is not the case.

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 9, *Photographing Theatrical Scenes*, Report of the Convention Delegates; July 16, *Iron Printing Processes*. Saturday, July 12, outing to Rickmansworth, train from Baker-street at sixteen minutes past two.

DR. SKIPPER sends us three photographs he obtained of the late solar eclipse, which were taken with the back lens of a rapid rectilinear lens. They fully exhibit the unpropitious state of the weather at the time. The photographs are about an inch in diameter, being enlarged about three diameters from the original negatives.

HOLBORN CAMERA CLUB.—Arrangements for July.—Friday, July 4, Mr. A. J. Jones, on *The Correct Development of Negatives*. Friday, July 11, Mr. J. E. Smith, an article selected from one of the photographic papers. Saturday, July 12, Field day to Greenwich. Friday, July 18, Mr. J. F. Cobb on *Mounting Prints*. Friday, July 25, Lantern night.

HONOUR TO AN AMATEUR PHOTOGRAPHER.—On Monday last, the 30th ult., Her Majesty the Queen conferred the honour of knighthood upon several gentlemen, who were called to Windsor for the purpose, among them being Mr. Henry Trueman Wood, the well-known Secretary of the Society of Arts, and a member of several of the London Photographic Societies.

DEATH OF MR. T. J. COLLINS.—We are sorry to learn of the death of Mr. Collins, the well-known camera maker of St. John's Wood, London, after an illness of five weeks. Mr. Collins was eminent in his profession, his work being of a high class. He was an active member of the Photographic Benevolent Association, of which he was deputy chairman, and was a man of quiet, unassuming manners. He died on Sunday last, the 29th ult., and the funeral takes place to-morrow at the Paddington Cemetery, Brondesbury, at half-past four p.m.

THE LATE MR. BAYNHAM JONES.—The *Gloucestershire Echo* says that Mr. Baynham Jones may be said to have connected the Cheltenham of to-day with that of the past. The deceased gentleman was the oldest solicitor in Cheltenham, having been admitted in 1832, and commenced practice in his native town, continuing till his retirement some time ago. The most important institution with which he was connected was the Assembly Rooms, of which he was secretary from the formation of the Company until a few months ago. Mr. Jones devoted much of his time to artistic pursuits, and was one of the first amateur photographers in the kingdom, having taken his first picture on an old silver salver by the first-known process. He gained first prize at an amateurs' exhibition in London for one of his pictures. The funeral took place at the New Cemetery on Monday last.

MR. FALLOWFIELD writes to express to his customers his regret that during the last few days he has been quite unable to attend to orders and queries with the usual promptness: "The task of removing one hundred and twenty van-loads of photographic goods, requiring care in handling and transit, has been even more than I anticipated at this busy season of the year, though my contractors carried out the arrangements admirably, and my whole staff has worked early and late. The continued downpour greatly delayed the transfer, and consequently I have had to disappoint valued customers, who seem to have shown their sympathy by sending increased orders." He adds that by the time this appears he hopes to be in full swing again, but meanwhile asks the indulgence of customers who may not realise the magnitude of his undertaking until they favour him with a call at his new premises.

THE LATE THOMAS SUTTON.—*Apropos* of our article on Jersey, Mr. Thomas Johnson, of Anerley, writes: "I have read the very interesting article on *Jersey: its Photography and Scenery*, and I can vouch for the account from beginning to end being correct, having lived in the island from the year 1838 to 1856. My father, James Johnson, was the principal auctioneer and house agent in the island, and managed the late Mr. Thomas Sutton's property during his absence in England and the Continent. One day in 1854 I saw in Le Feuvre's window two 12 × 10 photographs of old St. Brelade's Church, A.D. 1111, and some grand rocks near the same spot, and on inquiry I found out it was my modest friend Mr. Sutton who had produced them. The next day I called on him, and found him in his dark room experimenting with chlorides of silver, &c., and he at once agreed to give me lessons in the Fox-Talbot wax-paper process and also the wet collodion. After that till the time of his death we were fast friends."

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ON LENS SCREENS.

Some discussion on the true size for a lens screen that took place a little while ago suggests that it may be worth while to discuss the subject a little fully in some of its bearings. Primarily, it may be noted that almost every photographic objective sold is provided by the maker with a screen of some sort in the shape of a hood, and in some cases the hood is in such a position as actually to determine the maximum size of picture obtainable with the lens to which it is attached. It is either the hood or the body of the lens which prevents the circle of light from approaching anywhere near an angle of 180°. We need not say that even on an infinite plane a theoretically perfect lens would not cover that angle. But there are compound lenses which give circles of considerably over 100°, and others that do not approach that angle, sometimes not half of it. As a matter of fact, the screen or hood usually contracts the field of view very much when the lens does not give definition over a large circle, and is small when the angle intended to be included is large. It may be readily seen that the hood in these two instances is, so far as light-screening is concerned, exactly opposite in kind to what would be devised if a light-screen only were in question.

It is obvious, therefore, that we cannot look to the lens itself as usually constructed to provide a suitable screen. Some twenty or twenty five years ago a sky shade was sold, and very commonly sent out with the doublets of the period, but it is comparatively rarely seen now. At first sight it would seem that the best screen of all would be a sliding tube to the front of the lens, which might be made to slide backwards or forwards till it just included the field of view required, but the considerations we shall adduce will show this to be an error.

The first thing to be considered should be the real function of a lens screen. The following considerations are concerned; they are all capable of being included under the heading of lens fog treated recently by us:—Firstly, it is desirable, if only to avoid back reflection and consequent fogging of the image more or less severe, that a screen should be employed to cut off all possible sources of reflection not concerned in forming the image. This would obviously be done by cutting off from the lens every object, light or dark, that was not being portrayed. Secondly, all radiations likewise not concerned in forming the image should be prevented from falling on the lens, as it is capable, in a bright light, of being apparently luminous, and so emitting light in all directions, both in lights and shadows, on account of its not being homogeneously and perfectly transparent and free from opacities. Thirdly and lastly, all light not coming from the objects pictured should be prevented from arriving on either the inner surface of the lens mounts—whether that be the hood or the tube itself more especially concerned in the mounting of the lenses—or on the edge of the lens itself. It may be here observed that a very large number of lenses by makers of the highest repute are defective in respect of the edge of the lenses themselves which are the component parts of the objective. It is not enough to let them in a cell: they should be thoroughly well ground and smoothed, and then painted with a suitable black varnish.

The three conditions above-named could not be carried out by the use of the sliding-tube screen except the lens were of pin-point magnitude; and the larger the lens the less would a screen of such a type be applicable. The reasons, it might be thought, would be obvious, but apparently they are not. We present the following considerations, and for the sake of simplicity will consider that the picture is being taken on a round plate:—Let a lens of the rapid rectilinear or symmetrical type be taken, and a piece of black paper with a very small aperture be fastened outside the front lens. An extemporised tube of blackened cardboard, which may readily be made, is then slipped on and drawn forward until the circle of light just begins to diminish. Then, if it be brought nearer, the illumination of the marginal portion of the circle will not be altered in intensity; if it be taken farther away, the circle will diminish in diameter, and whatever the diameter of this extemporised screen, the intensity of the light received on the plate will be uniform when the screen is pushed to a point just on the verge of encroaching on the circle. With the black paper removed, a new set of effects comes into view, for before the circle is encroached upon, the margin will begin to diminish in brightness, and the centre remain as bright as ever, thus showing that the conditions are not the same in small as in large lenses. Further, it will be seen that if the tubular screen, still of the same size as at first, be placed so as not to obstruct any light at all, the conditions first specified by us will not obtain, and the lens and lens mounting will receive light other than that emanating from the portion of view selected, and according to the amount and intensity of that extra light will be the intensity of the fog inevitably produced.

Next, let a much larger screen be applied to the front of the lens, and it will be found that the larger the screen, and the greater the distance from the lens, the nearer will it approach the effects of a screen upon a pin-hole lens, and the nearer perfection, as regards fogless results, will it attain. Obviously, there is a practical limit to size, and beyond a certain area of front opening of screen there is no practical benefit to be obtained. In designing a lens screen, then, it is desirable to make one as large as is consistent with portability and convenience. In using it when designed, it should be extended

in front of the lens till it is on the point of contracting the field of view, remembering that the function of a screen is to prevent all rays of light, except those emanating from the objects intended to be included in the picture, from striking any portion of the lens or its mount.

REVERSED NEGATIVES ON GELATINE PLATES.

The problem of how to make a reversed negative on a gelatine plate in one operation has never yet been satisfactorily solved, though so far as collodion is concerned the operation is one of the greatest simplicity, and is based upon the fact just noticed by Major Russell in 1867 or 1868, that the image produced by alkaline development upon a bromide plate may be completely dissolved away, leaving only the unaltered bromide or "reverse," which may afterwards be converted into a printing image.

Though the same theoretical conditions prevail in the case of a gelatino-bromide film, yet in practice difficulties arise mainly owing to the physical character of the gelatine itself, and these it is that have hitherto prevented the full application of Major Russell's discovery to the modern dry plate. In once again attacking the subject, our contributor, Mr. Thomas Bedding, strikes to some extent new ground, and it will be interesting to examine in what respects his method is likely to succeed where others have failed.

Of the different attempts already made to effect the end, the first in chronological order is that of Bolas, made public in 1879, in which an ordinary gelatine plate is immersed in a solution of bichromate of potash and dried with certain precautions; it is then exposed under the negative to be reproduced for about the same time as an ordinary silver print, and developed preferably by means of ferrous oxalate, though there appears no reason why other developers should not be used. At the outset of development a positive image begins to appear, but this is very quickly masked and overpowered by a negative one, which, when complete, is fixed in hypo in the ordinary way. It has been suggested in explanation of the *rationale* of this process that the hardening of the gelatine in the portions most exposed to light prevents the action of the developer in those parts, while the excessive exposure generally produces an image by reversal. This explanation, however, does not seem tenable, or the fixing solution should not be able to act upon the hardened portions.

The next process was that of Brooks, who, owing to the destructive action of nitric acid upon gelatine rendering the use of that agent dangerous, if not impossible, proposed the substitution of a solution of iodine, by means of which the image is converted into iodide of silver. This being supposed to be unacted upon by the alkaline developer, at least at normal strength, represents so much inert matter, when, after a second exposure to light, the plate is redeveloped and a reversed image is formed, the iodide of silver being subsequently dissolved out by means of hypo.

This method partakes somewhat of the character of that proposed by Mr. Bedding in our last issue, though the latter converts the original image into chloride of silver, which is dissolved out before the second development. For various reasons, which will be noticed, this is preferable to Mr. Brooks's iodide plan.

Mr. Bedding's previously proposed process consisted practically in the old nitric acid method, the gelatine film being first hardened by immersion in a solution of tannin. But even setting aside possible difficulties introduced by the tannin itself, the hardening action could scarcely suffice to render the subsequent treatment with nitric acid a safe one. Even in the case of collodion films the application of nitric acid is an uncertain one, for which reason ferric, or ferric-potassic sulphate has been introduced as a perfect substitute. Unfortunately this is inapplicable to gelatine, owing to the fact that the latter combines with a basic ferric salt that is formed during the process, and causes the complete blocking up of what should be the shadows of the reversed negative, which is not the case with collodion. For these reasons we look upon Mr. Bedding's newer process as a step forward.

The weak point in Mr. Brooks's method is that in applying the tincture or solution of iodine for the conversion of the metallic image into iodide of silver, a greater or less portion of the previously unaltered bromide is also converted, though more slowly, into iodide. The actual quantity converted will, of course, depend upon the duration of the application, and this, of course, hinges on the depth or density of the original image, so that the denser the first image the more feeble will be the reversed one. Assuming that the iodide of silver is really unacted upon by the developer, every particle of silver bromide converted is lost for all useful purposes, and remains only to be dissolved out in the fixing bath.

A minor objection to this method as applied to gelatine is found in the deep stain caused by the iodine, which renders it impossible to judge of the progress of the second development, or, indeed, of the extent of the action of the iodide itself.

With regard to the details of Mr. Bedding's plan, he does wisely, we think, in discarding the use of cupric chloride; for quite independently of the existence of cuprous chloride in the bleached image or in the film, the excess of soluble cupric salt does cling with the greatest persistence in spite of the most careful washing. Here, again, a physical difference exists between collodion and gelatine; for whereas with the former a perfectly white image is produced by the chloride solution, and all excess of the latter removed easily in a few seconds, with gelatine no prolongation of the immersion will carry the colour of the image to white, a pinkish-buff tint always remaining, and careful tests will reveal the presence of traces of copper after a couple of days' soaking. In the case of collodion, the sub-salt formed during the reaction remains suspended in the solution, while in the case of gelatine it appears to be attracted to the latter just as in the instance of the basic ferric salt already alluded to.

The solution of bichromate and hydrochloric acid used in preference by Mr. Bedding is free from these objections; it forms no insoluble bye-products, but leaves the image in the form of pure chloride. But it does more. If applied for a sufficient length of time it entirely destroys the effect of the previous action of light, which is a matter of the greatest importance, especially if it be desired to resort to silver intensification. The acid solution, however, must be used with care, like all such applications to a gelatine film, or perhaps even with greater care, since it contains free chromic acid.

We come next to the removal of the chlorised image, which forms perhaps the weakest point of the process, since, in addition to the dangerous action of strong alkalies upon gelatine, caustic ammonia is also, as Mr. Bedding notes, a solvent—though to a less extent—of bromide of silver, and so must remove some of that. But by substituting a saturated solution of common salt or other soluble chloride, the danger of injury to the gelatine film would be obviated, and the loss by solution of the

silver bromide greatly lessened, if not altogether obviated. We throw this out as a suggestion that may be tried.

On the whole, we are inclined to regard Mr. Bedding's process as the most promising yet proposed for the purpose of the direct reversal of negatives on gelatine, and trust to find on trial it answers the requirements.

DISHES FOR DEVELOPMENT AND OTHER PURPOSES.

We recollect well, upwards of a quarter of a century ago, in company with a friend, spending a whole day in scouring a little West of England watering place in a well-nigh fruitless search. It was of course in "the old wet collodion days," and we had "dropped anchor" for a stay of some days in the quaint old town, had unpacked our "traps," and discovered to our dismay that our bath—the receptacle, not the solution—had been left behind.

What was to be done? In those days every local chemist did not keep a small stock of photographic chemicals and requirements, and there was no photographer in the place. If there had been, he would have scarcely been likely to possess more than a single dipping bath, and that most probably a quarter-plate, while we wanted whole-plate, an article probably not obtainable nearer than London, so we had to find a substitute. The two existing crockery shops were soon exhausted: it takes a large-size meat or pie dish to take in a plate $8\frac{1}{2} \times 6\frac{1}{2}$, and thanks to the lines on which they are built it requires an immense volume of solution to do more than *surround* the plate as it rests, like the ark on Mount Ararat, on the raised centre of the dish. One or two "useful" utensils that were offered to us looked as if they would have taken the "fatted calf" whole, but as we had not brought with us much more than our ordinary quantity of bath solution we had to decline them. Eventually, on stating our trouble at the little inn where we were staying, we were invited to "take stock" of the kitchen, and there we were able to select, literally, a "well" bath, in the shape of a tolerably flat-bottomed dish provided with a gravy well. After a little practice with clean water, we felt we dare venture with this to send the silver solution in a clean sweep over the collodionised plate, and as a matter of fact succeeded fairly well during the few days we were at work.

We were reminded of our old experience when, a few days ago, a friend recently returned from a photographic trip narrated his search after a substitute for a developing dish, and how, after fruitless attempts to obtain just what satisfied him, an "original" and happy idea came to him. Opening a packet of tobacco that had accompanied him from home, the lead foil lining struck his attention, and this was quickly folded to form a dish in which the whole of his negatives were subsequently developed.

The "happiness" of the idea under the circumstances is undoubted, but alas for the "originality!" Some five or six years ago the late Dr. Kemp described this very plan in our ALMANAC, and curiously enough had hit upon it in precisely the same way as our "original" friend, though the doctor qualified his discovery with the remark, "I dare say it's not new, but it was to me, and very welcome."

During the present holiday season it is more than possible that many of our readers may find themselves in the position of wanting a developing dish; and though, nowadays, a dealer in photographic requisites is to be found in almost every village, and fitted dark rooms are available almost everywhere, circumstances may arise when the photographer has to depend on his own ingenuity. We may throw out a few hints as to how such a want may be most readily supplied.

To be of real utility under the circumstances detailed, the substitute must be producible out of the simplest and most readily available materials, and in this respect nothing can surpass Mr. William England's plan described many years ago. This consists simply in turning up the edges of a sheet of stout paper—ordinary brown paper answers as well as any—so as to form a dish, fastening the corners with a touch of sealing wax, or with pins, or, failing these, by an extra pinch and a slight twist. Such a dish, if held on a rigid support, such as a piece of glass or thick cardboard, will prove strong enough for the development of several plates, and may be thrown away when done with. It has the great advantage, too, of being available anywhere and everywhere, without any special preparation previously.

It may seem out of place to describe any kind of substitute that requires a special preparation, since it is as easy to provide the real article as the materials for the substitute. Just so; but at the same time it cannot be denied that the materials for a makeshift dish are perhaps more readily accessible in out-of-the-way towns and villages than the dishes themselves, hence we shall describe a few such.

In the first place, if something a little stronger and more waterproof than the "England" paper dish be required, the paper itself may be waterproofed before folding by means of materials easily obtainable wherever there is a village store. For this purpose the material may be rubbed with paraffin wax, and held to the fire until thoroughly saturated. If not obtainable in its natural form, the paraffin can easily be got in the shape of candles, which from their cheapness are sold everywhere. In country places beeswax can easily be got at a reasonable price, or, failing that, even suet or tallow form perfectly efficient waterproofing substitutes.

A still stronger dish is formed by folding stout paper in the manner already described, and brushing the dish so formed inside and out with one of the numerous "enamels" now so common, or even with ordinary Brunswick black. Such a dish must be made some time before using, and hung preferably in the open air and sunshine to become thoroughly dry; when dry, however, it will stand a good deal of knocking about, and will be found perfectly water-tight.

Reverting to the lead-foil plan, this is no doubt superior to paper where the material can be obtained, since it is perfectly water-tight without preparation. Wherever a chemist's shop exists ordinary "tin foil" can usually be obtained, and most paperhangers keep in stock a stouter kind of lead foil that is used for covering damp walls and similar purposes. Even a village grocer will generally be able to supply what is wanted from the lining of his tea chests, so that even in the most outlandish districts there need be little fear of not being able to obtain metal foil in some form.

For purposes of development, or for washing, or clearing, these metallic dishes are perfectly harmless, though for fixing they may require using with care, especially if the fixing bath be old and charged with silver. For fixing purposes it would therefore be well to coat the foil with paraffin, suet, or tallow, or even with Brunswick black.

While on the subject of metal dishes, we may point out that shallow tin dishes of various sizes, and used for culinary purposes, are readily obtainable of tinsmiths and ironmongers, and though these may not be exactly the size wanted, they form excellent substitutes for the proper article for all but fixing purposes.

Here, as already suggested, it will be safer to give a coating of japan.

In addition to their utility as makeshifts when travelling, such expedients are frequently of the utmost convenience in case of emergency at home, and a few more may be added to the list already given. For instance, a supply of Willesden paper may be kept in stock for the purpose of improvising dishes of extraordinary size. This is, of course, superior for the object in view to any ordinary paper, but we have not mentioned it previously because it is not likely to be obtainable in out-of-the-way places. Thin sheet lead may also be kept if something stiffer than paper be required, but it is advisable to give this, as well as the Willesden paper, a coating of some kind of protective varnish in order to avoid chemical action. Dishes made of either of these materials may be folded up after use until required again—a convenience that will be appreciated by all who have to use large dishes only occasionally.

Many photographers employ regularly dishes and vessels constructed lightly of wood, and coated with paraffin or asphaltum, and these answer most perfectly if only they be reserved for one special duty. The application of paraffin or Brunswick black does not render the wood absolutely impervious, hence it is scarcely judicious to use for any other purpose such a bath that has been used for fixing. Looking at it from every point of view, paraffin is perhaps the better protector, though we ourselves prefer the Brunswick black on account of the greater ease of its application, as well as the greater degree of impermeability it gives. Whichever be used it should be renewed occasionally.

Those who still employ porcelain dishes, especially if they are applied indiscriminately to a variety of purposes, will do well to give these a coating of Brunswick black or japan. We were shown some time ago a large batch of silver prints that had been utterly spoilt by being left to soak in an apparently clean porcelain dish after fixing. The dish, it turned out, was one that had been purchased with other things at a sale, and though the enamel showed signs of cracks, it was immaculately white in colour, having, no doubt, been cleaned by chemical means. The body of the dish was, however, saturated with chemical matter—probably the dish had been used for sensitising paper—and the result was that a beautifully accurate map of the cracks in the enamel penetrated right through the whole layer of prints and indelibly *fixed itself*, at the expense of the fixing solution remaining in the paper. If this dish had been coated with black japan, such a result would not have occurred.

In conclusion, we would say that though the expedients we have mentioned are spoken of more as makeshifts, there is no reason why, for travelling purposes, as well as for large work at home, these light, flexible dishes should not supersede the necessarily cumbrous ones of porcelain, glass, or even ebonite. The force of habit and the persistence of old associations are very strong, otherwise we are convinced glass and porcelain would long since have disappeared from use.

A FRESH phase of the injurious mount question has just been brought under our notice. It is by no means uncommon for London portraitists to farm their printing out to those who do the work in the country. The photographer supplies his own mounts, and the printer does the mounting and rolling, and delivers the pictures finished, ready for spotting. Now, if under these conditions the prints fade or become spotty in an unduly short time, who is to be held responsible? A correspondent who is a printer for the trade recently sent us a lot of prints that had been returned by a London house because they had become spotty, and complaint was made of inferior workmanship. The mounts were supplied by the photographer, and it so happened the printer had to have some over-plus prints of the same subjects, produced at the same time as the mounted ones, which had not been mounted, and they show no signs whatever of deterioration. It is but a fair inference on the part of the printer that he is not at fault.

WHEN a printer is supplied by his customer with pernicious mounts whereon to put his work, he may suffer considerably in reputation. In time the prints develop spots or perhaps fade, and this is too often put down to bad work on the part of the printer, particularly if part of the printing of the establishment, as is frequently the case, is executed by other hands who are supplied with less injurious mounts. The delicate constitution of the present albumen paper picture will always be a source of trouble, and where fading arises it will be difficult to "put the saddle on the right horse" as to the origin.

IT is tolerably well known that in America mechanical processes are worked to a much greater extent than they are here. But many of our readers will be surprised to learn that an edition of the *Encyclopædia Britannica* has been reproduced in the States by means of photography. This is stated in a report of a suit recently tried there for infringement of copyright, and a conviction followed. There is no international copyright with America, but some of the articles in the work happened to be by American authors, and were copyrighted there. The Americans are wholesale pirates of English works (this does not apply to photographic works), and have hitherto held aloof from the International Copyright Convention.

THERE is one point which many photographers do not appear to understand, although it has many times been explained in these pages, namely, the covering powers of a lens. A correspondent writes this week saying that he has a lens of the "rapid" type, by a well-known maker, that is catalogued to take an eight by five inch picture, and this it does very well with a stop; but with an eight-inch square plate it fails to cover at the corners. He inquires why a lens that covers eight inches in one direction does not do so in the other. It may here be explained, once more, that the size of the picture is governed by the circle of delineation and the square or oblong that can be obtained therefrom. Now, for an eight-inch square picture the smallest circle from which it can be cut is eleven and a quarter inches, while for an eight by five a circle of nine and a half inches will suffice. A lens that will take a picture eight inches square will, equally as well, take one nine and a half by six inches, or even ten inches by five, because either size would be included by an eleven and a quarter inch circle.

IT is a very simple matter to ascertain the different shapes of plate the same lens will cover by measuring them diagonally. For example, the diagonal measurement of an eight-inch square picture is equal to the diagonal of an oblong nine and a half inches, or of one ten by five, namely, eleven and a quarter inches. Therefore, a lens that will cover a circle of the latter diameter will answer for either size picture.

THE trade in obscene photographs, it seems, is still carried on, both at home and abroad. The decisions sometimes given as to what are indecent and what are not are a little puzzling. Only last week one of the London magistrates was asked to order the destruction of over eleven thousand photographs that were alleged to be indecent. The magistrate decided that those which were copies of well-known pictures he should not condemn, but condemned those which were vulgar. In Germany, as will be seen from our "Foreign Notes and News" last week, a photographer was prohibited from publishing photographs of some of the pictures in the Berlin and other galleries on the ground of immorality. There it appears that the original paintings are not considered immoral, but photographs of them are.

Was it not a Glasgow magistrate who fined a man for selling photographs of the Greek slave?

In this country the judicial opinion appears to be different, for if the photographs be copies of paintings they are not looked upon as being indecent, though photographs of similar subjects from nature are. We strongly suspect that if some of the engravings from paintings to be seen in the shop windows were photographs from life they would be considered indelicate, notwithstanding that they may have been taken from the same models and in the identical pose. It is more than probable that photographs were used largely for some of the original paintings. Painters often work extensively from photographs of their models.

Notwithstanding that there is, as yet, no process that will yield a half-tone block which can be printed successfully with type in a quick machine, such as those used for newspapers, still photography plays an important part in most of the illustrations that appear in the "dailies." The portraits are drawn from photographs. From the drawing a negative is taken, and from this a block is made by the zinc-etching method. In these illustrations it is interesting to note the small amount of time that is bestowed upon them by the draughtsman. Often one sees a tolerably good likeness formed with only a dozen or two coarse lines. Small as is the work expended, great skill is nevertheless required to obtain the result.

It will be remembered that a few years back we directed the attention of retouchers to the care of their eyes, and advised those who experienced any inconvenience from the strain to lose no time in adopting remedial measures—suitable spectacles. At the same time, we stated that certain changes in the sight need cause no alarm. It would appear that many oculists are quite familiar with the work of the retoucher, for one, on visiting a London ophthalmic institution recently, and describing at some length his occupation, was met with the remark, "Then you are a retoucher." Evidently this patient was not the first that had visited the institution, as each of the staff with whom he had to do seemed to be familiar with photographic retouching.

CONVENTION NOTES.

That alteration in the laws by which a large provincial representation should be made on the Council was felt to be a step in the right direction. For the last year the Council was composed of residents in London, the idea being to ensure full attendance at their meetings. But from the fact that the real work was done by a comparative few, it was evident that if there was thus to be a merely honorary representation, it was quite immaterial whether this element of the Council resided in London or a few hundred miles away from it; and further, that in a national society the nation at large should be represented. Accordingly, with the greatest degree of unanimity, the law was altered, the Council was enlarged, and a national representation made; and the best feeling prevailed, even to the extent of some metropolitan members who were elected offering to throw up their seats rather than see any suitable provincial brother left out.

Although the usual routine of business will be managed by those who can make it convenient to attend the meetings, yet is it understood that on matters of special importance those at a distance will have an opportunity of expressing their sentiments by letter.

Since last year's meeting only two deaths, so far as we know, have occurred among the members, that of the Rev. S. J. Perry, F.R.S., and of Mr. Baynham Jones, the latter of whom was one of the oldest photographers alive. His *forte* lay in the improvement of apparatus, and many useful hints in this direction have from time to time been published by him. The trouble that this venerable man gave himself to attend the Convention meetings ought to serve as a lesson to those possessed of more physical stamina. Although the death of Mr. Hardwich took place during Convention week, and was announced at one of its recognised meetings—the annual dinner—yet was he not connected in any way with it, although we can assert that if in course of time the meeting should ever be held in Newcastle-on-Tyne, he certainly would have become a member.

The informal evening meetings, that is, those meetings that are held in the smoking-room of any suitable hotel "when the day's work is done," are very pleasant. They commence usually at the close of the last meeting for the day—say 10 p.m.—and are often numerously attended. Under the quiescent influence of the weed, and the other influence produced by ginger ale, lemonade, and stronger liquids, how merrily passes the time! Incident and anecdote follow each other with such frequency that before you know of it the midnight bell has tolled, when each bethinks himself of removing to his own quarters. These meetings originated during the Glasgow meeting in the smoking room of the Waverly Temperance Hotel.

During the excursion to Conway the vast old castle there sustained a siege such as it had never previously been subjected to. The whole hillside opposite was studded over with cameras and users of the same, some of them (the cameras) being sustained by the hand, although the majority were on stands. From any good point of view the castle is by far too extensive to get included in one picture; nothing short of a panoramic camera could do it justice. Mr. George Mason adopted a wise plan. Carefully levelling his stand, he directed his camera to one end, and by rotating it after each exposure, took it in sections.

Truly was it a pity that there was rather more than enough rain during the Convention week. This interfered somewhat with camera operations. But oh, what a number of cameras were there! Never in the history of any social or scientific outing were so many to be seen. Small matter of surprise was it that with—

> Kodaks to right of them,
> Cameras to left of them,
> Chester folks wondered;

as well they might, for one was continually rubbing against or tumbling over camera stands at almost every corner of the quaint old city. The number of photographs taken during the week must have been very great. The genial Tien Chang of the Chinese Legation, who retains his national costume in season and out of season, secured for himself a greater degree of attention from passers-by than any other member. Mr. Chang and the writer, when photographing on the walls in the vicinity of the place where their conveyance had been left, received a courteous invitation from Mr. Stivens, a dental surgeon, to inspect his collection of stuffed birds. This is one of the most complete and beautiful private collections extant, all the work of Mr. Stivens' own hands, extending over a period of forty years, and filling several rooms. He will give hearty welcome to any one who calls to see them.

One of the greatest advantages of such a Convention is the opportunity it affords of coming into personal contact with men of whom one may have heard much but has never seen. How easy and pleasant it is for those who have been nagging away at each other in print to settle their points of difference in course of a friendly chat, when each leaves the other, mentally saying, "He is a very decent fellow after all, and I have been mistaken in my former estimate of him." Good fellowship is the leading feature throughout.

When in Chester there was not much time to look around to see what the professional portraitists were doing, hence we confined our attention to the establishment of the talented Chairman of the Local Committee, of which we shall here endeavour to give some account.

The Studio of Mr. G. Watmough Webster.

In Bridge-street Row is situated Mr. Webster's well-known studio, which at once attracts attention by the chaste and tasteful manner in which are displayed the very beautiful photographs chosen for exhibition in the window, the effect of which is heightened by surroundings of hot-house plants and evergreens. This exhibition must be a matter of no small difficulty, as Mr. Webster informed us that he exhibits no portrait whatever without special permission. Entering the large reception room, we find the walls covered with high-class photographs in a great variety of styles—platinotype, and autotype in black and red, harmoniously arranged with silver prints, and here and there paintings in water-colour and oil with a photographic basis, the handling and execution of which were of a very high order. What struck us about the pose and arranging in the portraits shown

was the entire absence of forced or theatrical effect; they looked like pictures of gentlemen and gentlewomen, for they were of all class and ranks.

Passing by the dressing rooms, we arrived at the studio (again decorated with real plants), an irregular-shaped room, some thirty by eighteen feet in dimensions. This is glazed for the whole length on one side, so as to permit sitters to be taken at each end, thus permitting either right or left side of the face to be taken, and still retain the pure north light. The system of blinds described twenty years ago by Mr. Thomas Sutton in these columns is still carried out, exactly as then described, and, as we saw, is admirably simple and completely efficient, a couple of seconds sufficing to place the whole studio in darkness, or to allow a pencil of light of any width in any desired direction. The system consists of a series of blinds passing to and fro from end to end, arranged so that each series is about a yard higher than its predecessor. Each length is in three sections, and is suspended by rings attached to the blinds, and passing along lengths of thin wire kept taut by specially constructed screws, after the fashion of those used for wire fencing. We need scarcely add that a very complete series of lenses and other mechanical adjuncts for every photographic requirement formed part of the equipment of the studio.

Like every photographer who knows his work, Mr. Watmough Webster's cameras have hidden shutters, and the rapidity and neatness with which he photographs may be guessed when we say that he had taken eight different negatives of ourself before we were aware he had commenced operations. His dark room, commodious and well ventilated, had many contrivances for quick and efficient developing and finishing of negatives, a necessity in his case, as he informed us, much to our surprise, that, besides posing every sitter, he personally developed every plate. This he does at the close of the day, and when we saw him at work he was developing half-plates in batches of sixteen, eight in a dish. He employs a dish made to his own design, with wooden sides and *papier maché* bottom, provided with small wooden partitions to keep the plates from sliding on one another. One assistant puts the plates in the dishes, while another takes them from Mr. Webster as they are finished developing. The fixing was performed in grooved dishes.

Passing through the dark room we reach the first printing room, with long tables immediately under the glass, and over this was still another printing room, from which, when needed, the roof can be reached, where again is provided platform and tables for outdoor printing. We again admired the simple contrivance invented by Mr. Webster and before described by us for clipping the vignetting cards to the frames. It is a square, U-shaped piece of brass, with a screw through one arm, and allows of the removal or adjustment of the vignetter quickly and safely.

Immediately underneath the dark room is the laboratory, and on the same floor the enlarging room and the negative store room. Again, underneath the laboratory is the temporary dark room fitted up for the use of members of the Convention, the plan adopted being that in all the floors those rooms where water was used were immediately below one another, and thus damage from a possible overflow was prevented. Adjoining this "Convention dark room" lies the toning room, the dishes in use here being a series of Doulton-ware troughs. The plan adopted is to pass the print continuously from right to left through its various stages, thus avoiding the risk of contaminating any solution or washing water. We have omitted to state that the development of carbon prints (Mr. Watmough Webster's being one of the few studios in the provinces where enlarging and carbon printing are regularly carried out on the premises) is done in the floor above the silver toning room. Passing beyond this apartment we find ourselves in Mr. Webster's private office immediately behind the reception room. At the front of the building, in the highest story, are the series of rooms devoted to retouching, mounting, spotting, framing, &c., where we saw some seven or eight young ladies happily at work in those several occupations peculiarly adapted for feminine hands. According to the old proverb Cheshire is celebrated for "lasses." Mr. Webster's staff by no means belied it. We were specially struck with a light print-holder devised by Mr. Webster for those engaged in "spotting"—tedious work, too often spent at a desk or table in a cramped and unhealthy position. This rest consisted of a light board attached to a slight framework, and capable of being adjusted to any angle; the framework rested on the knees of the seated worker, and was kept from falling by a long strut hinged to it at one end and resting on the floor at the other.

Among the most noticeable pictures at this studio were a life-size portrait of the Duchess of Westminster, in sepia, the Marchioness of Ormonde, the Marchioness of Cholmondeley, the Marquis of Cholmondeley, Viscounts Combermere and Cole, the Prince de Vismes, and a host of other aristocratic names, while literature was represented by the late Dean Howson, Canon Kingsley, Judge Hughes (author of *Tom Brown's Schooldays*), politics by numerous members of Parliament, prominent among them being excellent likenesses of Mr. Gladstone and his family, Mr. Raikes, and others needless to detail.

Besides being a clever artist, a good chemist, and an expert manipulator, Mr. Webster is also a good man of business, and keeps himself in touch, not only with his customers, but with every department of his ramified business.

With these remarks we terminate our notes on the pleasant Chester meeting of the Convention. The next meeting takes place at Bath, under the presidency of Mr. William Bedford. The precise date of meeting has not yet been determined.

PRINTING IN BROMIDE.

One would imagine that with the increased price of platinum there would be a greater run on the sister process—bromide—for direct printing; whether this be so or not, it is of prime importance to endeavour to get the best results, and a critical examination of many of the *bromides* shown at some recent exhibitions seems to prove that the best results *are not*, as a rule, obtained. To say nothing at present of the *tone* of the prints, there is a "surface error" very frequently apparent, more particularly confined to the prints on smooth paper. When not visible it is, as a rule, the result of accident, for my experience is, that all makes of bromide paper are liable to the fault. Let the eye glance along the surface of many of these prints, and you will often see a stain or deposit of a soapy or greasy nature. I take it that this stain is somewhat analagous to the metallic lustrous stain often seen on ordinary gelatino-bromide plates when the development has been unduly prolonged or forced. Some plates, I believe, always develop this fog or stain when pyro and ammonia is used; so chronic, indeed, have I found the disease in certain plates that it is almost a matter of impossibility to develop them without pyro and ammonia, the exceptions being those plates which have received a full exposure, and which develop to full extent in the shortest time. It is well known in many studios that this stain is *easily* removeable, provided that the negative is not allowed to *dry* prior to action being taken. I don't think I ever met with a case which I could not cure by the timely application of a certain solution.

Those who have used bromide paper *ab initio* will know best to what extent it has improved, notably in the direction of matt surfaces, and here even there seems room for further improvement; the present rough-surface paper is very good, but something finer for small work would be desirable; a glossy, *natural*, bromide print is by no means a pleasant thing to look at, and really fit for nothing but to be painted over. But a *good* print, with clean whites, and good rich blacks, *made glossy* by contact with ebonite or collodionised glass, is much finer and prettier. It should be understood that as little gelatine as possible used in the manufacture the better, hence those makers should be avoided who use an excess of gelatine; such paper may be used for enlargements intended for work in oils, but otherwise is not desirable.

The best results in bromide printing are not necessarily obtained on the *slow* papers, but the quick papers *properly exposed* give as good results, *i.e.*, as fine a tone, and there is a pleasure in working with paper which does not require such irritating and interminable exposures; true, for landscape work and where we have to introduce *cloud effects* great care is requisite, but wax matches are plentiful and cheap, and the moderately expert manipulator need not fear. When masking the landscape for this purpose it is understood that the best material to use is something very pliable, soft, and easily worked, and of course of non-actinic colour; an old focussing cloth is, I suppose, the usual thing to use, but one of the best materials for this purpose I have found to be black wadding sold in sheets and much used by tailors and others for padding. I find it perfectly opaque, and when not too new, easily manipulated. The best bromide prints are those

which have received the correct exposures, and to ascertain this some trial will be necessary. I do not find that the papers in the market vary much, they may be relied upon at all times; and in writing particularly of such makes as the Ilford, Morgan & Kidd, and the Eastman, though these papers differ in rapidity, the rapidity is fairly uniform; therefore, if on ascertaining the correct exposure for a certain negative, and using a certain illuminant, the number of seconds be marked thereon, a further supply of sensitive paper from the same firm and of similar brand may be used without fear of failure; the prints may be exposed, stored, and developed comfortably. The same remarks apply to one's cloud negatives: use a certain brand of paper and ascertain the requisite exposure, marking on each cloud the number of seconds (of course, using a much weaker illuminant) for future use.

There is a considerable advantage in making all the exposures first and then developing; *uniformity* of tone is one advantage, and in fact the chief; the risk of staining is also much lessened. Presuming that a batch of prints is required, first ascertain the correct exposure, say ten or twenty seconds, or whatever it may be, erring, if at all, on the side of *slight* over-exposure. A print slightly over-exposed and developed with a rather weak developer, and which takes some two or three minutes to arrive at the proper stage, gives as good a tone as any, and will not be "chalky;" the developer I find best consists merely of a saturated solution of neutral oxalate of potash (made with boiling water), four or five parts to which add one part of saturated solution of sulphate of iron, leaving out the bromide restrainer altogether; to the solution may be added water, say to the extent of one-fourth. The exposed prints are immersed face down in *clean* water, which must be held in a *clean* porcelain dish; plenty of developer should be provided in another clean dish, and as the prints are developed they are transferred to a third dish containing water acidulated with acetic acid. Development should not proceed too quickly; it takes an appreciable time to get the admired velvety blacks, and by the time that stage is reached the high lights should not be veiled. The acid bath stops development, and by its action on the ferrous oxalate developer prevents the staining of the paper, provided that too many prints are not allowed in at a time and that the bath is fresh and clear. A thorough washing in water should follow the acid bath, and then twenty minutes in a fresh fixing bath (hypo, one pound to four parts of water) containing thirty drops of ammonia to the pint will complete the second stage of our operations. While in the fixing bath, prepare a bath as follows:—

Fixing bath	1 part,
Water	2 parts,
Saturated solution ferricyanide of potassium	·05 part,

more or less, according to the result desired. After fixing, immerse each print for a few seconds in the above, or place the print face up on a piece of plate glass and wash with solution, using a pledget of cotton wool; the solution is, if made stronger with the potassium salt, a powerful reducer, and nothing but *practice* will make one perfect in the use of this clearing bath. Made of proper strength, I have seen very fine work done in landscape prints by a skilful operator—clouds introduced, and two dense masses of foliage lightened, while the whole surface undergoes a *cleansing* process which completely bars the possibility of the soapy stain previously referred to.

A thorough and complete washing will complete the cycle of operations, except that, after mounting, the print is usually none the worse for a final wash with clean water applied with cotton wool.

D. D.

NOTES ON YELLOW SCREENS.

Since writing the last article on this subject, which appeared in the Journal of May 2, I have received a piece of orange glass from the manager of the photographic department of one of our leading illustrated papers, with the request that I would give an opinion as to its suitability, or otherwise, as a screen for photographic purposes. I found, on examining this piece of glass, that it was utterly useless, and worse than useless, for, in addition to the colour being unsuitable, the inequalities of the surfaces bent the rays of light in passing through it, making it absolutely impossible to get the whole of the rays in focus. I found, on inquiring, that this piece of glass had been sold with a box of, "orthochromatic" plates of German manufacture, and, perusing the instructions, I learned that the screen supplied with the plates increased the exposure *one hundred and fifty times*, *i.e.*, supposing that the subject required two seconds without the screen, it would require five minutes when the screen was employed. This fully accounted for the objection that I have occasionally heard raised against isochromatic photography, viz., that it was necessary to use a yellow screen. If isochromatic or orthochromatic photography involved the use of such a screen as I have described, I should certainly consider that the advantage gained in correcting the colour-sensitiveness of the plate was counterbalanced by the increased exposure.

Before going on to describe the use of a screen for copying oil paintings, &c., as promised in the last article, I will just enumerate a few experiments tried with screens of various shades and densities. I have painted in oil colours on a piece of canvas a representation of the solar spectrum. The colours I used were vermilion, orange, deep chrome, pale chrome, light green, ultramarine, indigo, and violet. Of course, these pigments do not truly represent the solar spectrum, but they give a very good idea of its appearance so far as solid paint can convey an idea of the beautiful band of colours produced when a ray of sunlight is decomposed by means of a prism.

When I examined this band of colours through the dense orange screen before mentioned, the vermilion and orange appeared as extremely light colours, much lighter than they appear in nature, in fact, only very slightly darker than the pale chrome shown about mid-way between the D and E Fraunhofer lines, whilst the pale green appeared very dark; the ultramarine and indigo were indistinguishable, appearing quite black; the violet, however, did not appear to be abnormally dark.

I next tested this piece of orange glass (I cannot call it a screen in the photographic sense) on natural objects, for although a dweller in suburban London I have the good fortune to live in a house which was built before the speculating builder was invented, consequently I have a fairly pleasant prospect from my windows of grass lawn and various kinds of trees and shrubs, and although not extensive, it is sufficient for tests of this kind. When I looked at the grass through this dense orange glass it appeared quite dark, whilst the newly gravelled paths (which have not yet been bleached by sun and rain) looked quite light. Further, a box hedging, which has just put out its new foliage of pale green, appeared of exactly the same tint as the dark foliage of some summer roses which were in juxtaposition. I then examined some foliage, consisting of evergreen eunoimus, poplar, chestnut, plane, and other trees. The various shades of green appeared as of one uniform tint, and (greatly to my surprise, I must confess) the reflections of white light from the shiny leaves, such as the poplar and the eunoimus, were more strongly marked when seen through the orange glass than when viewed without it. There were a few very pale streaks of white cloud in a rather greenish (sunset) sky, and I do not consider that even these would have been rendered better by means of this dense-coloured glass than it would have been by means of either of the three screens which I will now describe, and which I will call, for convenience' sake, A, B, and C.

A is an optically worked glass screen of a very pale orange tint, increasing the exposure of an isochromatic plate about two and a half times; B, a screen made in the form of a Waterhouse diaphragm, with a gelatine film covering aperture of a delicate lemon colour, this, I found, increased the exposure three times; whilst C was a screen of like pattern, but having a somewhat denser yellow film, which increased the exposure about four times; of course, I need hardly say that the exposure would be much greater with an ordinary plate. For brevity's sake I will call the orange glass D. I then examined the same subjects through A, B, and C, respectively. Through A the grass and gravel walks retained their relative values, whilst the various shades of green were clearly shown; the clouds also were distinctly shown. Seen through B the grass and foliage assumed a more brilliant yellowish green, the clouds and distance were well rendered. Finally, examining the same subjects through the medium of C the greens all appeared too light in comparison with other objects, whilst distances appeared too near through the loss of the atmospheric blue haze. I should have stated that the weather was slightly hazy. I then examined the before-mentioned imitation spectrum through the three screens. A apparently cut off some of the ultramarine, but did not alter the values of any of the other colours. B caused the vermilion, orange, and yellow to appear considerably lighter in proportion to the ultramarine, whilst the green had assumed a lighter tint, indigo not very much altered. C gave apparently the same result as B, with the exception that the contrast between the blue and yellow was increased, whilst the difference in value of the ultramarine and indigo was nearly obliterated.

I have intentionally minutely described the visual effect of these various screens, as in my experience the only way to test the suitability (so far as colour and density are concerned) of a screen is to examine the object to be photographed through it, placing the screen near the eye, and noting the effect produced on the blues in relation to the yellows. A plate should then be exposed upon the subject with and without screen, giving relative exposures according to

density and colour of screen employed. If the blue appears too dark, the screen is of too deep a tint; if, on the other hand, the blue is too light, then a deeper screen may be advantageously employed. The screens I use are supplied by Messrs. B. J. Edwards & Co., and I find the three that I have described as A, B, and C, ample for every kind of work.

There is a painting in the National Gallery which is about as difficult to photograph correctly as any that I have seen. I cannot remember the title of it just now, but it consists of some life-size figures in a sitting posture, with a portion of a stone building showing on the left-hand side, which is painted a pale yellow (cadmium or chrome). The sky is a *very* pale blue, but to the eye it appears much darker than the stonework. Photographed on an ordinary plate, this stonework comes out quite black, the sky perfectly white. But even a colour-sensitive plate will not do justice to these values unless a screen of a particular kind is employed, and from my experience on kindred subjects I should, in order to photograph that picture successfully, employ the two screens A and C, which would increase the exposure about five times. The combination of these two colours, A and C, produces a tint capable of cutting off an unlimited amount of blue without seriously interfering with the yellows. The same rules may be laid down for every description of work, including photographing flowers, landscape, &c. If a screen must be employed, always use the palest possible tint, otherwise the yellows will appear too light, whilst the blues will appear too dark.

BIRT ACRES.

THE SALTING AND EXCITING OF DRAWING AND OTHER COMMERCIAL PAPERS.*

I HAVE now to introduce to your notice somewhat of a novelty, and that is a system of intensifying paper prints. During the atrocious weather of the last fortnight I have continually found that at nightfall, which has generally taken place about mid-day, I had prints still in the frames that were underdone. When I examined these half-finished prints, I found that all the detail was there, it was simply intensity or depth of colouring they lacked; some were almost completely finished, others were but very faintly outlined, but still, if the negative were good, all the detail was there—faint, but still visible.

It at once struck me that any process of intensification would save all these prints. Of course, by means of mercury or uranium, I knew it would be quite practicable to intensify them; but I did not wish to introduce fresh chemicals into the image, but rather to have it formed as nearly as possible under the same conditions as if it were printed right out. In other words, I wished to *grow*, to adopt an electro-plating term, a silver image on the skeleton already formed by the action of light.

I turned my attention, therefore, to the old system of silver intensification used with the collodion wet plates. I am not as yet in a position to give definite working formulæ, but the several examples I hand round will, I think, show the very great possibilities of the process. As you can see for yourselves, it is possible to obtain the most beautiful tints, of a peculiary rich brown colour, and these without any subsequent toning. At the same time, it has the advantage that we are not bound to print to any particular depth, providing only all details are there; for this process cannot create (at least only slightly), but only intensifies. You can take the print out of the frame when you will. If nearly done, it requires but slight strengthening; if, on the other hand, the image is only faintly shown, the operation must be more energetic. Even after the prints have been toned, I find that they can equally well be strengthened to any desired point, should they have lost too much in the toning bath. These two examples were toned by double protochloride of palladium and sodium ($PdCl_2 2NaCl$); the salt reduced their intensity considerably, but by my intensification process, they were brought up to their present vigour.

Prints thus intensified, although naturally of a very pleasing colour, can, if it be wished, be further toned by any of the ordinary processes; my acid platinum process, for instance, gives prints of the greatest vigour and blackness imaginable.

I have here two prints taken from the printing frame to-day; one is only very slightly visible, the other is about three parts done. I shall now proceed to intensify these before you, and endeavour to so manipulate them that the one that is now the feeblest shall become the strongest and most intense. These prints were produced by the citrate of silver process I have described above. I cannot say whether paper prepared with plain nitrate would answer as well; I think not. At any rate, if the prints be in any way alkaline, I find it is impossible to manipulate them. For instance, prints prepared on the ammonio-nitrate bath are instantly blackened all over on the application of the pyro, and it is essential, if clean results be sought for, that all the solutions, as well as the print, be distinctly acid. I need hardly point out that the process must be carried on by gas or artificial light, and not by daylight, or the purity of the whites will be destroyed.

I will first take the fainter print, and after soaking it in water, I pour over it some of the citrate of silver sensitising bath. When this has flowed all over the print, I pour on a solution of pyrogallol, strongly acidified with acetic acid. You will notice that the print soon begins to darken, the vigour rapidly increasing. Before it has reached the desired intensity the solution should be poured off, and the print rinsed with a fairly strong acid solution; this will, to a considerable extent, stop further action, but there is a great tendency for the action to continue if not well washed. At this point, if it is to be toned with my platinum process, the solution can be at once applied, but if alkaline gold toning be used, it must be well washed first to free it from all acidity. No alkali should be added to the print until all the intensifying solutions have been thoroughly removed, or bad stains and general discolouration will result. (The stronger print was then intensified by Mr. Clark, the action being, however, stopped when a moderate intensification had been effected, so that in the end it was much less vigorous than the first print intensified.)

I am afraid that at present I can give you no further working details of the process than the above, nor can I say if it is applicable to the commercial ready-sensitised papers. As far as I know at present, I think that the resulting colour depends on the amount of pyro used, but am not sure of this point. I shall, of course, work out the process more fully, and make known my results when the time comes. At present I must leave you to judge, from the few first samples produced, of the capabilities of the process, which will, I venture to think, be found a boon to the amateur.

I think I have now described all the different manipulations that are proper to the preparation of sensitised papers. The operations of toning and fixing are of the same character as those employed with ordinary printing papers. Any toning bath that gives the worker good results with commercial papers will give him better results with the paper he prepares himself. It must be remembered, however, that matt papers tone more readily than albumenised papers, and therefore the toning bath should be diluted with as much again water. With the heavy varieties of papers, however, this is not necessary, as they have a distinct tendency to tone more slowly than thin papers. My own platinum toning process is most suitable, as the many examples I hand round will, I venture to think, prove.

I will not conclude, however, without pointing out that the washing and fixing of these heavy papers require to be much more thorough and prolonged than when thin paper is used. I invariably myself pass the prints through a second fresh bath of hypo, after they have been at least ten minutes in the ordinary bath, so as to ensure the hyposulphite of silver being dissolved. A pretty thorough squeegeeing between the changes of water ensures the soluble salts being removed, and the resulting prints may, I think, hope for a very fair amount of permanency.

There must be several points on which I have not touched to-night, and about which, perhaps, some of you may be desirous of obtaining information. I can only say that I shall be most happy to answer, to the best of my ability, any questions you may put. I feel very strongly on the subject of home-prepared printing papers, and in coming before you to-night and advocating their revival I feel like a second Peter the Hermit raising the standard of a fresh crusade with the object of rescuing the charming art of silver printing from the hands of the Saracenic dealers. May I hope that I have chosen a propitious spot for the unfurling of my ensign, and that I have done rightly in addressing myself to the Camera Club, where the seed that I have sown will fall on good ground, and in due time will bring forth its harvest of artistic work to enhance the beauty of our exhibitions and lift our craft another rung up the ladder of art.

LYONEL CLARK.

* Concluded from page 428.

Foreign Notes and News.

THE *Photographisches Wochenblatt* gives an amusing skit on the new photographic phraseology which attempts have been made to introduce in Germany. A photographer who has become a convert to the new terminology, after getting into various difficulties with his *employés*, hangs out a sign entitling himself a "*Lichtbildner*." Soon after this he is visited by a customer who wants to know where the photographer who formerly lived on the premises has gone to, and who, on being asked if

he desires his portrait in "sleeping-room" (cabinet) or "ladies' retiring-room" (boudoir) size, precipitately retires, to be followed by the tax-gatherer, who desires to assess the income tax on the new branch which the photographer has added to his business.

There has also been appearing in the same periodical a very entertaining photographic story entitled "A Christmas Surprise." A loving husband and wife determine each to surprise the other by means of a photograph of themselves executed in the newest style. The husband, who has discovered his wife's design, betakes himself to the same photographer and arranges to have their portraits copied in oils from the photographs and executed together on the same canvas, which he hopes will give unexpected pleasure to his affectionate spouse. But, alas! *l'homme propose*. A popular actress comes to be taken just at the time when the wife was expected, and her image finally appears united with that of the loving husband in the picture which he hands unopened to his wife. Tableau—jealousy, rage!

The Vienna Club of Amateur Photographers has arranged to hold a photographic "Salon" in April, 1891. The exhibition will be held in the Imperial Museum of Art, and the admission of works sent in will be decided on by a jury of photographers and artists.

It is announced that M. G. Balagny, of Paris, intends holding a "Conference" in Geneva, during the month of July, on the newer rapid collotype processes.

Liesegang recommends a new method of intensifying which is said to present the advantage of not in any way altering the original silver image. The negative is coated with varnish or collodion, in which an aniline substance sensitive to light has been dissolved. The negative is then exposed for a length of time to the action of light, which acts through the negative, bleaching the dye, which thus becomes bleached behind the shadows, remaining unaltered behind the lights, and thus intensifies the darker portions of the negative in due proportion. The aniline colouring matters, unfortunately, still continue to be acted on by light, so that when the negative has been used for a length of time the effect disappears and the operation must be repeated. The aniline compounds may, however, as Liesegang points out, be replaced by developable iron salts, such as those used in iron printing. The intensification then becomes permanent.

It would appear that photographs are now regularly accepted by the German courts as evidence of identity. Recently a professional beggar, who combined a little occasional petty larceny with the exercise of his regular profession, was prosecuted before one of the police courts of Berlin. He very naturally avoided putting in an appearance, but the prosecutor was permitted to establish his identity by reference to a photograph, and Barabbas was sentenced in default.

To get every German name as wrong as possible seems to be a point of honour with some of our French contemporaries. Recently the *Moniteur* gives on one page three variations of the title of the *Wochenblatt*, "Photographische Wochenblatt," "Photographisches Wochenblatt," and "Photographische Wochenblatt." And yet there are not three *Wochenblatts*, but one *Wochenblatt*!

These eccentricities may, however, be due to the misdirected enthusiasm of the printer—our own representatives of that fraternity not being above little eccentricities of a similar kind. Last week the Spree, the river on which Berlin is situated, appeared in this column spelt with a small "s," the result being to make it appear that a dignified German Photographic Society had actually been on a spree! Could it be supposed that, even if the Society in question so far forgot itself, The British Journal of Photography could ever have made use of such a colloquial expression? *O tempora, O mores!*

Our Editorial Table.

Swinden & Earp's Hand Camera.

21, Islington, Liverpool.

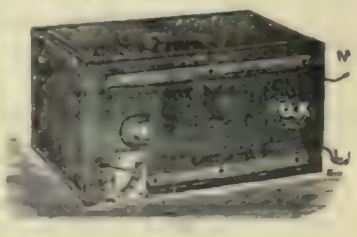
We were present when the judges at the 1889 Exhibition of the Photographic Society of Great Britain were examining the apparatus with a view to the awarding of a medal to that which was considered by them to be the most meritorious and novel, and the fact that the one medal awarded by them on that occasion was given for the detective or hand camera of Messrs. Swinden & Earp speaks volumes for the estimation in which it was held by the jurors, even although at that time the camera exhibited was not one constructed for that purpose, but was one which had been subjected to hard work, its exhibition having been urged at the last moment by one who saw in it features possessed by no others. Circumstances prevented our being able to try the camera now under notice until almost ready to start for the Chester Convention, when we devoted a hasty ten minutes to acquiring a routine knowledge of its working, and it is enough here to say that with the three dozen of plates we then exposed in it there was not a single "hitch" from beginning to end.

We shall now attempt to give a description of this prize-medal camera. First of all, the leading feature in which it differs from others consists in this, that a package of plates (twenty is the number in our case), previously backed with paper, and with no other frame or sheath, is inserted *en bloc* in a chamber at the rear of the camera, and when the door is closed it is now found to be loaded and ready for use. After exposure, a little catch handle sunk in the bottom is moved, and immediately the exposed plate falls down from its vertical position to a horizontal one in a recess below, the next one of the package standing ready for exposure; and thus it goes on until a register outside informs the user that the whole twenty have been exposed, when, upon undoing a fastening, a door in the side is opened, and the whole of the exposed plates are removed *en bloc* as before, and a second series of plates inserted for exposure.

Let us now examine the camera more in detail. Throwing open the front, we find that the lens (which, by the way, is a very good one) is attached to a front actuated by rack and pinion. There is also a graduated scale of distances indicated by a pointer, but this is quite as plainly to be seen, alongside of the finder, when the camera is closed up. On the front flap of the case, now seen laying down, is fitted an adaptation of the Kershaw shutter, capable of being timed for various degrees of rapidity. To prevent the plate from being damaged by the light while the front is opened for the purpose of changing the stop of the lens, a shutter is provided between the lens and the plate chamber, this being operated from the outside.



We have said that the lens can be focussed by a rack and pinion. This pinion is actuated by a small and flat key on the *bottom* of the camera, as shown at K in the cut, H representing the little catch handle, by the pulling of which each plate in succession is removed from the exposing chamber to the reservoir. The progress of the utilisation of the plates is indicated by the scale and automatic pointer at S.



The inventors, who are practical photographers, have thought out everything that can conduce to the efficiency of their invention, hence it is scarcely necessary to say that the camera can be used on a stand for giving time exposures as well as "instantaneous shots." We learn that Messrs. Mawson & Swan are now issuing plates ready backed with paper for use with this camera, and *apropos* of backing, Messrs. Swinden & Earp write us:—

"Although the backing of the plates is such an easy matter—we would not think of using sheaths ourselves—we are rather under the impression there is a small percentage of the photographic public who do not appreciate its many advantages as compared with carriers. To meet the requirements of this section, who like the camera, but who hesitate at the trouble of backing, and cannot readily obtain the ready-backed plates, we may at some future date make the trifling modification requisite to carry this into effect, although we would like to see the paper backing generally adopted, and no doubt it will become popular by degrees."

We, too, thought of the sheaths, and at this moment have several sheathed plates in the camera ready for exposure. We did not find any, even the simplest, modification necessary; but we do find that whereas it is capable of containg twenty paper-backed plates, it will only contain twelve when placed in sheaths—at least, such sheaths as those to which we had ready access.

A Casket of Photographic Gems.

This is a compilation of Mr. W. Ingles Rogers of Cornwall, who has been assiduously culling from our Almanacs, "Answers to Correspondents," and other sources. We have, however, come across one or

two "gems" which seem to us quite original, as the statement (Gem, No. 3) that "the full aperture of a portable symmetrical lens is $\frac{1}{8}$," whatever that may mean; or the *bonne-bouche* which concludes the collection, viz., "If you lose a lens cap, cut a makeshift out of a piece of cork."

The Preparation of Drawings for Photographic Reproduction.

By Colonel J. Waterhouse, B.Sc. London: Kegan Paul, Trench, Trubner, & Co.

This invaluable book, by the acknowledged master in processes of reproduction by photographic agency, is one which no one interested in that now important department of applied science can afford to be without. It is of much wider scope than is foreshadowed by the title above given, for although it treats with entire fulness of the art of making drawings for reproduction by photo-mechanical processes, it also contains a most lucidly written account of the various processes by which such reproduction may be effected.

Of these, five are treated, first with descriptive detail and afterwards critically, the special value and advantage of each being summarised. These processes are: 1st, photo-lithography and photo-zincography; 2nd, photo-typography or block processes; 3rd, photo-engraving or heliogravure; 4th, photo-collotype; and 5th, Woodburytype or stannotype. It will be seen that these embrace every process suited for this class of work. The remarks of Colonel Waterhouse on each of these, with all their ramifications, are characterised by the same technical ability and honest desire to keep nothing back that have rendered his previous writings on cognate topics of such value to technologists.

We have frequently of late received inquires concerning a reliable book treating of process work; and the advent of this one enables us to point to it as the book *par excellence*, as a book written by one who is most intimately acquainted with his subject, and who possesses the ability of writing with the utmost clearness.

To the more recent entrants into photographic circles we may state that Colonel Waterhouse is Assistant Surveyor-General in charge of the Photographic and Lithographic Office, Survey of India, Calcutta, and the author of several works of great value. This one is illustrated by various processes.

The Evolution of Photography.

By John Werge. London: Piper & Carter.

It is always pleasant to read the reminiscences of one who has mixed with the world, even so small a world as photography, one whose memory is good, or his note-book full; and much material for experiencing this feeling is to be found in Mr. Werge's *Evolution*.

Where he makes a mistake is in calling his work a history of photography, for to be an historian a man must occupy a much higher standpoint than has been done in this case. He must be able to see the events transpiring all around, and not suffer his range of vision to be blocked up by the presence of his surrounding coterie of friends, however estimable they may be. It is doubtless this, rather than any desire not to do historical justice to all, that has led to Mr. Werge's omission of very many events appertaining to photography, including, *inter alia*, mention of an event—nay, of his totally ignoring it—which cannot be over-estimated, viz., the introduction of the first practical emulsion process with bromide of silver by Messrs. Sayce and Bolton in 1864, concerning which Captain Abney, in the preface to the Inventories Exhibition Catalogue, said it revolutionised the production of negatives, and in which he saw the possibility of doing away with the silver bath, which was a great matter in photography, and concerning which a gold medal was awarded at that exhibition to Mr. Sayce. Could Mr. Werge have mounted a pedestal sufficiently high to look beyond his surroundings of the period, and have inspected the pages of The British Journal of Photography, in which the discovery was first recorded, he would there have been made aware of the rise and progress of this revolutionary departure from the beaten path. True, in a species of chronological record seemingly by another pen, if differences in the spelling of names afford any criterion, the bare fact is tabulated, but with such a complete ignoring of its source compared with that accorded a good deal of "small beer" which appeared in a rival paper (concerning which he now lets the public into the secret that he was an anonymous contributor) as to at least suggest a strong feeling of *camaraderie* somewhere.

This leads us to make an extract from a letter we have received which bears somewhat strongly on Mr. Werge's omissions in his book. The writer says:—"I am convinced that the only correct history of photography must be the outcome of a commission appointed to weigh all evidence and investigate all claims to recognition. That its labours would be arduous, and the difficulty of getting suitable men with time at their disposal and ability for the work would be great, we all must recognise, but many errors might be dissipated by such careful investigation. Statements are constantly being made and handed down as history which are very misleading; for example, at the Stockport Photographic Society in 1888 a gentleman delivered an address, in which he mentioned having been a photographer since 1853, and then *dry plates were unknown!* What about those exquisitely beautiful albumen dry plates of 1848–52? I saw in 1852 a large series of Roman views by Mr. Carr, negatives and prints which would do credit to a good worker to-day."

But if Mr. Werge has missed his chance of becoming a reliable photographic historian, so far as its completeness is concerned, we are glad to see that he has done justice to another revolutionary discovery, that of gelatino-bromide by Dr. Maddox, notwithstanding the fact that it too, like the other, was given to the world through our pages, which is admitted by our author, as indeed he could not otherwise well do, seeing he quotes three pages from its columns.

One-half of Mr. Werge's book is occupied by the reprinting of his own contributions to photographic literature and photographic societies, and we read these with much pleasure, especially his description of the scenery of the American Hudson river and his visit to the Potomac. In this compendium we are informed by the author that he is the author of certain anonymous articles that appeared several years ago in our contemporary under the signature of "Lux Graphicus."

The work contains several miniature collotype portraits of men of mark, such as Wedgwood, Reade, and others.

The Encyclopædia of Photography. Part I.

By W. E. Woodbury. London: Iliffe & Son.

The idea of an Encyclopædia is good, as many like something to which they can readily turn and obtain at least some general idea of any matter on which they are short of information. It was this feeling that prompted the Editor of the British Journal Photographic Almanac of 1868 to embody in that volume a photographic cyclopædia.

Mr. Woodbury says in his preface that in subsequent numbers the chief aim will be the accurate character of the information, and that the illustrations are all *very carefully* prepared by himself. It is matter of regret for Mr. Woodbury's own reputation that this aim did not also extend to the present part or number, for we feel quite certain that in after years, when he comes to have a more intimate knowledge of some of the topics on which he writes—aberration, for instance—he will feel sorry that such was ever associated with his name. How, in connexion with his first illustration, he could have allowed a set of incident rays which fall upon a surface of glass directly at a right angle to them to undergo refraction at *that* surface, while they emerge from an oblique surface of the lens without undergoing any refraction at all, is a conundrum beyond the power of any mathematician or optician to solve.

In his second diagram matters are no better, but, if possible, worse, for here he sends his rays through a concave or negative lens without considering it necessary that they should be refracted at all, and this he calls "negative" spherical aberration. He is evidently under the impression that distortion of the image is a consequence of the thickness of the lens, and the paragraph on "Aberration of thickness or distortion of the image" is perhaps the most extraordinary thing in optics that we have ever read. Under the heading "Alabastrine Process," it is stated that this was a name given by Archer to one of his processes. So far from this being the case, this name was not given until many years after Archer's death, when a bleaching solution, the composition of which was held as a secret, was placed on the market with this name attached. In describing the orthochromatic properties of alizarin, is the author not confusing this name with erythrosine? The two, we need scarcely say, are quite dissimilar.

We are sorry, for the sake of a young author, that he has got rather badly at sea in some of his definitions; but with care, attention, and the acquiring of some knowledge of his subject before he writes, we shall hope for improvement. But we would advise that in making extracts he should give the source. No one looks askance at an author who honestly says whence he got his information, especially if it be of an exceptional kind. But *apropos* of the article, "Wide Angle," Dr. Clarence E. Woodman, of America, will scarcely relish the fact of his valuable tabular investigations, which he wrote for the *New*

York Photographic Times of 1855, being abstracted without the slightest acknowledgment of either source of publication or author.

The work, however, is admirably printed on good paper and covers sixty-four pages.

Scenes of Native Life in the South Pacific Islands.

Messrs. W. A. Mansell & Co., 271, Oxford-street, have sent us some photographs of natives of the Solomon and other islands taken by Mr. Ernest W. Henderson during a cruise in the South Pacific. Among these are some really pretty girls with intelligent faces, although their drapery is somewhat scant. Quite apart from their interest to the ethnologist, artist, and traveller, the photographs, as such, are of a high order of merit.

RECENT PATENTS.

PATENTS COMPLETED.

An Improvement in Photographic Objectives.

No. 6028. Dr. Paul Rudolph, Jena, Saxe-Weimar, German Empire.—*May 24, 1890.*

My invention relates to photographic objectives, and the improvement consists in the construction of the objective of two separate systems of lenses, the individual members whereof have, relatively to each other, particular refractive properties.

A main difficulty to be overcome in the construction of photographic objectives, beside realising the other numerous conditions subject to the purpose which these objectives have to serve, consists in sufficiently compensating the astigmatism of the obliquely incident pencils of light and in removing the indistinctness of the marginal portions of the field resulting from such astigmatism. And, in fact, all the photographic objectives constructed so far possess more or less this deficiency, that with an approximately plane field the focus of a group of rays within a primary (meridional) section of an oblique pencil of rays remains at a greater distance than the focus of the group of rays within a secondary (sagittal) section of the same pencil.

After a course of investigations on the conditions whence results this anomaly and the means of mitigating its effects, the photographic objective forming the subject of this specification was arrived at. It is mainly a disymmetrical combination of lenses composed of two distinct systems of single lenses cemented together. This combination of lenses is characterised by the concurrence of the following two properties :—

(1) That in one of the two distinct systems the positive member (collecting lenses) has a smaller, in the other system, however, a greater refractive index than the negative member (dispersing lenses) cemented thereto.

(2) That each system in itself is approximately achromatised, *i.e.*, that the chromatic aberration of each of the systems, expressed by the difference of the reciprocals of its focal lengths for two different colours, is small as compared with the chromatic aberration of a single crown-glass lens having the focal length of the entire objective, the latter chromatic aberration being measured after the same manner as the former.

A combination of lenses realising both these requirements simultaneously presents particular advantages. On the one hand it admits of the astigmatic differences being removed without rendering the application of more than two distinct systems necessary, and on the other hand it yields favourable conditions for satisfying all the other requirements connected with the correction of photographic objectives.

The above-defined contrariant combination of the two distinct systems composing the objective furnishes the simplest means for compensating the astigmatic differences of oblique pencils. This is due to the fact that a system composed of lenses cemented together, and in which the collecting lens has a greater refractive index than the dispersing lens, gives rise to astigmatic differences opposite to those caused by a system of lenses the collecting lens whereof possesses a lower refractive index than the dispersing lens.

With the mode of compounding both parts of the objective as indicated above, it is therefore only necessary to choose the ratios of the single lenses in both these parts in such a manner that the opposed astigmatic differences are of the same magnitude, in view of attaining compensation of this astigmatism, or anastigmatic correction of the entire objective.

But in order that the realisation of this condition does not enhance the difficulty of achromatising the whole objective, it is essential that the objective possesses also that second property as defined at the beginning of this specification ; *i.e.*, it is necessary to effect the contrariant composition of the two separate systems in such a manner that at the same time each system may be in itself achromatised. It is, however, neither particularly advantageous nor in all cases practicable to perfectly achromatise the individual members of a double objective ; for the mere thickness which must be given to the lenses may in each member of the objective necessitate deviations from achromatism amounting to about one-fourth of the chromatic difference of the reciprocals of the focal lengths of a single crown-glass lens having the focal length of the whole objective. But it is of practical importance that the mode of composing the systems of lenses does not in itself involve any limitations even to their approximate achromatisation, and that it does not render inevitable still greater chromatic differences than are required to meet other conditions.

This last requirement may be satisfied by a suitable choice of the combinations of glass which are employed to form the two parts of the objective. The following observations may explain the principles which govern the selection of suitable glasses.

These pairs of glasses (crown and flint) which are generally resorted to in the construction of achromatic lenses (and which a few years ago constituted the sole means of obtaining achromatism) possess this characteristic feature, that a higher refractive index invariably implies a greater relative dispersive power. (Under the term dispersive power is to be understood, as usual, the quotient $\frac{\Delta n}{n-1}$, *i.e.*, the difference between the refractive indices for two different colours divided by one of these indices, or by the mean index of refraction minus one.) A pair of glasses of this kind—which may be said to be of a normal character—admits of the application of positive (collecting) systems, if achromatism is to be attained, only under the condition that the positive element has a lower refractive index than the negative.

Recent progress in glass manufacture has, however, added to the list of optical glasses other kinds of glasses which admit of such pairs being selected in which the relation of the refractive indices and the relative dispersive powers is just the opposite as in the other case, *i.e.*, in which the glass having the higher refractive index does not also possess the greater but, on the contrary, the smaller relative dispersive power. Such pairs of glasses may be said to be of an abnormal character, in contradistinction to the first-named class.

The application of pairs of glasses of the last-named or abnormal character, admits of the production of systems with positive focal lengths in which, without prejudice to the attainment of achromatism, the more refractory medium acts as the positive (collecting) element.

Accordingly, in an objective consisting of two distinct systems, the contrarious elements required for compensation of astigmatic deviations are obtained without prejudice to full liberty as regards achromatisation of each single system, by compounding one of the systems—presuming both to be positive systems—of a normal, the other of an abnormal, pair of glasses (the terms "normal" and "abnormal" being taken in the sense of the definition as given above).

The elements of actual construction of objectives as specified in Tables I., II., and III., furnish examples for the practical application of this invention under varying conditions.

The opposite character of the pairs of glasses in the two separate members of a doublet are, however, conditional to the desired effect only in case both these members are required to be positive (collecting) systems, and if both are also required to assist in a notable degree in the concentration of the rays of light, or, in other words, in the diminution of the focal length of the objective. For many purposes it may, however, be sufficient or even advantageous to assign the function of the concentration of the rays of light wholly or principally to one system (principal system), viz., in such a manner that the other need not produce any notable refractory effects in the sense of a diminution of the focal distance, it having simply and essentially to act as a correcting system, which admits of a relatively large positive or even negative focal length. According as in this particular case the principal system consists of a normal or of an abnormal pair of glasses, the positive or the negative element of the correcting system must be made to have the higher refractive index ; the nature of the pair of glasses of which the correcting system is composed, *i.e.*, whether it is of a normal or of an abnormal character is, however, non-essential, provided its focal lengths be taken very great. If, however, a negative focal length which is not very great as compared with the focal length of the principal system be given to the correction system, the latter, in order to ensure the conditions of achromatisation, must be composed of a pair of glasses of the same character as the principal system, *i.e.*, either both of pairs of glasses of the normal or both of pairs of glasses of the abnormal character.

The elements of construction as specified under IV. serve to illustrate an anastigmatic combination of lenses of this last kind, in which one of its members constitutes such a correcting system of a negative focal length, both members consisting of normal pairs of glasses.

The new type of photographic doublets thus set forth admits, as is shown by the preceding explanations and the examples appended to this specification, of many modifications of detail, which modifications do not, however, introduce any novel features. The focal lengths of both parts of the double objective may have any ratio whatever, the system consisting of an abnormal pair of glasses and likewise the correcting system—assuming this latter case to enter into consideration—may constitute either the anterior or posterior member of the combination ; finally, a great variety of glasses may be employed for carrying out the constructive principles as stated above, provided they leave sufficient scope for the selection of such pairs as are prescribed in each particular case by the foregoing directions.

All these special alternatives of practical construction are intrinsically dependent upon the particular purpose which such an objective has to serve, and the corresponding conditions regarding the aperture, the size of the field, and the degree of perfection required with respect to correction. Whenever these particular conditions on the one hand, and the optical constants (refractive index and dispersive power) of the available kinds of glasses on the other hand, are given numerically, any optician versed in the treatment of problems of this kind is enabled, guided by the preceding remarks and the examples appended at the end of this specification, to numerically determine according to known methods those elements of construction (radii, thicknesses of lenses, air distances) which will sufficiently compensate astigmatic deviation beside furnishing all the other usual corrections. In particular, no novel constructive feature is introduced by making one (*vide* Table III.) or both of the cemented systems of the doublet to consist of three instead of two lenses, which may be particularly advantageous in such cases where the objective is to have a large aperture. For inasmuch as the use of three single lenses has no other aim in view but to distribute the effect otherwise attained by a single lens over two made of the same or similar kinds of glass, the substitution of a triple for a double lens belongs to those expedients which are ordinarily made use of by practical and theoretical opticians in order to attain an increased number of elements affording means for optical correction.

In the annexed drawings three different arrangements of objectives carried out according to my invention are shown in full size, partly in elevation and partly in section. According to Fig. 1, the anterior system of lenses is composed of the dispersing lens, L_1, and the collecting lens, L_2, while the posterior system consists in the collecting lens, L_3, and the dispersing lens, L_4, all these

enses being concavo-convex. B is the diaphragm. In the objective represented by Fig. 2, the anterior system, L_1 L_2, is composed alike to the preceding one, whereas the posterior system consists in the bi-concave dispersing lens, L_3, and the bi-convex collecting lens, L_4. Fig. 3, again, shows

FIG. 1



FIG. 2

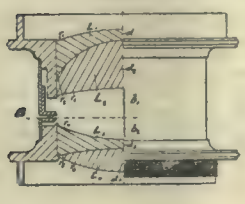
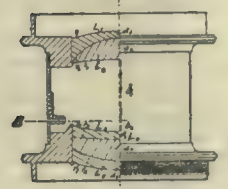


FIG 3



a like system, L_1 L_2, while the posterior system comprises two concavo-convex dispersing lenses, L_3 and L_4, and the concavo-convex collecting lens, L_5. The letters r_1 r_2 r_3 r_4 r_5 r_6 r_7, to be referred to hereafter, denote the radii of curvature of the lens surfaces to which they are applied, d_1 d_2 d_3 d_4 d_5 the central thicknesses of the lenses, and b_1 b_2 the distances between the diaphragm B and the lenses.

In conclusion, I append to this specification of my invention four examples which serve to illustrate the manner in which the principles set forth in the preceding pages may be applied to the construction of different types adapted to various purposes. All dimensions (radii, thicknesses of lenses, and air distances) are expressed by proportional numbers, the focal length of the whole objective being taken as unity. A simple multiplication of these numbers with the focal length actually required will suffice for obtaining the dimensions of any objective wanted.

The letters of the following tables correspond to the letters marked on the drawings. The different kinds of glasses are determined by the indices n_D and n_{G1}, relating respectively to the D line of the spectrum and to the Hγ line of the spectrum of hydrogen. In order to render obvious the character of the pairs of glasses used in each system, I have appended to each kind of glass the value of the relative dispersive power $\left(\frac{\Delta n}{n-1}\right)$, where Δn has been calculated for the interval from the D to the Hγ line of the spectrum, while the value of n_D is taken for n.

Examples.

Table I.

Objective of the kind shown by Fig. 1, consisting of two positive systems having greatly differing focal lengths.

Effective aperture: 0·056. Angle of field about 110°.

Radii.	Thicknesses of glass.
$r_1 = +0{\cdot}2041$	$d_1 = 0{\cdot}013$
$r_2 = +0{\cdot}0962$	$d_2 = 0{\cdot}025$
$r_3 = +0{\cdot}3329$	$d_3 = 0{\cdot}067$
$r_4 = -0{\cdot}1589$	$d_4 = 0{\cdot}013$
$r_5 = -0{\cdot}0962$	Distances of Diaphragm B.
$r_6 = -0{\cdot}1798$	$b_1 = 0{\cdot}013$
	$b_2 = 0{\cdot}057$

Kinds of glass employed:

	n_D	n_{G1}	$\frac{\Delta n}{n-1}$	
L_1:	1·55540	1·57036	0·0269	normal pair of glasses;
L_2:	1·51900	1·53047	0·0221	focal length = +1·1275.
L_3:	1·57360	1·58642	0·0224	abnormal pair of glasses;
L_4:	1·54763	1·56316	0·0284	focal length = +3·3785.

(The objective of this combination, represented in full size by Fig. 1, has a focal length of 24 cm.)

Table II.

Objective of the kind shown by Fig. 2, consisting of two positive systems having but slightly different focal lengths.

Effective aperture: 0·166. Angle of field about 75°.

Radii.	Thicknesses of glass.
$r_1 = +0{\cdot}2559$	$d_1 = 0{\cdot}012$
$r_2 = +0{\cdot}1029$	$d_2 = 0{\cdot}062$
$r_3 = +0{\cdot}4122$	$d_3 = 0{\cdot}012$
$r_4 = -0{\cdot}2058$	$d_4 = 0{\cdot}029$
$r_5 = +0{\cdot}4122$	Distances of diaphragm B.
$r_6 = -0{\cdot}1897$	$b_1 = 0{\cdot}0656$
	$b_2 = 0{\cdot}0656$

Kinds of glass employed:

	n_D	n_{G1}	$\frac{\Delta n}{n-1}$	
L_1:	1·57973	1·59357	0·0239	normal pair of glasses;
L_2:	1·50546	1·51610	0·0210	focal length = +2·325.
L_3:	1·53789	1·55250	0·0272	abnormal pair of glasses;
L_4:	1·57360	1·58642	0·0224	focal length = 1·426.

(The objective of this combination, represented in full size by Fig. 2, has a focal length of 35 cm.)

Table III.

Objective such as shown by Fig. 3, consisting of two position systems with nearly equal focal lengths.

Effective aperture: 0·180. Angle of field about 70°.

Radii.	Thicknesses of glass.
$r_1 = +0{\cdot}3408$	$d_1 = 0{\cdot}015$
$r_2 = +0{\cdot}1217$	$d_2 = 0{\cdot}044$
$r_3 = +0{\cdot}6815$	$d_3 = 0{\cdot}015$
$r_4 = -0{\cdot}3894$	$d_4 = 0{\cdot}044$
$r_5 = -0{\cdot}8763$	$d_5 = 0{\cdot}019$
$r_6 = -0{\cdot}1947$	Distances of diaphragm B.
$r_7 = -0{\cdot}3213$	$b_1 = 0{\cdot}122$
	$b_2 = 0{\cdot}024$

Kinds of glass employed:

	n_D	n_{G1}	$\frac{\Delta n}{n-1}$	
L_1:	1·55540	1·57036	0·0269	normal pair of glasses:
L_2:	1·51310	1·52461	0·0224	focal length = 1·741.
L_3 and L_5:	1·53984	1·55463	0·0274	abnormal pair of glasses;
L_4:	1·57360	1·58642	0·0224	focal length = 1·809.

(The objective of this combination, shown by Fig. 3, has a focal length of 20 cm.)

Table IV.

Objective consisting of a positive principal system and a correcting system having a negative focal length.

Effective aperture: 0·056. Angle of field about 100°.

The letters correspond to these marked in Fig. 1.

Radii.	Thicknesses of glass.
$r_1 = +0{\cdot}1928$	$d_1 = 0{\cdot}012$
$r_2 = +0{\cdot}0938$	$d_2 = 0{\cdot}056$
$r_3 = +0{\cdot}1251$	$d_3 = 0{\cdot}034$
$r_4 = -0{\cdot}3127$	$d_4 = 0{\cdot}010$
$r_5 = -0{\cdot}0834$	Distances of diaphragm B.
$r_6 = -0{\cdot}1511$	$b_1 = 0{\cdot}084$
	$b_2 = 0{\cdot}034$

Glasses employed:

	n_D	n_{G1}	$\frac{\Delta n}{n-1}$	
L_1:	1·51282	1·52421	0·0222	normal pair of glasses;
L_2:	1·57973	1·59357	0·0239	focal length = −15966.
L_3:	1·51680	1·52755	0·0208	normal pair of glasses;
L_4:	1·56490	1·58215	0·0305	focal length = +0·5956.

Having now particularly described and ascertained the nature of this invention, and in what manner the same is to be performed, I declare that what I claim is:—In a photographic objective the combination of two distinct systems of lenses, each composed of single lenses cemented together, the positive element of one system having a higher, the positive element of the other system a lower refractive index than the respective negative elements cemented thereto, and each system, being in itself approximately achromatic, substantially as described.

Improvements in Photographic Objectives.

No. 10,930. Dr. Rudolf Krügener, Bockenheim, Germany.—*June* 14, 1890.

The objectives heretofore used in photography consist almost exclusively of two halves or parts, each of these halves or parts being made of two lenses (crown glass and flint glass), which are cemented together.

The progress made in the science of photography during the last few years has considerably increased the requirements with regard to optical apparatus, whilst by the momentous undertaking of the Glastechnische Laboratorium at Jena the calculator or the designer of optical apparatus has had placed at his disposal kinds of glass enabling conditions to be fulfilled which were formerly altogether unknown.

In photographic objectives the aforesaid conditions bear more especially upon the evenness and lightness in focal depth of the picture on the plate, as regards the arrangements of the spherical surfaces.

The present invention is the result of a research which has been carried out with much labour spent in calculations, and in which many modifications have been taken into consideration.

In this research it has been found that the circumstances are most favourable if the front part or system is made of a single flint-glass lens of positive focal length, whilst the rear part or system, which may be composed in any desired manner, annuls the faults caused by the flint lens in front, and together with the former part or system, produces a picture which is planatically and chromatically correct.

As an example may serve an aplanatic device in which the rear part or system consists of a negative flint-glass lens cemented to a positive crown-glass lens.

The constants of the same for the following kinds of glass are :—

$n D = 1,506$ crown.
$n D = 1,588$ flint.

R 1. 48,25 + } front lens, flint glass.
R 2. 76,89 − } central thickness, 6,19 millimetres.

Longest distance between the front lens and rear lens = 8,26.

R 3. 76,89 } rear lens, flint glass.
R 4. 22,56 } central thickness, 1,34 millimetres.
R 5. 22,56 + } crown.
R 6. 50,74 − } central thickness, 19,38.

The system has a free opening of 25 millimetres, and a focal length of about 200 millimetres. In the present case + signifies convex, and − concave.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 14	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 15	North London	Wellington Hall, Islington, N.
,, 15	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 16	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 16	Bury	
,, 16	Manchester Camera Club	Victoria Hotel.
,, 16	Edinburgh Photo. Club	5, St Andrew-square.
,, 16	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 17	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

July 3.—Mr. G. W. Atkins in the chair.

This being the adjourned annual meeting, the election of officers was proceeded with, Messrs. C. H. Cooke and F. W. Pask acting as Auditors :—*Trustees* : Messrs. J. Traill Taylor and J. B. B. Wellington.—*Committee* : Messrs. H. D. Atkinson, F. A. Bridge, J. J. Brigginshaw, F. P. Cembrano, E. Clifton, W. E. Debenham, T. E. Freshwater, and F. W. Pask.—*Curator* : Mr. A. Haddon.—*Secretary and Treasurer* : Mr. R. P. Drage.

Mr. P. Everett proposed that a special vote of thanks be given to the retiring Hon. Secretary and Treasurer, Mr. F. A. Bridge, for the efficient way in which he had carried out his duties.

This was seconded by Mr. A. Cowan, and carried by acclamation.

Mr. Bridge briefly responded, thanking the members for their good feeling, and regretting that the limited time at his disposal had necessitated his resigning the Secretaryship.

A vote of thanks was also passed to the editors of the photographic journals who had supplied the Association with their publications.

The following report was then read and adopted :—

In presenting the eighth annual report your Committee is pleased to be able to congratulate the members on the work done by the Association during the past year. The general meetings have been fairly well attended, and the discussions have been interesting and well supported. In accordance with a suggestion made in the last report, your Committee recommenced the giving of lecturettes and demonstrations monthly. These have been very successful, and the best thanks of the Committee and members are due to those gentlemen who have given them. Among the interesting subjects introduced on these special evenings should be mentioned, *Glass Blowing as Used in our Chemical and Physical Laboratories* (Mr. A. Haddon), *The Action of Ferricyanide of Potassium on Developed Plates* (Mr. P. Everett), *Selecting Focal Distance with Detective Cameras* (Mr W. E. Debenham), *Etching on Glass* (Mr. A. Haddon), and *The Ethics of Photography and Photographers* (Mr. J. Traill Taylor). The lantern meetings have been well supported, and the competitions in connection with "Slide making," "Silver and platinum printing," and "Developing," have been productive of much pleasure and beneficial discussion. Monthly outdoor meetings have been again recently introduced, and bid fair to be very popular with those members who have Saturday afternoons at liberty. There have been a few resignations from various causes, and your Committee regrets to have to record the death of Mr. J. T. Collins, who had been a member since 1884, and was for some time a member of the Committee. In thanking all those who have in any way helped the success of the meetings of the Association during the past year, your Committee would specially urge the desirability of increasing the number of members. The amount of subscription is very small (only 5s. per annum), and it is only by keeping up the number of members that the Association can be made to pay expenses. Finally, the financial condition of the Association, as will be seen on presentation of the balance-sheet, is thoroughly satisfactory—all accounts and liabilities have been paid, and there is a balance in hand.

The next outing of the members was fixed for Saturday, the 12th inst., at Wanstead Park. Train to Forest Gate from Liverpool-street shortly after two o'clock.

A question from the box was read :—"With two plano-convex lenses of the same focus, but one having twice the diameter of the other, is there any advantage in rapidity with the larger lens when stops of the same size were used for both?"

Mr Debenham replied that for the centre of the field, and perhaps all that was included on the plate, there would be no difference towards the margin ; if a wide-angle were employed, and the stops so placed that light which would help to form the image with the larger lens fell partly outside the area of the smaller one, there would be a ring of deficient illumination in the latter case.

Another question was :—"What is the composition of dichroic fog?"

Mr. Haddon said that it was silver, as was the image.

Mr. Freshwater showed prints from negatives taken during the last outing. He mentioned that with some ready-sensitised paper he had found a good deal of blistering. The manufacturer, when complained to, said that it would not occur if ammonia were added to the hypo, and if the prints were put from the hypo into salt and water, but that was exactly what had been done.

AMATEUR PHOTOGRAPHIC ASSOCIATION.

July 2.—The annual meeting of the Council of this Society was held at 58, Pall Mall, the Right Hon. the Lord de Ros in the chair.

H.R.H. the Duke of Cambridge was elected a Vice-President, and Mr. A. Newton Melhuish was appointed Assistant Secretary.

Mr. Arthur James Melhuish, the Hon. Secretary, then laid before the Council the pictures for the current year, which had been arranged and classified by Mr. Glaisher. After a careful examination, they were pronounced by the Council to be far in advance of any previously received. They were arranged in four classes. The first class comprised 128 pictures, which were contributed as follows :—R. O. Milne, 22 ; R. Murray, 9 ; the Lord de Ros, 1 ; General Kaye, 1 ; W. S. Hobson, 5 ; F. S. Schwabe, 10 ; General Sladen, 1 ; W. Vanner, 11 ; R. Leventhorpe, 7 ; the Vicomte de Condeixa, 5 ; Mrs. Hobson, 3 ; J. C. Cohen, 1 ; Mrs. E. T. Daubeny, 1 ; Dr. Drew, 5 ; Miss Mahon, 4 ; H. O. Hutchinson, 6 ; the Rev. G. J. Perram, 1 ; F. Wrigley, 8 ; J. T. Black, 1 ; F. Griffith, 11 ; M. de Dechy, 2 ; W. Gaddum, 3 ; L. Ashburner, 1 ; Miss J. Wilson, 2 ; Surgeon-Major Foster, 3 ; and F. G. Smart, 4.

The following prizes were awarded :—To R. O. Milne, for Nos. 5, 400, 412, and 415, the first prize, a large silver goblet. F. S. Schwabe, for Nos. 15, 24, and 33, a silver goblet. W. Vanner, for Nos. 105, 106, 110, and 111, an oil painting in frame, by McEvoy. R. Murray, for Nos. 255, 257, and 262, a handsome portrait album with silver plate. F. Griffith, for Nos. 4, 7, and 14, a handsome portrait album. The Vicomte de Condeixa, for Nos. 4 and 5, a large silver medal. W. S. Hobson, for Nos. 366 and 367, a handsome portrait album. Dr. Drew, for Nos. 6 and 13, a medal. W. Gaddum, for Nos. 10 and 31, a medal. Miss J. Wilson, for Nos. 5 and 6, a medal. Miss Mahon, for Nos. 4 and 14, a medal. J. C. Cohen, for No. 7, a medal. H. O. Hutchinson, for Nos. 5 and 7, a picture in frame. F. Wrigley, for Nos. 2 and 6, a handsome portrait album. The Rev. G. J. Perram, for No. 6, a medal. F. G. Smart, for Nos. 16 and 13, a medal. General Kaye, for No. 2, a medal. M. de Dechy, for No. 55, a portrait album. R. Leventhorpe, for No. 204, a medal.

A vote of thanks was given to Mr. Glaisher for the time and attention he had bestowed on the arrangement and classification of the pictures.

HOLBORN CAMERA CLUB.

July 4.—A lecture on *Developers and Development* was delivered by Mr. A. Jones, and a discussion followed.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

July 1,—Mr. R. J. Taylor in the chair.

The President, Secretary, and Mr. Crowder showed prints of views taken at the recent excursion to Bolton Abbey and Woods.

Mr. E. Beck then read a humorous paper on *Bolton*.

It was arranged to purchase three American stereoscopes for use at the meetings, many of the members now taking stereoscopic views.

Arrangements were made for a half-day excursion to Ashopton and Derwent Hall on Saturday, July 19.

July 8,—Mr. R. J. Taylor in the chair.

Mr. Smith, the representative of the Eastman Company, gave a lecture and demonstration on their latest Kodak hand-camera and their new films, which was very instructive and interesting, proving the great advance which had been made by the Company both in hand cameras and films, after which he developed some film negatives exposed during the day at Chesterfield, which all came out splendidly.

The Saturday afternoon excursion was postponed until the 26th inst.

The Secretary announced an invitation from the Rotherham Society to join their excursion to Haddon Hall on the 17th.

OXFORD PHOTOGRAPHIC SOCIETY.

June 11,—The President (Mr. R. A. Ryman-Hall) in the chair.

It was decided to make a set of slides of selected Oxford views for loan to photographic societies. Many of the slides required are already done, and several members are actively engaged taking negatives of the other views. It is hoped that the set will be completed by the end of October.

June 19.—An excursion was made to Clifton-Hampden, near Culham. Over seventy-five plates were exposed. The members were entertained to tea b the Vicar and Mrs. Cotton, who also lent them a donkey-cart to carry the baggage.

July 3.—Several members showed their negatives taken on Jun 19, and therefrom.

Mr. Kerry showed a batch of prints (by the cold-bath platinum process bright pink colour.

It was arranged to have an excursion, instead of a lecture, on July 17, to Sutton Courtney, near Culham ; and an extra outing on Saturday, July 12, to Iffley and the neighbourhood.

The Photographic Club.—Subject for discussion, Wednesday, July 16, *Iron Printing Processes* ; July 23, *Ceramic Photography*.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

WEIGHTS AND MEASURES AT THE PHOTOGRAPHIC CONVENTION, 1890.

To the EDITOR.

SIR,—We had been looking with impatient expectation for the last issue of your valuable paper in order to read the account of the Chester Convention, knowing that among other important questions submitted was the report of the Committee on Weights, Measures, and Formulæ.

The able Secretary of the Committee, with his usual lucidity, explained in the preamble the superiority and convenience of the metrical system; further to heighten its value by the strong contrast, he compared with it—in its negative beauty—the English system. From this portion of the report we learn (what was not generally known) that the apothecaries' ounce of 480 grains after all is not legal, and that the legal one of 437·5 grains is divided in 480 parts, which increases greatly the already inextricable chaos. When arrived at this point of the report we exclaimed, "Bravo, Convention! that's a good blow at that horrible system!"

But, alas! our joy was of short duration. The Committee, after informing us that "for scientific purposes the metric system is exclusively used," declared that photographers are not intelligent enough to understand it, and required long education before they should be permitted to use it.

After throwing this gratuitous insult at the heads of thousands who, with good reason, considered themselves fully entitled to the privilege of using the language of their brothers occupied with other branches of the sciences, the Committee made a very grave error by proposing a modification of the condemned system. And what a modification! Till now we have had to deal with a bad, but only *one* system. The Committee impose on us *two:* (1) Metric; and (2) ounces and grains; but different to old ones—they shall be divided decimally, conveniently forgetting that "photographers do not possess the knowledge of decimals sufficient to enable a decimal system to be used easily and accurately," because after all they recommend the decimal system.

Scarcely twelve months have passed since the Photographic Club passed the resolution that the metric system *pure* and *simple* should be adopted by photographers, and communications were sent to other Societies inviting them to co-operate in view of the general introduction of the system, which proposition was well received. Why now put an obstruction in the path of the useful progress of our art by introducing another bad system, and thereby increasing the chaos? I believe there cannot be two opinions that the existing system of weights and measures is recognised as so bad that we cannot use it any longer. It is admitted that the metric system is good, it is already introduced all over the world, and even adopted by scientists in this country. Let us adopt it, too; we shall secure, by doing this, universal uniformity of our expressions and simplicity in calculations. Let us protest against insinuations that we are too ignorant to understand the decimals, and less intelligent than the mass of the population of Germany, the Balkan peninsula, and other countries of the Continent, who three months after the introduction of the metric system became thoroughly conversant with it.—I am, yours, &c., L. WARNERKE.

Silverhowe, Champion Hill, London, S.E.

BRITISH PHOTOGRAPHIC UNION.

To the EDITOR.

SIR,—The Organising Council of the above proposed Union meets at the Polytechnic School of Photography on Wednesday evening, July 16, at eight o'clock. Any workman who can get three or four of his fellow-workmen to delegate him may attend. Let every worker in the trade get himself sent in this way. The subjects to be discussed are the form, rules, and methods of the Union, the appointment of acting officers for London, the form of appeal for funds, and arrangements for the institution of an examining body.—I am, yours, &c., ARTHUR G. FIELD.

"THE RECORD OF PHOTO-MICROGRAPHY."

To the EDITOR.

SIR,—I have just read this paper in yours of July 4, and should like to make one or two observations upon it.

It is stated that "resolution and definition depend on angular, or rather numerical aperture." Now resolution certainly does so depend, but I do not see how definition depends on angular aperture. A glass may have excellent definition, that is, its corrections may be unequalled, and yet its angular aperture may be small. The most of Zeiss' dry lenses have small angular apertures, while their definition has seldom been equalled. Again, it is stated that N.A. 1 (the highest air angle gives the power of resolving 127,000 to the inch. This has evidently been taken from the table published on the fly-leaf of the journal of the R. M. Society, but I would like to know if the writer ever substantiated the statement. Has he ever in his own practice resolved 127,000 lines to the inch with a dry lens of N.A. 1, supposing it were possible to get a dry lens with that aperture, which it isn't?

Further, it is stated, *re* immersion lenses, that if we use not only suitable oil, but suitable glass for our condensing arrangements, we can reach 1600 pencils of light instead of 1000. No reference is here made to the object glass to be used for getting 1600 pencils. You get it solely by means of the oil and the condenser. It is further stated that "beyond this gain, *immersion greatly improves the qualities of our objectives . . . . improves illumination*, and mitigates the tendency to diffraction images." How immersion can increase the quality of the object glass I fail to see. It certainly increases the illumination, but the writer had already told us that it did so, yet he says, "beyond this gain," that is, beyond the admission of a greater number of pencils of light, it increases the illumination. The language is certainly a little loose here. He says, farther on, that Mr. Wenham *seems* to have suggested but not used the homogeneous immersion system. I have always understood that the first homogeneous immersion objectives were made by Zeiss on the suggestion and instructions of Mr. J. W. Stephenson, and that it is to this gentleman we owe the immense benefit conferred on microscopists.

Again, he says that the new Jena glass contains "fluor spar." Has he read the paper by Professor Abbe on this subject in the June number of the *R. M. S. Journal?* Does the glass "contain fluor spar," or are some of the component parts of the lenses only made of fluorite?

The writer of the paper is well known as an excellent photographer, or as he is designated, I presume by himself, "a consulting experimentalist;" but I fear his acquaintance with the microscope is not of such long standing as to warrant us placing implicit confidence in his every *ipse dixit.*—I am, yours, &c., T., R.M.S.

To the EDITOR.

SIR,—I do not wish to find fault with Mr. Pringle's admirable and very interesting paper read before the Photographic Convention, but I should be glad if he will explain the following passage, which will be found near the close of his paper:—"Penetration decreases directly as aperture increases, but decreases as the *square* of magnification. It is therefore beyond argument that *the more the aperture*, and consequently the more the resolution . . . . *the greater will be the penetration we shall obtain.*" (The italics are mine.) Now I will admit the larger the angular aperture the greater is the resolving power *on a single plane*, but this is obtained at the expense of depth of focus. Mr. Swift, sen., whose practical experience as regards microscopic objectives is second to none, has repeatedly informed me that for histological and pathological research a medium angle should be preferred to a wide one, owing to the cells of the tissue examined not being all in the same plane. Dr. Lionel Beale, in his work on the *Microscope* (fifth edition, p. 10), says much to the same effect. Mr. Pringle's statement, as reported, therefore requires considerable amendment to be consistent with facts.

Mr. Pringle also states that the new glass of Schott contains fluor spar. What a lot of trouble it would have saved English opticians if it had! Unfortunately, the truth is that Messrs. Abbe, Zeiss, and Schott gave out to the world that all the results claimed by their new apochromatic objectives could be obtained from the glass made in Schott's factory. This was absolutely false, or rather, I should say, only half the truth, for with the glass they issued the results stated by them could not be obtained, and it was only by accident that our opticians discovered the secret, viz., that one of the lenses in the combination of the objective *consisted of fluor spar*, and without this lens the correction could not be made. Whether a firm resorting to such mean practices deserves the generous encomiums that Mr. Pringle has lavished on them is more than questionable, nor can I agree with Mr. Pringle that Zeiss apochromatics show a marked improvement for visual observation, although I admit they are slightly better for photographic work.—I am, yours, &c., G. LINDSAY JOHNSON.

14, *Stratford-place, Oxford-street, W.*

RETOUCHING AND RESITTING.

To the EDITOR.

SIR,—Your correspondent Mr. Rodgers has entered on a subject calling for the earnest consideration of those photographers who have a real feeling for art. That retouching *is* an art there cannot be two opinions upon; that it should be practised by those who have a good art training must also be admitted; that, in point of fact, it should be the work of an artist.

When you consider by whom this department is carried on and entrusted to, viz., young girls and lads who have had no artistic training, is it any wonder that the likeness is so often *destroyed?* In Mr. Rodgers' case I should have asked the photographer to have had the retouching entirely removed; no doubt a few *judicious* touches might have been all

that was required. This over-retouching has become a perfect nuisance, and I believe will not be tolerated much longer.

No doubt with *proper lighting* and the *correct exposure* much of retouching may be obviated. Unfortunately, not one studio in fifty has a true photographic artistic light—I make this assertion advisedly—situation for business being the main thing thought of; the studio is erected as best you can under, often, the most adverse circumstances. These two points require grave attention by the profession: more carefully selected sites for the studio, combined with artistic knowledge of how to use a north light; the second part will follow—*very much* less retouching.

I would merely remark, finally, that the less diffused light you have in the studio the better. To obtain a fine round picture, *less light* properly directed is of more real value than any amount of general scattered light. As business is carried on at present, I mean to say it is lowering to the profession. The very idea of any man calling himself a photographer placing on his card, "If parties do not like their portraits they can have a resit free," as though they are not ready enough without calling their attention to the fact. I look upon it as a kind of touting for this undesirable result. There is one thing quite certain, photographers are **their own enemies, and they have only themselves to thank for half the nuisances they have to endure from the public. They have gradually** coached their sitters to the dissatisfied state they are in.—I am, yours, &c.,

Cheltenham, July 7, 1890. PHOTOGRAPHIC ARTIST.

BICHROMATE OF POTASH AS A COUNTER IRRITANT.

To the EDITOR.

SIR,—Mr. Wenham's letter in last week's JOURNAL reminds me that some years ago, in consequence of a suggestion that appeared, I believe, in your columns, I tried bichromate as an antidote for cyanide poisoning (of a wound), and with perfect success. Not only was the pain almost instantly destroyed, but the wound healed quickly, and left no abnormal results behind. Your article, if I remember rightly, suggested cyanide as a remedy for bichromate poisoning, and suggested the possibility of the two substances proving mutual antidotes.—I am, yours, &c., B.

THE NEW GELATINE FILMS.

To the EDITOR.

SIR,—In your leader on the new gelatine films you speak of "Obernetter" films. This is, so far, correct, as the films are coated with the well known Obernetter emulsion. The support, however, that is, the films proper, is entirely the make of Otto Perutz, of Munich, who also does the coating both of plates and films with the said emulsion.—I am, yours, &c., J. R. GOTZ.

19, *Buckingham-street, Strand, London, July* 9, 1890.

FRENCH CORRESPONDENCE.

(*From our own Correspondent.*)

Exhibition of the Vienna Photographic Club—A Large Paris Newspaper Making a Weekly Article on Photography—Meeting of the Photographic Society of France—Presentation of Books—The New Non-actinic White Light—Yellow Shade—Daguerre's Tomb—Warning to Plate Makers—M. Vidal's Colour Sensitometer—A Case of Metal Lamp—Projections of Stereoscopic Slides—The American Centenary—Busts of Daguerre ready.

THE Photographic Club of Amateurs at Vienna (Austria) invites amateurs and photographers of reputation to send them specimens of their *chef-d'œuvre*. The Club has obtained permission to open a photographic "Salon" in "La Maison Imperial de Royal des Arts et Métiers." All pictures sent will have to undergo the ordeal of a serious examination by a jury composed of amateurs and photographers before admission.

One of the leading French papers, *Le Figaro*, has determined to periodically devote a few of its columns to photographic subjects. This decision proves beyond doubt the interest that the public takes in the new art so enthusiastically followed up by so many successful amateurs and admiring devotees, who will read with delight the articles published upon an art which gives them so much enjoyment.

The Photographic Society of France met together last Friday evening, M. Davanne in the chair.

A number of new books on photography were offered to the Society for the Library by Messrs. Gauthier-Villars et Fils—*La Photographie sans Maître, Traité Pratique de Photographie Appliquée au Dessin Industriel, Manuel d'Héliogravure et de Photocollographie en Relief*. The titles of some of these works were criticised, their names not being in accordance with the terms proposed by the last Photographic Congress held in Paris. The Society expressed the desire that in the second edition the authors would modify the titles.

A discussion took place on the proposed non-actinic white light as recommended by Lumière. The fact that white albumenised paper could be exposed some time behind such a light proves nothing, the question is, How would sensitive gelatino-bromide plates act under such treatment?

The yellow stain in negatives after development was again brought forward. M. Lumière made the remark that plates exposed to yellow fog would take that tint whether they were developed by eikonogen or hydroquinone. In his opinion, the cause must be laid to a faulty emulsion.

A letter was received from the "Cure de Carnetilles en Parisis," informing the Society of the dilapidated condition of the tomb of Daguerre, as well as of his extraordinary panoramic painting in the village church. He expresses his deep regret that such a personage as the inventor of photography should appear to be forgotten. He finishes by requesting the Society to open a subscription to defray the expenses of the necessary repairs.

Messrs. Lumière, of Lyons, sent a paper to the Society on *The Action of Different Chlorides on Gelatine*. The chloride of barium dissolves gelatine in a cold solution, whereas the chlorides of potassium, sodium, and calcium do not present that dissolving action. What I could learn from the paper is that certain chlorides, such as barium, magnesium, and even zinc chlorides, should be abandoned in the preparation of gelatino-emulsions, and that this dissolving action can be utilised in the precipitation of the silver from residues.

Messrs. Mariller & Robelot presented an instantaneous shutter adapted to the front board of the camera. Nothing new, excepting that the diaphragms employed have square and not round holes, as is customary. The inventor says that this form prevents the image being reflected by the inside of the bellows upon the sensitive surface, and thus prevents fog.

The new "sensicolorimetre" of M. Léon Vidal was presented to the Society. This little instrument will be found of great service to all those who employ colour-sensitive preparations, be they isochromatic, orthoscopic, or others. The instrument is of the same size as the Warnerke sensitometer, and can be used in that gentleman's apparatus. It contains forty squares, and is composed of a series of coloured bands side by side, the top line being of a dark blue tinge, the second of a light blue tint, the third of a dark green, the fourth a light green, the fifth a dark yellow, the sixth of a light yellow, the seventh of a dark red, and the eighth of a light red hue. Each line contains five squares: No. 1, colour normal; Nos. 2, 3, 4, and 5 are modified as to intensity by bands of yellow, forming screens of different densities, such as were presented at the last meeting by Professor Stebbing. On each square is printed a letter and a number, at once showing the colour and the density of the yellow screen. The value of this instrument is now apparent. By exposing a plate behind it for a certain length of time, on developing the same it can be easily seen for what colour the plate is sensitive, and not only that, but its rapidity can be judged of by comparing the result with other plates already experimented upon. M. Vidal has rendered great service to all who employ colour-sensitive preparations for reproducing paintings, &c. The employment of such preparations having now become general, a number of manufacturers have now their preparations in the market; these being made by different formulæ, naturally give different results, and the operator will be happy indeed to know if his plate is sensitive, more or less, to the red, yellow, green, or other rays of the spectrum. To experiment upon a plate, the sensicolorimetre is placed in a printing frame and the sensitive plate laid upon it: the apparatus is stood at a distance of half a yard from the flame of a wax candle, or, what is better, the flame of a lamp as proposed by the Congress. The exposure must be exactly sixty seconds. When different plates are to be compared with each other, all must be exposed and afterwards developed in the same tray and with the same solution.

General Sebert laid before the Society an acetate of methyl lamp, such as was recommended by the late Photographic Congress. This lamp is to serve as a standard or model for other lamps of the same kind. I am certain that the Photographic Society of France would have no objection to procure for foreign societies such a lamp, to serve as a model, so that sooner or later experiments made throughout the civilised world may within a little coincide with each other as regards the light employed.

The PRESIDENT informed the Society that, as the Belgian and other foreign photographic journals have been teeming with articles upon a *dispositif* permitting to see in relievo stereoscopic pictures projected from the magic lantern, and as he had a faint remembrance that such a thing was not new, he had written to M. Molteni, asking information.

M. MOLTENI informed us that similar experiments had been gone through twenty-five years ago, and that he would renew the experiment before the members that evening. M. Molteni then distributed a piece of red and a piece of green glass to each member. Two magic lanterns were now lighted up, on one the rays passed through a red, on the other through a green medium; a stereoscopic slide was cut in two, the one was placed in the left-hand lantern, the other into the right-hand one; the two coloured images were made to lap as nearly as possible one upon the other. Upon putting the red piece of glass over one eye and the green over the other eye, when the image on the screen was looked at the colours became monochromised and a beautiful relievo could be perceived. This exhibition gave great pleasure to all the members present.

Mr. Frank La Manna, an American gentleman, President of the Brooklyn Academy, exhibited by the lantern a collection of very remarkable slides, representing the celebration of the centenary of the Presidency of George Washington at New York. Mr. La Manna was highly applauded and heartily thanked by all.

M. Cousin, Agent-Secretary of our Society, informed me that the artist to whom was confided the task of making the busts of Daguerre (which the Photographic Society of France intended to present to the Camera Club and other photographic societies of London) had finished his work, and that the busts would thus soon be ready to be sent on.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange half-plate lens (French make) for Demon set.—Address, E. GIFFORD, 127, Upper Dorset-street, Dublin.

Burton's *Photographic and Photomechanical Printing*, also *Year Book* (1889), and ALMANAC (1887), in exchange for chemical or scientific books.—Address, PARLOW, 16, Victoria-street, Triangle, Hackney.

Will exchange whole-plate portrait lens for a good wide-angle rectilinear whole-plate lens.—Address, C. MURRAY, Benhill-street, Sutton, Surrey.

Wanted, modern whole-plate camera, lens, and tripod, in exchange for hand camera and enlarging lantern. Cash adjustment.—Address, S. E. DAVIES, Troon.

Exchange showcase, four feet by two and a half feet (unpainted and unglazed), and imitation stone terrace (new this season), for backgrounds and other accessories.—Address, F. G. SMITH, Photographer, Redhill.

Answers to Correspondents.

**** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

STEPHEN IMUIN.—Any spectacle manufacturer will supply the lenses required.

PHOTO-LITHO.—Mr. Gotz, 19, Buckingham-street, W.C., is the agent for the Obernetter films.

C. EMDEN.—In photographing the interior of a conservatory we should always back the plates, even if they were orthochromatised by Dr. Mahlman's method.

EDWARD WHEELER.—Ammonia may be used, but the manufacturers recommend the carbonates. Make comparative experiments with the different alkalies, and adopt that which you find answers the best in your hands.

SIMPLEX.—Adopt the design for studio marked "C." It will prove far easier to work, and will be the most convenient for all-round work. If it can be made three or four feet longer it would be an advantage in taking groups, &c.

R. J. P.—So far as we know, you cannot prevent an apprentice, after he has served his full time, from commencing business on his own account in the immediate vicinity of your establishment, even next door, if he chooses.

J. L.—1. Abney's work will answer your purpose best.—2. The best and only practical way is to compare the plates yourself. You must not depend upon advertisements and the prices charged as any criterion of comparative sensitiveness.

HIGH PEAK.—The fading is no doubt caused by the humid atmosphere of the West Coast of Africa. Of this there appears to be little doubt, seeing that prints produced at the same time and kept at home show no signs of deterioration.

SIGMA.—The hardness of the portraits arises partly from bad lighting and partly from under-exposure. You might, perhaps with advantage, change your lens as suggested, but should first effect such a modification of the lighting as to ensure softness.

LANDSCAPE.—There is nothing better than black varnish for stopping out skies. If the paper sticks to the varnish when printed from in the sun, it shows that an unsuitable sample was employed. Try Bates's black, which may be had from most dealers in photographic materials.

K.—Without seeing the "graduate" we cannot give an opinion. From the measurements you give we should have imagined that its capacity would have been greater. Possibly it is a measure that has been graduated for some special purpose, hence does not correspond with any standard measure.

J. W.—Collotype is by no means a difficult process to work, but, like every other, it requires learning. Proficiency in any process is not to be acquired by reading, however much may be read. Although you may have adopted the formula to the letter you could scarcely expect success at the first essay.

H. HARVEY.—We presume there would be no objection to your photographing scenes, with the actors, at any of the theatres with a detective camera. It might, however, be as well to ask the permission of the managers first. They might, in addition to granting permission, give you extra facilities in carrying out your object.

CHROMO asks: "Could you kindly let me know where I can get full particulars as to working chromotypes?"—Read our article on page 533 (August 16) of the volume for last year, and if there is any further information required, write again. The Autotype Company used to issue literature in which full details were given. You might write to them also.

W. M. COLLEN.—The patent has not expired, inasmuch as the fourth year's fee was paid upon it; so that it has many months yet to run. Of course, if the fifth and subsequent years' fees are kept paid the patent will last for fourteen years from the date of application, and, under exceptional circumstances, may be extended for a still longer period.

BROMIDE inquires: "1. Would any one give me a simple receipt for silvering glass mirrors?—2. In doing bromide enlargements, especially large ones, size 12½ × 15½, I always get them stained with iron, even after being washed four times in water acidulated with strong acetic acid, in the proportion of one of acid to six of water. They do not seem in any way stained until after I have fixed them and taken them to ordinary daylight, and then they have yellow streaks on the whites. Do you think H Cl (pure) would be better than acetic acid?"—In reply: 1. A good formula for silvering glass will be found on page 187 of our ALMANAC for 1879.—2. Yes; try the substitution.

FLORENCE.—1. It is impossible in any manual to give anything beyond a description of the various processes and a brief outline of the method of working.—2. We believe a new edition is being prepared.—3. If you can get the view from a public thoroughfare there is no necessity to pay any fee. One can take any picture he likes from a public highway, provided he is not photographing fortifications and the like, where the case may be different.

GELATINO-CHLORIDE says: "I wish to coat paper with gelatino-chloride emulsion on a substratum of sulphate of barium. Can you recommend a permanent colouring matter for tinting the substratum as rose-tinted albumenised paper?"—We know of no permanent rose colour which would answer. Those used for tinting albumen paper are far from being permanent; indeed, they are very fugitive. They are coal-tar colours, and would be as permanent on gelatino-chloride paper as they are on albumen.

PUZZLED.—So far as we can see from the sketches, you have not erred, but have built a studio which requires a great deal of skill in working. Good portraits can be taken in such a building, but, at times, at a great disadvantage as regards illumination. Where a studio without top light has been recommended, a high side light has been made to take its place, and that you have omitted to secure. The studio shown in the sketch was at one time recommended, but it has now become obsolete—except, perhaps, for copying only.

G. BOUCHER writes: "Would it not be as well while Arthur Field is agitating the photographer for him to put in a word and regulate the price of photographs, as they vary so considerably? I think he would be a good man to bring forward the subject, as he appears to have a very good idea of the value of his own work, viz., *cartes-de-visite* 3*s.*, cabinets 7*s.* 6*d.* per dozen. I forward you his price list. It reminds me of a note in *Practical Photographer* of this month, "Advice to Cheap John." No doubt you have seen it. What is your idea of above prices? Can a business be successfully worked at such a low ebb? I have had over twenty years' experience, and never heard of such starvation prices, only on commons and the sands."

SCRAPS inquires: "Why will makers and others persist in giving formulæ for development in which the bromide or retarder is mixed with the alkali or accelerator? It must be evident to any one considering the subject that this puts out of our power any alteration of the relative proportions of these two constituents. So that if we want more accelerator, we can only add it combined with more restrainer, and the result places us almost where we were. Another point is, especially where the accelerator is ammonia, that the alkali becomes weakened by every withdrawal of the stopper, and the bromide is unaltered. How does the original formula hold good then? The natural remedy is to use the bromide with the developer proper, be it pyro or what not, or, perhaps better still, use all three ingredients in separate solutions."

LIGHT, writing from a provincial studio, says: "Many thanks for your reply. Can you inform me if many photographers are using the electric light in their studios, and if the photographs taken by it are generally successful? Would you advise me to introduce it?"—The use of electric light in portrait studios is extending, but in London it is chiefly employed on dark days when daylight is not available. As good portraits can be taken by the electric as by daylight. With regard to the last query we can scarcely give an opinion. In a provincial town the light is far better and more constant than it is in London; artificial light is far less needed. It may be possible that the novelty of being taken by the electric light might, in a country town, prove a commercial success.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Monthly Outing, Saturday next, July 12, to Wanstead Park. Train from Liverpool-street at seventeen minutes past two.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—Meeting on the 15th inst. at Morley-street Café, Newcastle, at half-past seven p.m. Mr. H. M. Smith, of the Eastman Company, will give a demonstration of *The Kodak and Rollable Film.*

WE have on our table Fallowfield's *Photographic Remembrancer;* Wray's *New Catalogue of Lenses; Photographic Scraps;* and Wiggin & Son's price list. Messrs. Wiggin inform us that they have fitted up a dark room, which they place at the disposal of tourists (corner of Berners-street, St. Matthew's, Ipswich).

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—Excursions proposed:—Gawsworth, &c., Wednesday, July 16; train at a quarter to ten from London-road, L. & N. W. Goyt Valley, Saturday, July 19; excursion train at twenty minutes past one from London-road, L. & N. W., to Whaley Bridge; return fare, 1*s.* 6*d.* Bollin Valley, Saturday, August 9; train at half-past one from Central to Ashley.

ENFIELD CAMERA CLUB.—A society has been formed called the "Enfield Camera Club." The objects are to popularise the art of photography and afford mutual help in photographic pursuits, by—1. The interchange of prints and lantern slides; 2. Field days, meetings, and discussions; 3. Giving advice and assistance to beginners. The subscription will be 5*s.* yearly, with an entrance fee of 2*s.* 6*d.* Meetings are held on the first and third Wednesdays in each month at the Lancaster Coffee Tavern, Enfield. The Secretary is Mr. James Dudin, "Roseneath," Chase-green-avenue, Enfield.

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CELLULOID FOR COMBINATION NEGATIVES.

How often does the landscapist find on examining the image on the focussing screen that the picture would be infinitely improved if more of the subject could be included? This it would be easy to do provided a shorter-focus lens were at hand to include a wider angle. Sometimes, however, this would not altogether meet the case, because then the subject might be rendered on a more diminutive scale than desirable. Or it might be advantageous to secure the picture on a larger scale than either the lens or camera is capable of taking, say one of ten or twelve inches by eight, while the apparatus is only of the whole-plate size. Yet the thing is simple enough.

Sometimes this end has been attained by taking two or more negatives, printing from them, and afterwards joining the prints in the mounting. All who have tried this method know quite well that the plan is not so simple as it might appear to the uninitiated; for considerable skill is necessary in order to get two or three prints of so exactly the same depth and tone—to say nothing of the often unequal expansion of the paper—that the juncture is not conspicuous in the finished result.

In former volumes we have described different methods of making combination negatives by reproducing them, and when the Eastman stripping films were first introduced, referred to them as a great acquisition in the production of combination pictures. The use of these films, however, entailed one or two little inconveniences, the principal one being the expansion and contraction of the gelatinous film under different hygroscopic conditions, while, occasionally, the temporary paper support expanded unequally, and of course the picture with it, which rendered accurate joining difficult.

With the new celluloid films no such difficulties exist, for here the material is uninfluenced alike by water or the various solutions through which it has to pass, and it can be cut to the greatest nicety either with scissors or knife. As those who work films, particularly the rollable ones, usually take a larger number of them into the field than they would of plates, they might often be tempted to expose a couple or more to secure a larger picture or a panorama if they knew the facility with which the negatives could afterwards be united and printed from as a single negative. Here are a few hints which will be useful to those who have not as yet tried their hand in this direction.

When the negatives are taken, whether they be two or more, the camera must be placed perfectly level and be made rigid, and on no account must it be moved for the other pictures, except by rotating it horizontally on the stand. In taking the negatives a fair proportion of the subject in one should be included in the next, for two reasons: first, the extreme edges of the negatives may prove a little imperfect; second, the illumination of the lens may fall off at the corners, particularly if it be one of short focus. There is still another reason why a portion of each subject should be included in both negatives, which will be seen presently. The points of juncture should be duly considered beforehand, so that they may be made where there is but a small amount of sky showing, as joins in the sky are the most difficult ones to deal with. Hence, in many instances, it will be better to take three negatives than two, as it often happens that two joins may be more easily concealed than one.

It need scarcely be mentioned that the exposure must be identical with each film. In developing the different negatives, they should all be done at the same time and in the same solution, so as to secure uniformity in density. This is easily managed with films if a good quantity of the solution be employed. In fixing, too, they should be similarly treated. The joining of the negatives requires but little skill. Supposing we have, as we recently had, three negatives of the whole-plate size taken vertically to unite, this is the way to proceed:—

Take a sheet of glass a little larger than the finished negative is to be and place it in a sloping position before a window, with a piece of white paper below to act as a reflector—or, preferably, on a retouching desk, if one large enough be at hand; then place the centre of the three negatives on the middle of the glass, and secure it, top and bottom, with strips of gum paper—we generally use the strips torn from the edges of sheets of postage stamps. This done, next take one of the other negatives and adjust it in position. Accuracy is secured by simply making the overlapping portions of the negatives to coincide with each other. The edges of this negative are then secured to the glass, as with the other. Next, the third negative is dealt with in a similar manner. When all the negatives have been secured, and the gum paper dry, they should be carefully examined to see that they have not shifted. All that now remains is to take a keen-edged penknife and cut through, with one clean cut, the overlapping portions of the film, and then take away the liberated pieces. It will now be found that the negatives are most perfectly united, and the edges butt together so closely that when held up to the light no juncture is perceptible.

In cutting through the film some little judgment should be exercised as to the direction. The cuts should never be made in a direct line, but round or through some dark portion of the subject—say, as much as possible, through foliage; or through a building, taking advantage of the doors, windows, gables, &c., as the case may be.

On a future occasion we may indicate some other useful purposes to which celluloid films may be applied in combination work.

PRINTS ON PLAIN PAPER.

In view of the rapidly increasing popularity of prints upon matt or even coarse-grained paper, we may be excused for once more reverting to a subject that has recently been somewhat exhaustively treated by Mr. Lyonel Clark, amongst others. Our remarks will be confined, however, to supplementing the excellent paper of that gentleman in the matter of choosing, sizing, and preparing the paper.

First, with regard to the choice of papers. This may, at first sight, appear to be a perfectly easy matter, dependent only upon the character of surface required, but upon closer investigation it will be found to be far less simple than at first imagined. It is impossible to judge from a mere examination of a sample of paper what effect it will give when sensitised and printed, this can only be ascertained by actual experiment; and, frequently, of two apparently identical samples of paper the results will prove totally different. Not only does the sizing affect the colour or tone of the finished picture, but also, in conjunction with the method of finishing, it exercises a great influence upon the surface of the finished print. Some kinds of paper will pass through the various baths and washings with little or no alteration, whfle others, originally smooth and hard, will turn out rough and woolly in the extreme.

If a suitable paper can be obtained, of course half the trouble is saved, and the subsequent operations are comparatively plain sailing. But it is not every amateur photographer who is so situated that he can have the selection of a large variety of papers. Certain kinds of paper are, however, readily obtainable—that is to say, certain kinds of surfaces—and if these be not photographically suitable, it is our object to show how they can be made so.

Commencing with smooth-surfaced papers for small work, nothing superior can be found, perhaps, than the plain papers specially prepared for photographic purposes where these are obtainable, which, unfortunately, is not the case everywhere. So far as purity and surface finish are concerned, these are perfect, but even with such papers the subsequent treatment is subject to variation in order to produce special effects. Where plain papers are unobtainable, a satisfactory, though, perhaps, a rather expensive substitute is to be found in albumenised paper, which is easily obtainable wherever photographic stores exist, and which is readily deprived of its albumen surface and the accompanying salt by soaking in clean water. Such an article may answer well, at least, for experimental purposes, and, if carefully dried and smoothed, will be ready for use without any special preparation in the way of sizing.

But we have secured very satisfactory results upon papers of a far commoner type than those specially prepared for photographic purposes, such, for instance, as "printing" papers of good quality. These may be obtained of beautifully even texture and smooth surface, though if submitted to the ordinary routine of salting, sensitising, and printing without special preparation, they will probably be found scarcely equal to the test, while, not being prepared for chemical purposes, the quality of the image obtained will, perhaps, not be all that could be desired. Before use, then, such papers must be sized, not only in order to strengthen them, but also with a view to isolate any impurities they may contain.

A variety of sizing materials offer themselves, but for the present purpose nothing in our experience excels gelatine rendered insoluble by means of alum or chrome alum. This strengthens and waterproofs the paper, keeps the image on the surface, which is the great *desideratum*, and renders us photographically independent of any inequalities or impurities in the paper; at the same time, the surface is left in a condition which permits of any desired subsequent modification in the next process of salting.

The size may be applied by floating the sheet on the warm solution, in which case it will be necessary to mark the prepared side, or by immersing the sheets bodily and allowing the solution to thoroughly impregnate the paper. A number of sheets can be immersed one by one, and after soaking for a few minutes they may be removed in a mass, submitted to pressure, and then separated and hung up to dry. The sizing solution we employ consists of—

White gelatine (such as Coignet's) ...	1 ounce.
Chrome alum	10 to 15 grains.
Water	60 ounces.

Dissolve the gelatine, after soaking, in one pint of the water, and the chrome alum in the remainder, and at a temperature of about 120° Fahr. pour the latter solution gradually into the gelatine, keeping it well stirred. The mixed solution must then be filtered and used without permitting it to get cold. The chrome alum may be omitted if desired, and the sheets, after sizing and drying, dipped for a few seconds into a weak solution and re-dried, but the method first given is preferable.

However spongy in texture the paper may be originally—a quality that would rob the prints of all brilliancy, and perhaps lead to great inequality—the treatment described will, by filling the pores with insoluble matter, render the surface hard and at least comparatively impermeable. We say comparatively, for it must be borne in mind that though the alumed gelatine is practically insoluble it is still capable of absorbing water, and this property enables the salting solution subsequently applied to get a hold of the surface.

If the preceding operations should cause the paper to become "woolly" from raising the fibre, it will be necessary, after drying, to hot-press the paper. This will be best done at a small cost by taking it to a manufacturing stationer's, but if that plan be not convenient a hot laundry iron may be passed over it several times, another sheet of paper always intervening. If one of the ordinary hot rolling presses for photographs be available nothing better could be employed.

If rougher surfaced prints be desired, a very wide choice of material will be found in the various grades of drawing papers—we are assuming, as before, that the specially prepared papers are not obtainable—but these will almost invariably require previous preparation as described above. This is not, however, always the case, as we have met with examples of various degrees of roughness that have permitted the salting to be done direct without previous sizing. This is particularly the case with ordinary cartridge paper, which we have found most suitable where a medium surface is desired. When the sizing is to be performed the same solution may be employed, but it will be well to allow it to act longer so as to thoroughly impregnate the paper, especially when the latter is thick. In the case of very rough drawing paper it will also be well before hanging up to dry to dab the surface over with a sponge or linen cloth in order to remove the surplus solution which would

otherwise have a tendency to collect in the hollows in the surface and produce glossy spots and unevenness generally.

It is needless to say that the rougher sorts of paper are only suitable for large work, unless, indeed, it be desired to perpetrate some special eccentricity. The very roughness of the paper prevents the necessary sharpness being obtained for fine work, and, indeed, medium-sized pictures have often a very "fuzzy" appearance when printed on the rougher kinds of paper. Where this result is feared it is a good plan, either after sizing or preferably after the next operation of salting, to hot-press the paper in contact with a smooth hard material, so as to break down or flatten the roughness of the surface. In this manner better contact is secured between print and negative, and thus better definition; while the prolonged washing after toning and fixing will restore the original roughness of surface.

It is pretty well known, as we have already stated, that the sizing material considerably affects the colour or tone of the picture, but we have to point out that that rule prevails only where a *plain* salting solution is employed, and the silver used in sensitising has to form its organic compound with the paper itself or the size it contains. In order to modify the tone, and for other reasons, it is customary to combine some organic matter with the salting solution, and this is part of our programme. We would therefore impress upon our readers that up to this stage the operations are only intended, as it were, to render the surface of the paper photographically neutral, the variations in colour and quality of the image being obtained at a later stage, as we shall describe in a future article.

The condition of the surface of the planet Mars is a subject that has been food for assertion and conjecture for a long time past, one of the most recent discoveries having been the construction of an immensely long canal by the Martian inhabitants! In all probability it will be to photography alone that the ultimate extent of exact knowledge of the interesting body will be due, and the latest real additions to our knowledge are some photographs taken by Mr. Wilson as described by Professor Pickering in the *Sidereal Messenger*. Seven negatives were taken on each of two evenings in April with one day only between the exposures, the planet thus presenting practically the same surface. Distinct and identifiable spots are seen on each photograph. Strange to relate, the spots are quite different on the two occasions of photographing, and show that a great change had taken place. It was known that the region—the pole—where the alteration was shown had been known to change, but the photograph gives the precise date and approximate extent of one of these changes.

In astronomical photography in another direction a distinct feat has been achieved. Every one is familiar with the appearance of the moon, and has seen "the old moon in the arms of the new," though it has been asserted that the visibility of the dark part of our planet is an optical delusion. Let that be as it may, the twelve-inch equatorial telescope of the Lick Observatory has been powerful enough, with the aid of dry plates, to produce a negative of the dark part of the moon's surface when just under three days old, clearly showing details upon it. The plates employed were the "Seed" plates, and the exposures given were from forty to seventy seconds.

Mr. Roberts, of Liverpool, whose photographs of difficult astronomical objects are known all over the world, is leaving Liverpool, on account, he states, of the unsuitable nature of the atmosphere for taking observations, including, we may be sure, photographic observations. His new observatory is near Tunbridge Wells, and upon his leaving Liverpool for his new sphere of operations an address was presented to him in the Council Chamber of the Town Hall, Liverpool, before a large and representative assembly. The Mayor, who presided, referred in eulogistic terms to the services rendered to astronomy by Mr. Roberts, his chosen field of astronomical photography. The address, the adoption of which was proposed by Principal Rendall, was signed by the Mayor, Principal Rendall, and the professorial staff of University College, many members of the Council and of learned and scientific societies in Liverpool, and other prominent citizens.

At a recent meeting of the Berlin Physical Society the "photographs in colours" by Vereses were exhibited, and showed conclusively that photography in colours is not much nearer of achievement. Certainly, the photographs were fixed, which others, more brilliant, have not been, but the scale of tones is very limited in extent and correctness; but although the reds were shown as reds, so also were the yellows and greens, while the blues were a nondescript colour.

The photographers at the "Zoo" may have a new sensation in photographing a fine example of the ancient breed of English wild cattle. Earl Ferrers has recently presented to the institution a fine young bull which he captured in Chartley Park, Staffordshire, this being the first occasion that the Society, since its establishment of the Gardens, has possessed an example of this breed. It is over six hundred years since Chartley Park was separated from the forest, and it is little changed since that time. The wild cattle have been preserved there down to the present day. The production of a really good photograph should be a very paying experiment.

The Right Hon. Lord Rayleigh, in his most interesting lecture on "Foam," delivered at the Royal Institution of Great Britain some little time ago, explained that the production of froth or foam was due to the foaming liquid being impure. Really pure water, or alcohol, or ether, &c., did not foam, though each of them would do so if a slight portion of one of the other liquids was present. From the same cause, to the addition of another ingredient, must be due the fact that the ammonia-pyro develops froths after a plate has been developed in it. Whether this "impurity" be the oxygen absorbed, or something of a gelatinous nature dissolved out of the film, does not now concern us. But it may be well to refer to the fact, hitherto, we believe, publicly unnoticed, of this tendency to froth. In actual practice it has a very unpleasant effect: it is extremely difficult to develop a second plate after the solution has been once used without getting the well-known transparent marks due to air bubbles. Where, from motives of economy or otherwise, the solution is required for use for more than one plate, our advice is always to use a brush to sweep the surface of the plate as soon as immersed, by which means any bubble taken down with the plate will be removed. It is at this stage, and not so much afterwards, that bubbles are dangerous.

THE ART OF RETOUCHING.

Chapter XIII.—Unsuccessful Negatives and their Treatment.

It is almost unnecessary to say that in the ordinary course of business a retoucher will have to prove his skill by working upon every possible quality of negatives. He will inevitably get them of every class—good, bad, and indifferent, and with all these he will have to establish his reputation for being a skilful retoucher by securing the best possible results in *each* case. In connexion with *commercial* photography I fear his task will be strewn with many difficulties, and the majority of the negatives entrusted to his care may truly, and in some cases flatteringly, be termed *indifferent*. From this I wish it to be understood that this class may be said to possess several degrees of quality, or the want of it. It will be well, therefore, to thoroughly consider how we may have to treat this varied class of negatives, ranging from the absolutely bad to the merely indifferent. The two negatives I have already treated (*with my pen*) were really good, in fact first class, but nevertheless requiring a great deal of knowledge and skill to retouch *properly*. I wish it to be thoroughly well understood that in the present instance I do not select these *unsuccessful* negatives with

any intention of making a sly dig at the *operator* who produced them, or in the least to hint at his inability. Quite the contrary, some of the defects are purely accidental, no doubt the result of the general hurry and pressure of business; others may be, and in many cases are, traceable altogether to inattention upon the part of his assistant. Still, this is not the point. The object we have before us is to know how to treat them successfully when they are placed in our hands, as they surely will be if we go in thoroughly for retouching.

In the present system of dry plates the loss of a *panel plate* is a very serious item, and one which the photographer must very naturally spare no pains in trying to avoid. A *first-class* panel plate, such as our best plate makers produce, costs, roughly, from two shillings to half-a-crown, and many such being spoiled must greatly affect the temper as well as the income of the photographer; hence every effort must be made to lessen, if not altogether to avoid, the necessity of taking duplicate negatives, or the still more vexatious alternative, a *resitting*.

Now the studies I have selected are two panel negatives—the one a lady in evening dress, full-length, and three-quarter face; the second an officer, three-quarter figure, and full-face. In these two may be found most of the troubles to be generally found in the class of negative under our consideration. We will begin with the lady's negative. It is not necessary to enter into the various causes for the many defects, but I can truly say the operator need not be held responsible for them. Of course, it may be said, a great number of them would not be there if he had seen them in time; but, again, *had he the time*, or was he bustled along in business, so that he had not time to calmly examine the various points of his picture? I think this is very likely, for I know many cases where this system of bustling and commercial photography exists. I think too, in this case, the sitter was an exceedingly difficult subject, and as though this were not enough, the quality of the light was anything but what it should be under the circumstances. Under these conditions we could scarcely look forward to a first-class negative. The light being bad at the time, the operator should have given a rather long *exposure* to the plate, but, the sitter being an uneasy subject, he could not do so, hence what we term an *under-exposed* negative, wanting in *detail* as well as *brilliancy*. Here we must the aid unsuccessful efforts of the operator to gain a successful result.

When printed, a general grey tone will pervade the whole picture resulting from such a negative, not one brilliant light anywhere to be seen, and as a natural result—that most objectionable of faults—*flatness* will be the leading feature. Add to this the fact that the sitter had either altered the position of her head (unobserved by the operator—*bien entendu*) just before *exposure*, or else the assistant may have badly fixed the *head-rest*, leaving a portion of it in view. By some mishap, too, a portion of her dress has taken such a form just over the shoulder as to impart a very objectionable appearance to the figure. The waist, too, is very thick and unshapely, and the dress generally is flat and wanting in force and detail. The eyes are rather hollow, and the *markings* in the face are all strong, although not suggesting an unpleasant expression. The nose is very weak, and its outline scarcely defined. There are also creases in the bust which should not be left in their present condition. The ornaments on the neck and dress are likewise devoid of brilliancy or effect. There are a few stains, too, in the background, &c. In fact, it is a most unfortunate negative, but presumably the best that could be got at the time, and had consequently to be passed, and hence the retoucher in due course finds a most uninviting undertaking before him.

Our task now is to clear away these defects and see what we can do to make a good picture, or, more correctly, a passable one. As in the case of a good negative, we must rub our *medium* upon all the parts upon which we feel we will have to work with our pencil; we can then start our labours at the forehead, working a high light where we feel it should be. In fixing all these high lights care must be taken to secure their all being in their proper places and of correct relative strength. The deep shadows around and under the eyes will require considerable reducing. All this, however, cannot be successfully accomplished by retouching them in the ordinary way. We will find it necessary, *after retouching them*, to place a little colour on the opposite side of the glass in order to stop out the light somewhat. This is very easily done by putting a little colour—I generally use black—on the *glass* (not the film side) and then *dabbing* it with the finger until it is dry; by this means the natural softness of the negative will be preserved and the desired end gained. To give the nose its due value and importance in this instance will require extreme care and judgment. The light must be very carefully drawn in—it must not be a straight or well-defined line running all down the *bridge*, but must be so placed as to impart absolute shape. This light must then be softened towards the shadow or outline, which in this case is very indistinct. In order to give a little force to this outline we must, when working the shadow side of the face, endeavour to suggest a line or shadow that will not only help to indicate the shape of the nose, but also give it strength and prominence.

The shadows falling from the wings of the nose and those from the corners of the mouth may be treated as before laid down. The treatment of the chin, neck, &c., may be the same, having due regard to the greater necessities of a bad or indifferent negative in comparison with a good one. But now, in all cases like the present one, when all this is done, the face will be found still to lack brightness and prominence. To impart these qualities, the reverse side of the negative must be matt varnished, and then with a stump charged with plumbago proceed to strengthen the face by laying it on such parts as may most require to be brightened. Done with care, this treatment will prove of incalculable value to the picture. Indeed, we may consider that the treatment of a head under the conditions stated may be carried out in the usual way—it being of course so modified as to meet the necessary requirements of the negative—with the addition of the matt varnishing and stumping.

In such cases as the one under treatment, when the dresses are light, they require a great deal of care and work to help them out. Now here we have a portion of the dress showing over the back of the shoulder, which almost gives the idea of a malformation, and must be *cut* away. For this purpose a really sharp knife will be necessary, as it is a *matter* of *cutting* not *scraping* that will be necessary to carry out this operation. With a sharp knife, therefore, you will proceed to cut away the film representing the offensive portion of the dress, and little by little reduce it to the same degree of opacity as the surrounding background. If by chance you should reduce it too much (a very likely matter), that is to say, if you reduce it to such an extent that the part cut away will print blacker or darker than the rest of the background, you will then have to apply some *medium* to the part abraded, and you can then, by using your pencil in the ordinary way, work it up to the same degree of density as the background. For this purpose a very blunt pencil will be the best, as softness is essential, the least approach to hardness or lines being inconsistent with the natural quality of the background. It is quite possible to make these alterations with such precision that no trace of the retoucher's work will be perceptible on the print afterwards. I need not say that this is a result which is most essential. Should a number of copies be ordered from such a negative, and these alterations be badly executed, it would leave a dreadful amount of work for the *spotter*, and indeed would not at all pay the photographer.

The wrist must be treated in a similar manner. First draw in lightly with your pencil what you think would represent a good figure, then proceed to abrade the film as before. Of course, where the dress is *black*, and consequently darker than the background, there will be no necessity for the use of the knife, it being possible to carry out the alterations with the pencil alone. I have known alterations such as I describe, judiciously done, so please a customer that an expensive life-size painting has been the result. All offensive creases or shadows on the bust must be removed, as such markings tend considerably to mar the beauty of the figure. In panel pictures all this is of great importance, and every little detail is worthy of a retoucher's best attention.

The ornaments round the neck and on the dress will want attention. For this get a pencil a grade or two softer than that ordinarily used for the face, and with a decided and sharp touch impart the necessary high lights. Having done this we come to the rest of the dress, which, being at present flat and of one tone, will require a lot of helping up as regards the lights. All the broad masses of light should be put in with a stump. This done, the absolutely high lights can be put in with the soft pencil used before. By this combination we secure softness and brilliancy, the two qualities before wanting in the negative under our consideration. I do not wish to convey the idea, how-

ever, that the negative treated as I direct will ever yield a really *first-rate* print, but it will so materially help it that a very *passable* picture will result from a negative completely useless. I think I may leave this subject now, and hope that the reader, should he meet such a negative, will know how to tackle it. The head-rest when showing, and all other unfortunate or offensive markings in the background, must be similarly treated.

Now for the portrait of the soldier. I do not think it very necessary to enter into the minutest details as regards the face: my instructions are, retouch it as you would the example I gave you in a former chapter, the only difference coming with the matt varnish, which we put on the opposite side to the film, and proceed to stump out those parts which should be in relief. Of course the cutting away of the matt varnish would strengthen a shadow. Owing to being packed in the regulation trunk or box an officer's coat and trousers are sometimes very badly seamed and creased. When photographed these creases appear something dreadful, and must be taken away. This is not such an easy matter as one might think at first sight, but with care it is quite possible to remove them without leaving any trace of our work. This is absolutely essential in an officer's uniform, as any trace of the work would make the tunic look old and shabby. If there should be a depression in the chest it must be removed. In the negative before me there are a lot of short creases, as though the tunic had been damp when packed away in the case, and of course they must be removed. This may mean a great amount of work, but it must be done, or else a *recalling* will be the result, for he would be ashamed of appearing in his uniform when it was in such a condition. There are also some very unsightly markings in the sleeve; they must be removed, and a sharp bit spoiling the shape of the arm must be cut away. The trousers, too, will require looking over in the same manner.

In the ordinary cabinet portraits all this labour would have been spared, but when it comes to panel-size pictures really first-rate results are required. Under these circumstances no pains must be spared upon our part to make the negatives perfect, or as nearly so as we can. I think I have mentioned almost everything which will require the retoucher's help in ordinary portraiture, and will, therefore, be able to turn my attention to other branches.

I hope the student will have been able to grasp the intentions of the last few chapters, and that I have not quite failed to thoroughly place before him the *studies* I had before me as I wrote. Later on the pictures in connexion with these chapters may be published, and if so they would be of inestimable help to the beginner. It is so difficult to explain such subjects without the aid of diagrams that much will depend upon the careful manner the reader has perused these chapters.

I can now unhesitatingly enter upon the various *methods of retouching*, or means by which we carry out the instructions I have tried, I hope successfully, to convey. I believe in knowing what you *should* do before you attempt to do it, hence I have left the "*methods*" to the end.

REDMOND BARRETT.

PHOTOGRAPHIC CONVENTION AT CHESTER.

REPORT OF THE DELEGATES.*

THE fifth annual Photographic Convention of the United Kingdom was opened at the Town Hall, Chester, on June 23, with a *conversazione* given by the Mayor of Chester. Certainly the reception was a most cordial and hospitable one, and it is flattering to note that in the opinion of a local newspaper, well capable of forming an estimate, "never before had so much artistic skill been employed in the decoration of the main corridor of the building as was brought to bear on the present occasion." After the formal reception by the Mayor of the members of Convention, the retiring President, Mr. Andrew Pringle, in the presence of the members and guests, introduced his successor, Mr. C. H. Bothamley, who, in the course of his most eloquent presidential address, while admitting that no discoveries or inventions of far-reaching importance had startled the photographic world, pointed out what minor advances have been made. With regard to photography in natural colours, there are differences of opinion as to whether the results of Herr Verescz, of Vienna, which it is understood are founded on the experiments of Carey Lea, are in advance of those of previous experimenters; at any rate, so far we can only say that the direction in which the solution of the problem is to be looked for is not yet apparent. No marked advance had been made in orthochromatic photography, and the general adoption of such methods is impeded by, among other causes, the fact that the commercial products upon which many have to depend do not at present represent the maximum possibilities of the methods. The appreciation of eikonogen and the introduction of guaiacol as developers were alluded to. The application of photography to science, the President did not hesitate to say, is the direction in which photography has won, and probably will win, its greatest triumphs, and he instanced the remarkable astronomical photographs of Mr. Ainslie Common, F.R.S., and Mr. Isaac Roberts, F.R.S. On the other hand, he deplored the fact that the number of competent investigators, apart from experimenters, was very few indeed, and strongly advocated the cultivation of scientific method, which could only be inculcated by long and careful training. Turning to the art aspect of photography, he pointed out how we have advanced in our knowledge of science and art since Mr. P. G. Hamerton's well-known criticism of the claims of photography to rank as a fine art appeared in 1873 in the *Portfolio*, and he agreed with those who would fix a limit to subjects which may be considered to come within the legitimate scope of photographic treatment. Lastly, after alluding to the efficient school of photography at Berlin under Dr. Vogel, and the splendid institute at Vienna under Dr. Eder, he advocated the development of a desire for better training, and the provision of means to satisfy the desire. Whether this could be brought about by founding a photographic institute would depend on whether it is founded on a right basis and conducted on right lines; but, after all, the future of photography would depend on the work of individuals, and every one must see to it that his own work is honest and thorough, and the best that he can do.

Our minds having been thus strengthened, the remainder of the evening was with a clear conscience devoted to indulgence in the Mayor's hospitality, the admiration of lantern pictures illustrating former Conventions, and to general sociability. The apparatus was scanned with attention, especially the splendid photo-micrographic instrument constructed for the Royal Veterinary College by Messrs. Swift.

Tuesday—a glorious photographic day—was well spent in excursions (1) to Little Moreton Hall, unfortunately in process of necessary repair, but one of the finest examples of half-timbered, moated mansions in the country; (2) to Llangollen, and by the valley of the Dee to Berwyn and Valle Crucis Abbey. The Photographic Club was well represented at both places, and you will no doubt see them fully illustrated. The first business of the evening was the presentation of the report of the Committee on Lens Standards, which was prefaced by a lucid explanation by Mr. Haddon of the means taken to arrive at a decision. The report recommends the adoption of the Photographic Society standards, with some few additions in the nature of amplification and explanation. It is satisfactory to note that there was no opposition expressed to the standard diaphragms, which, since they were first recommended, have been very extensively adopted, and now seem to be well established; but with regard to the flanges, it was evident that that portion of the report did not commend itself to those opticians who have been manufacturing lenses with mounts screwed to a different gauge, and who naturally consider the matter in the interest of those who use such lenses, and of which many thousands are stated to have been issued. In view of the fact that the decision of these opticians to abide by their own gauges had not been brought before nor considered by the Committee, it was proposed and carried that the report be once more referred back to the Committee, in order that they may confer on this point with the opticians and with the Photographic Society of Great Britain Committee. The only point now in dispute is whether the standard flanges should be 1 in., 1·5 in., 1·25 in., 1·75 in., 2 in., 2·25 in., &c., with 24 threads to the inch, as recommended by the Committee, or whether the 1·5 in. and the 2 in. should be superseded by the 1·52 in. with 32 threads, and the 2 in. with 30 threads at present in use. But whatever the final result may be, the Convention may fairly be congratulated on having aroused the opticians to a sense of the importance of coming to some agreement on this question, which is one that more or less affects all users of lenses.

Mr. Gambier Bolton, in his paper, *Animal Photography: Its Difficulties, Uses, and Abuses*, told us of the trials he encountered in securing scientific and artistic qualities in zoo-photography; how he succeeded in giving, with the expenditure of from thirty to fifty plates, the exposure of two seconds, which was necessary to show the object in all its detail, on an animal which was never still for an instant. He considered that instantaneous exposures were of little or no use, and was severe on detective camera animal photographers, though he would admit the occasional use of a hand camera with twin lenses. The perfect animal photograph should have had sufficient exposure to bring out all possible detail in the hair or feathers, and in the shadows; should be full of life, yet unstrained

* Read before the members of the Photographic Club, June 9, 1890.

natural in position and expression (not as a man would look who had just sat down on the business end of a tin tack); all four legs and the tail should show distinctly, and the mane, if any; nostrils, ears, eyes, and the hairs round them should be microscopically sharp. He urged on photographers, especially those who travel, the importance of securing faithful scientific and artistic representations of birds or animals which are either rare or fast becoming extinct, and implored them not to waste plates on such childishly easy subjects as swans, deer, cattle, and sheep. Mr. Bolton then illustrated his paper by lantern pictures, first showing the kind of representation to be avoided if results of any permanent value were aspired to, and then his own pictures showing the way to do it. These proved to the satisfaction of his audience that the immense patience and perseverance he had exercised had not been in vain, and went far to justify his own estimate of their importance and scientific value.

The next paper was an important essay by Mr. Philip H. Newman, entitled *Imagining and Imaging*, which proved to be an attack by an experienced art critic from the conventional standpoint on the doctrine and dogmas of Mr. P. H. Emerson contained in his *Naturalistic Photography*. It is comforting to find at the outset the rival combatants agree in paying tribute to photography as an art, and in admitting its claims to be a legitimate means of artistic expression. The combat seems mainly to resolve itself into one of mere words. Each sees individuality in Van Eyck's *Jean and Jeanne Arnolfini*, though the one calls it conventionalism, while with the other it is the absence of that quality. Perhaps Mr. Newman's strongest point is where he charges Mr. Emerson with not permitting the freedom to others he takes himself, especially when he is taken at his word and his principles judged by his own works, though it must be observed that they can shake hands when treating of the expression of detail by photography, and presumably also on the question of composite photographs, nothing being said on this latter subject. As these two last are the points which have most agitated photographers, and as the treatment of historical and mythological subjects is by common consent determined to be beyond the range of legitimate photography, we, as spectators, cannot but feel that Mr. Emerson's position is, on the whole, not materially weakened by this clever onslaught.

The annual meeting of the members was held on Wednesday morning, when it was resolved that the next Convention (1891) be held at Bath. It having been generally felt that provincial members should, in the interest of the Convention, be more largely represented on the Council, an alteration of rules was made to the effect that the Council shall consist of forty members, of whom not more than twenty shall be London members, and five members from the locality where the Convention shall be held in the following year. Power was also given to alter or amend the rules at any special general meeting called for the purpose. In spite of the rain most of the members proceeded by steamboats up the River Dee to Eaton Hall, where they assembled on the terrace and were successfully photographed, in the face of the adverse conditions which still prevailed, by Mr. Watmough Webster. In the evening the President (Mr. Bothamley) explained that the detailed results of his recent experiments with rhodamin would be deferred until they are more complete than he has at present had time to make them. Mr. Paul Lange then gave an interesting account of a recent visit to Norway, interspersing it with valuable hints to intending visitors, and illustrating it by a number of fine lantern pictures taken with a hand camera.

On Thursday the excursions were to Conway and up the valley of the Conway river as far as Llanrwst and Trefriw. The weather during the day was all that could be wished, and your delegates determined to join the Trefriw party. Each started with the impression that the other had found salvation through Mr. Gambier Bolton, F.Z.S. Imagine, therefore, their mutual surprise when, casting away their crowns, they found themselves childishly hurrying after a trivial group of cattle, which they suddenly resolved to image. This trip into North Wales involved the loss of the evening's papers, the first being the report of the Committee on Weights and Measures drawn up by the President. The feature of the report is that it recommends, in dealing with formulæ, "a method which is independent of the system of weights and measures used, provided that the relation of the unit of weight to the unit of measure is the same as that which exists between the gramme and the cubic centimetre, or the ounce and the fluid ounce." It is recommended that formulæ should give the number of parts of the constituents by weight or measure to be contained in some definite number of parts by measure of the solution. The mixture can then be made up according to the unit selected, either in (1) grammes and cubic centimetres, or (2) grains and fluid grains, or (3) ounces and fluid ounces. The report, we understand, was well received, and without dissent adopted.

Mr. Andrew Pringle's *Record of Photo-micrography* pointed out the difficulties that had been encountered in rendering bacteria on account of their colour. This difficulty had led more than one eminent bacteriologist to abandon the use of photography for the purpose; colour-correct photography, however, is now removing this stumbling-block of the earlier workers. Reviewing the optics of the subject he pointed out the advantages derived from the immersion system, and from the later Zeiss objectives, and looked for the time when every candid investigator would employ photography, the only scientific method of delineation.

Mr. Friese Greene's paper, *Suggestions*, was, at his desire, taken as read. He exhibited his magazine camera, but, owing to some hitch in the optical arrangement, he was unable show the results on the screen to his satisfaction.

On Friday many of the members might have been seen with their cameras busily securing reminiscences of Chester architecture, ancient and modern, the projected excursion to Liverpool being evidently considered less attractive. Later in the day Hawarden Castle was the object of attraction.

The annual dinner at the Grosvenor Hotel, at which about sixty members were present, happily completed the programme.

The Chester Convention of 1890 was thus practically brought to an end, and although, perhaps, the number of members from the Chester district was not so large as might have been desired, there was no question as to the success of the meeting. All who did attend, we cannot but feel, are considerable gainers both mentally and physically. It is one thing to attend such a meeting and have the events indelibly impressed on the memory, it is quite another thing to read or perchance merely skim the papers as they appear in the journals, or to listen to such an imperfect report as can be brought before you on an occasion like the present. It is good to be in a position to exercise our own individual judgment on the interesting matter put forward for consideration, and thus to bring our influence to bear to direct the future course of the development of what at present are little more than the germs of photographic knowledge. In photography, less perhaps than in most other pursuits, can any one afford to take up an entirely independent position. Each must recognise the principle of inter-dependence, and it is for these reasons that we would urge you to support the Convention, seeing that it has no other aim or claim to encouragement than in so far as it tends to advance the interests of our chosen occupation.

WILLIAM BEDFORD,
R. P. DRAGE, } *Delegates.*

A NEW PROPERTY OF GELATINE.

WHILE studying the action of metallic chlorides on bromide of silver gelatine, we have made the discovery that gelatine will dissolve cold in a solution of barium chloride. The consequences for photography which may arise from this peculiar property have induced us to examine into the matter further. Other bodies which present a similarity from a chemical point of view, such as the chlorides of potassium, sodium, calcium, &c., do not display this capacity for dissolving gelatine, nor do their iodides or bromides. The chloride of strentium is, however, an exception, and possesses the same property as the chloride of barium, though in a much smaller degree.

With a solution of fifteen per cent. of barium chloride the solubility is so great that sufficient gelatine may be dissolved to render the solution syrupy. The liquid keeps well and does not decompose under the action of the air. Allowed to evaporate spontaneously, it leaves behind a solid white substance, which, when examined under the microscope, shows itself to be composed of an amorphous mass of filaments mixed with chloride of barium; but it does not appear that any combination has taken place between the two substances. This solid substance dissolves in water without leaving any sediment behind. When the barium salt is precipitated by means of sodium sulphate, chloride of sodium is obtained in solution, and the gelatine does not then solidify in the cold.

From these observations we have drawn two conclusions which may be of practical use in photography. These are:—

1. The presence of barium chloride in gelatine emulsions should be avoided. We have sometimes found traces of this compound in chloride of silver gelatine, and have then observed that the films have a tendency to detach themselves from the plate.

2. The property we have observed might be employed in treating emulsion residues.

It suffices to add barium chloride to the said residues to cause them to dissolve in the cold. If the liquid be then diluted till it be no longer viscous, the haloid silver collects at the bottom of the vessel, and the dissolved gelatine may be removed by washing and decantation. The employment of heat and acids may thus be avoided without causing the cost of money to be much raised.

Finally, the chloride of barium may be employed for developing carbon prints in the cold, but in this case the image shows a tendency to leave its support. A. & L. Lumière.

—*Moniteur de la Photographie.*

FLASH-LIGHT PHOTOGRAPHY.

The Atelier of Professor Schirm, Berlin.

Until quite recently I considered the magnesium flash light suitable chiefly for photographing dark caverns and sombre interiors, where light found difficult entrance. Of course I knew that in the hands of a select few, good negatives of groups and interiors were secured, but that flash-light photography was as practical (and perhaps even more so in this country) as daylight I had not the least idea.

A few weeks ago I was in Berlin, and naturally visited my friend Professor Vogel. When I asked him what things of special photographic interest I might this time find in Berlin, he asked me if I were interested in flash-light photography, and finding that I was, at once gave me an introduction to Professor Schirm.

Professor Schirm is one of those cultured men that one delights to meet. His profession is that of painter; he is also a clever experimentalist, and latterly he has taken up flash-light photography as a pioneer to show Berlin and the world that it is the thing of the future, and I think he will succeed. From the first time I entered Professor Schirm's studio I was convinced that, properly used, the magnesium flash light was in many respects a worthy competitor of sunlight itself, and certainly infinitely superior to the electric light.

It was in the early days of the magnesium flash light, when others were working with magnesium powder mixed with various oxidising materials, and often at great risk and danger to themselves, and besides which, burning the mixture in the most ineffectual manner as far as actinic light value was concerned, that Professor Schirm quickly perfected apparatus for burning magnesium powder alone, which, for simplicity, effectiveness, and uniformity, cannot at present be excelled.

The professor's *atelier* in Potsdamerstrasse, one of the finest streets in Berlin, is certainly quite unique. The rooms occupied for photographic purposes are situated on the first floor—in fact, ordinary dwelling rooms—so that necessarily there is neither top light nor blinds of any description. Besides the reception and other rooms there are two operating rooms, the chief difference being that one is larger than the other. The principal photographic accessories in these rooms consist of a camera and fittings, and the various rubber tubes, pneumatic and gas, leading to the flash-light burners, which are placed along the top of the room about a couple of feet below the ceiling. In the smaller room there may be about ten of these lamps distributed around the room, in the larger perhaps ten to fifteen. Only a few of these flames are required at one time, usually only three or four, even for groups of five persons, size of plate being not larger than 18 × 24 cm. Even for so-called large work rarely more than six to eight flames are required, whether day or night.

The lamps, which are really Bunsen burners, are so constructed that the act of turning on the gas also automatically opens the valve for letting the magnesium free to pass into the flame. The magnesium is also automatically supplied by means of a hopper; so we see that as many Bunsen burners may be lighted as necessary, and when the pneumatic pear is squeezed, magnesium powder will only be driven into the lighted flames. As soon as one exposure is made, more magnesium at once drops down into the hopper neck and is ready again to be driven forwards. The method is also quite uniform as regards quantity of magnesium supplied, whilst it can always be adjusted more or less if necessary. The exposure is worked electrically and pneumatically. When the pneumatic pear is pressed, it opens the shutter in front of the lens and also drives the magnesium powder through as many flames as are lighted; then, at a moment just before the whole of the flash-light necessary is utilised, the shutter is closed electrically; by this means no appreciable movement of the sitter due to sudden light can take place during exposure.

I have already stated that the lamps employed are Bunsen burners. They are so constructed, however, that perfect combustion does not take place; that is to say, that only an insufficient amount of air is allowed to mix with the gas before combustion. This is necessary, for if there were perfect combustion before blowing the magnesium through the flame, the act of drawing in so air through the flame would be a cool if too much, due to excess of air over that necessary for perfect combustion, and the magnesium would not be burnt to advantage so far as the maximum actinic effect is concerned; whereas, if there be imperfect combustion before the admission of air and magnesium, the flame will at once get its maximum of heat intensity, and the maximum light intensity will also be obtained.

When flash-light lamps have to be carried about, Professor Schirm has devised a lamp burning with spirit of the following construction:—



a b is the tube connected with the pneumatic pear, and running into the middle of wick; *A* is the magnesium reservoir; *c* is the wick; *d* cover of same. M is a cock with tapered hole, which, when turned vertically, allows the magnesium powder to fill it. When now turned a quarter turn, the hole is naturally horizontal, and by means of the pneumatic ball the powder is driven onwards through the spirit flame.

By means of the sliding groove the magnesium reservoir can be detached, and the cover of wick secured down tight.

One trouble may be, though very rarely, met with; that is, a charge of powder may be imperfectly, or not at all, supplied. This is due to the fact that the magnesium powder, which is made by scraping magnesium by rapidly revolving steel brushes, consists of more or less pointed spicules with sharp edges, allowing the powder more or less to bind together. The professor is thinking of remedying this defect by placing the powder in a barrel and allowing it to revolve for a week, or whatever time is necessary to remove all angularities.

The quantity of magnesium burnt in each lamp can be varied, it is usually about ·03 gramme, but ·05 gramme may be considered a maximum quantity. The quantity being so small, the repeated flashes (which I have myself seen) of half a dozen lamps give practically an inappreciable amount of smoke. The cost of these flashes is really quite trifling. The powder in Berlin is forty marks per kilo, or less. The cost of burning one flash will therefore be ·2 pfennig, and as eight pfennigs equal an English penny, the cost in English money will be about one-fortieth of a penny, so that, even for five or six lamps, the cost may be considered a negligible quantity.

The lenses used by the professor are Voigtlander Euryscopes, usually with medium-sized stops; he also uses Steinheil antiplanat, which he employs chiefly for groups.

Professor Schirm is not content with taking negatives of sitters with the flash light, but practically does all his printing and copying by the same means. The paper he uses for his contact work is the chloride developable paper of Dr. Just, of Vienna. For making exposures in this case the flash lamp is placed in a properly constructed cupboard with glass front about 24 inches or more square. In front of the glass the distances are measured off in centimetres. The negative is placed at what is judged to be a suitable distance from flash, if not found correct a second trial exposure (nearer or further removed from flash apparatus) is usually found correct, and the exposure can be marked on the envelope containing the negative, so that at any time a properly exposed print—the flash being always perfectly uniform—can be made without any preliminary trial. Lately, however, at my suggestion, Professor Schirm has been trying Alpha paper, and finds that it answers his purpose better than anything else.

It is interesting to compare the actinic value of the Schirm flash lamp and electric light. Professor Vogel states that Professor Weber found the flash of ·03 gramme powder burnt at a distance of a metre equal to that of one and a half direct sunlight. Professor Vogel found that the flash of three lamps, the flash lasting one-tenth of a second, equal to the light of five arc lights during three seconds—the strength of the arc lights being given by him as 50,000 candles. This seems somewhat large, but allowing 3000 candles per lamp, or 15,000 for the five, this would make the value of three flash lamps 450,000 candles

for one-tenth of a second ($3 \times 10 \times 15{,}000$), or 150,000 for one lamp using ·030 gramme magnesium powder.

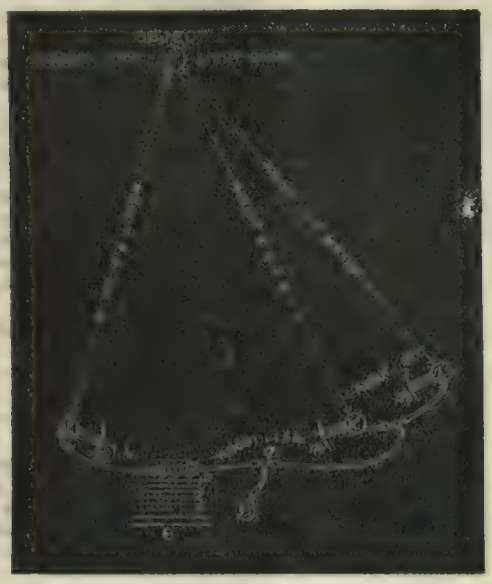
Another way to get at the photographic value of these flash lamps. Professor Schirm finds that Alpha paper requires (for ordinary negatives) one flash at 60 cm. (24 inches about). The exposure I find Alpha requires is usually one minute, using a gas flame of about 15 candle power, and distance 15 cm. (6 inches), therefore at 60 cm. the candle power required would be as $15^2 : 60^2 :: 15 : 240$; but as the flash only lasts about one-tenth of a second instead of a minute, we must again multiply this number by 600. $\therefore 600 \times 240 = 144{,}000$ candles, the photographic light value of one of Schirm's lamps burning only ·03 magnesium powder.

As regards what can be done by flash-light photography, Professor Schirm states that Herr von Delden, in Breslau, attended a fancy-dress ball, and during the hours from 9 p.m. to 5 a.m. took forty negatives of groups and single pictures, using six to eight lamps, and obtained forty perfectly exposed negatives; in fact, such a record of results as could seldom be obtained during daytime, and certainly never beaten.

Professor Schirm, however, far exceeded this feat, for last winter he attended a fancy-dress ball in Berlin, and during the night, from nine p.m. till five a.m., he took no less than 218 pictures, a considerable number being taken on orthochromatic plates, using a yellow screen. I have a little collection of these results—some fifeeen to twenty, which the Professor gave me—and all who have seen them agree that nothing better has ever been produced by flash-light photography.

In consequence of the success achieved by Professor Schirm, many German photographers in Berlin and elsewhere have already fitted up their studios with lamps; some work with lamps exclusively day and night, whilst others use them as an accessory to help the work during dull weather, thus placing them practically independent of daylight. The only marvel to me is, that in a country like ours, with such a changeable climate, with rarely two consecutive days alike, flash-light photography has not become the general thing. The lamps are at once so easy to manipulate, and so certain as regards correct exposure, "you cannot over or under-expose," the professor remarked, for daylight may always be taken as almost a negligible quantity.

I conclude by giving a sketch for arrangement of lamps as suggested



L, L′, L″ are lamps.

by Professor Schirm when only three are used. Such is suitable for small groups and single figures. I think the diagram is self-evident without further explanation. In a following short article I shall touch further on two or three points of scientific interest.

J. J. Acworth, Ph.D., F.I.C., F.C.S.

THE FORTHCOMING EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

The exhibition will be inaugurated by a *conversazione*, open to members and their friends, at eight p.m. on Saturday evening the 27th of September.

The exhibition will remain open daily (Sundays excepted) from Monday, the 29th of September, until Wednesday, the 12th of November; admission (from ten a.m. till five p.m.), one shilling. It will also be open every Monday, Wednesday, and Saturday evenings; admission (from seven to ten p.m.), sixpence.

Members have free admission at any time, and will be supplied with tickets to admit their friends.

Medals will be placed at the disposal of the judges for artistic, scientific, and technical excellence of photographs, and for lantern transparencies and apparatus.

In accordance with Rule No. 37 of the Society, the under-mentioned gentlemen have been elected by the members to act as judges, and have consented to serve:—Capt. Abney, R.E., C.B., D.C.L., F.R.S.; Valentine Blanchard, W. England, J. Gale, Henry Moore, A.R.A., H. P. Robinson.

Photographic Pictures.—Each exhibitor will fill up a printed entry form (supplied by the Society). This must be enclosed, with letter of advice, and addressed to the Secretary, Photographic Society of Great Britain, 5A, Pall Mall East, London, S.W.

At the back of each frame must be written the name and address of the exhibitor, with the title or description of the picture, and the number (if there be more than one) to which it refers in the entry form. Each frame or picture may have the exhibitor's name and the title of the picture neatly inscribed, and this only. Pictures in Oxford frames, and pictures previously publicly exhibited within the London postal district, will not be admitted.

With any work sent in, produced by a special process of the exhibitor, information as to particulars should be communicated.

Photographic Apparatus.—Each exhibitor will fill up the entry form (supplied by the Society), and write a concise description of each piece of apparatus; on the exhibit itself a removeable card must be attached, containing the name of the exhibitor and the number to which it refers in the entry form. Attention is requested to this regulation, as without it difficulties arise, and the apparatus may not appear in the catalogue. The exhibitor should fasten on each exhibit a small adhesive printed label, containing his name only.

Apparatus and appliances that have been already shown at London exhibitions may be refused, and also those that do not embrace some points of special interest (to be mentioned by the exhibitor on the entry form).

Photographs coloured by scientific or mechanical means will be admissible. Photographs coloured by hand will not be admitted. Negatives and transparencies will be admitted.

The name or title of all exhibits must be entered on the Society's entry form.

No charge will be made to members of the Society for exhibiting their pictures, but to non-members a charge of one shilling per square foot will be made for wall space, the minimum charge being five shillings. It is requested that postal orders to pay for the wall space required by non-members will be enclosed with the entry form; and should any of the pictures sent not be hung, the due proportion of wall space charge will be returned. The charge for wall space to those exhibitors who may become members of the Society at the November and December meetings will be remitted, and the amount paid credited to their entrance fee and subscription.

The apparatus being now under the personal supervision and explanation of a competent attendant during the whole time the exhibition is open, a fixed charge is made of five shillings to members and ten shillings to non-members, which in all cases must be enclosed with the entry form, or such apparatus will not be received.

Price Catalogue.—A list containing the price of pictures and apparatus to be disposed of will be laid on the table. It is desirable that professional exhibitors should state the price of their pictures on the entry form, as frequent inquiries are made to the Assistant Secretary (who is in charge of the exhibition every day) respecting the price of framed and unframed copies. Ten per cent. commission will be deducted on sales.

Foreign Exhibitors are specially invited to contribute. The Society will pay the carriage of photographs one way, and provide frames during the exhibition for photographs approved by the judges. There will be no charge for wall space.

Reception of Exhibits.—Exhibits sent in packing cases (carriage paid) must be addressed to the "Photographic Society of Great Britain," care of Mr. James Bourlet, 17, Nassau-street, Middlesex Hospital, London.

Packing cases must arrive not later than Monday, September 15th: they will be too late if received after that date. No packing cases can be received at the Gallery.

Exhibits (including pictures, negatives, transparencies, lantern slides, apparatus, and appliances, &c., sent by hand), will be received at the Gallery, 5A, Pall Mall East, on Monday only, September 15th, until nine p.m. Delay will prevent exhibits coming under the inspection of the judges.

Lantern transparencies sent in competition for a medal, not less than six, should be fitted (removeable) in a frame to stand upon the table, and it is desirable that duplicates be sent for exhibition in the optical lantern. They will only be eligible for award when both the negatives and slides are the work of the exhibitor.

Photographic lantern slides will be shown with the Society's optical lantern during the exhibition. The loan of slides for this purpose is

invited; they must not exceed three and a quarter inches in height, and, to enable the Committee to select and arrange them, must be delivered at the Gallery not less than one week before the evening of their being shown in the lantern.

It is to be distinctly understood that the sending of exhibits signifies acceptance by the exhibitor of the decision of the Council upon all matters connected with the exhibition as absolute and final. The Council do not hold themselves responsible for any damage that may happen to the pictures or other exhibits whilst in their custody, but they will take every precaution to ensure their safety and prompt return to the owners at the close of the exhibition.

Blank entry forms and any further information respecting the exhibition, apparatus, lantern slides, also nomination forms for membership, can be obtained from the Assistant Secretary, Edwin Cocking, 5A, Pall Mall East, S.W.

INTERIORS.

For many years past I have made the photographing of interiors my special study, which to me has been very fascinating. When at work I never value time when aiming at the best possible result, and in the photographing of interiors one cannot hurry; and to those who pride themselves in producing so many dozens of negatives per day had better not include interior work. Three-fourths of the prints one sees at the present day of interiors are under-exposed, not only under-exposed, but they have not made the best of the exposure in developing, which I shall allude to hereafter. I have actually seen parties expending in some of our cathedrals (dark interiors, mind you) with an instantaneous shutter, pinning their faith to instantaneous plates, lenses, and shutters; and if one gets into conversation with the owner of these wonderful things, they tell the most extraordinary tales of the wonders of photography. I have been told on many occasions more than I ever knew or heard of before; but I need not say that I never attempted to verify these wonderful statements, being too far above me.

In interior work it is always best to study the subject and think it well out as to the result that one requires to get, and not be satisfied until that desired result is obtained. I never believe in getting what you can. Some interiors are exceedingly difficult, owing to lighting, &c., others are altogether as easy. It is not always that one can have the lighting as he could wish, but with careful study it is wonderful what can be overcome. Churches, as a rule, stand east and west. I have at times found a few standing due north and south. Providing the church is due east and west, if we require to take a view looking west from the altar, between six o'clock and eight o'clock a.m. is the best; if from west and east, I generally find about one o'clock p.m. to be a good time. There may be certain other circumstances to be taken into consideration, which must be left entirely to one's judgment. It will never do, under any consideration, to attempt to take a picture with the full blaze of light coming through a window full into the lens. The camera to be used should be fitted with a swing back, with plenty of swing to it, rising and falling front, with good range, avoiding a conical bellows camera, which is in the way when the front has to be raised or lowered, and cuts off part of the image. A camera with parallel bellows is the best form, which is all that is required, as far as my experience goes, in any camera. The tripod stand should be one of the sliding-leg order, that can be shortened or lengthened as required. It very often occurs that the legs have sometimes to be of different lengths in some positions, viz., over the backs of pews, tombs, or close up in corners, &c. The ordinary straight-legged stand is but of very little use. I generally use a stand where the camera can be worked from, say, eighteen inches from the ground up to six feet and more, and very stiff and firm. These spider-legged, gingerly looking stands that look so pretty to some are of no use for this class of work: they seem almost if a fly were to settle on them it would make them shake. I think this kind of stand has something to do with the artistic focus we hear of at times. The head of the stand ought to be of a good size, as large as possible for the size of the camera: small tops to camera stands tend very much to unsteadiness.

Lenses.—On no account must any lens be used that does *not* give straight lines; the single landscape view lens and also some of the portrait lenses of the Petzval form are useless. The rapid rectilinear lens and rapid symmetrical lens are the best to be used when not looking towards the light. If looking towards the light—for instance, a window—I have always obtained the best results by using a Ross' portable symmetrical lens. I am well aware that this lens is not liked by many on account of its being slow; in my hands it is slow and sure. For this class of work it has no equal, and another point in its favour is that the so-called flare spot is entirely absent. If lenses of the rapid order are used, they produce halation in its worst form. I have never found the backing of plates of any service whatever. An experiment is very easily tried: Take for the subject the inside of a conservatory, exposing to test plates with the lens of the rapid order, the sash bars are mixed up with the sky; whereas with a lens of the portable symmetrical form the very detail on the inside of the bars is absolutely defined. It is far better to give an hour's exposure with this lens than give ten minutes' exposure with the other form and get a bad result. I look upon this as the most important point in interior work; backing of any kind on the plate I never use. I have been repeatedly asked how it is I never get halation, and my answer always has been by using the proper lenses, as stated above.

Some fall into the error of using a lens of as wide an angle as possible, and I believe if it were possible to use a lens that would look round the back of the camera, under the legs of tripod and seats, some would go in for it, and think it very clever. I have always found that the best result is obtained by using a lens of such an angle as to get sufficient of the subject matter to give a pleasing result. Wide-angle lenses, if improperly used, give the worst possible results by way of distortion. Take, for instance, a room with pictures on its walls on either side, with some of these pictures being higher than they are wide, and by using a very wide-angle lens, if these pictures were at the sides or margin of the photograph, they would be represented as being much longer than they were high, or as if they were turned on their side. Take as another example, say, a railway station, or a long building lighted with lamps of globe form (perfect spheres), those occurring in the middle of the photograph would be correctly rendered, whilst those at the margin would be oval in form; and I don't think, on a little consideration, it takes much to see the cause.

Plates.—The best plates to use for interior work are thickly coated ones, this is the best kind of backing, as Paddy would have it, on the front. For myself I much prefer a plate of medium rapidity, the very rapid plates giving a very poor image; and if it is a well-lighted interior I much prefer to use a slow landscape plate, as giving a much finer image.

Having selected the subject, point of view, and proper time of day as regards lighting, &c., focussing is the next operation, which requires the greatest possible care to obtain the best result. It matters not whether the subject be church, chapel, hall, or what not, great care must be paid to get the lines of the picture perfectly upright.

Many pin their faith to the use of a small spirit level about the size of a shilling—I don't; for however correctly the level is made, practically it is of very little service. There is scarcely any interior but what the swing back must be brought into requisition, and the camera be cocked up and out of the level, unless the desired picture can be obtained from a gallery or elevated position, and then, perhaps, it has to be pointed downwards. I always more prefer to use the swing back than the sliding front of the camera, keeping the lens in the centre of the plate to avoid marginal distortion, as before mentioned. In extreme cases the swing back and sliding front have to be used to their utmost. As a golden rule, everything *must* be absolutely sharp in the foreground, not forgetting the middle distance to be tolerably sharp, and the distances beyond, being less and less sharp to the extreme distance, and by this means the artistic result, as far as atmospheric effect can be obtained, is at its best; this is my idea of artistic focussing to obtain atmospheric effect and breadth. I am perfectly aware that this does not meet the optician's idea of perfection, which is to bring everything into absolute sharpness on to one plane, and if that is done the result is soulless and like a map. I think it would be a funny pair of eyes that could see everything absolutely sharp in nature on every plane, possibly like Sam Weller's "forty horse power double oxyhydrogen gas microscopes."

It is often seen in photographs that the camera has been planted in the centre of the middle aisle of a church, giving a result as if the whole thing had been set out with a pair of compasses—this is the very worst point of sight that can be imagined—instead of going a little on one side and getting a more pleasing perspective view of whatever the subject may be. The foreground is very often represented as being something like forty-five degrees, which is either anything but pleasing or a truthful representation. So much for taste.

The upright lines must be as perpendicular as possible. In many instances in our old cathedrals, churches, &c., the columns are anything but upright or straight, and when they have to be reproduced into the space of a few inches this defect becomes painfully visible; all that is left to be done is to reproduce them as they really are in nature. This kind of thing is the result of the settlement of the foundation. In Westminster Abbey I have noticed several of those very tall, clustered columns have given in in the middle. In a photograph this would give the appearance of its having been taken with a single-view lens or a portrait lens, in the case of being out of the upright; if one attempts to get any of these columns upright on the

screen, if the other columns on the other side are out in the other direction it only makes matters worse.

As mentioned above, a spirit level is but of very little use; a far better instrument is a small plumb rule—it need not be more than six inches long—with a plummet on a fine cord; it is the plane of the focussing screen that must be perfectly upright. It can also be used up the side of the camera to get it upright in the other way. I have often wondered why such a little instrument has not been placed on the market. The tail-board of a camera is scarcely ever to be depended upon for truth, as it is very often pulled and warped out of a true plane by the bolt that attaches the camera to the tripod. A very good plan is to have a few fine perpendicular lines ruled on the focussing screen, which is a wonderful help in getting the lines of the subject upright. I always make it a practice to oil the ground side of my focussing screen, and well rubbing off with an old silk handkerchief, whereby the image on the screen can be far more distinctly seen, and focussing is rendered much more easy in a dull light.

Exposure.—Never attempt to use any of these nonsensical tables for calculating exposures, which are only got up by schoolmasters and figure jobbers who have nothing better to do. I have never yet known anybody to succeed with them; they are like some companies' balance sheets—look very pretty on paper, but very untruthful from any other point of view. The only thing to guide one is to look for the amount of shadow and its depth on the screen. Never mind the class of either lens or stop that is being used, it must be judged by the image on the screen entirely, taking into consideration the rapidity of the plate and the colour of the stonework or the material that it is composed of; but always expose for the shadows, and give enough, and the rest can be got over by judicious development, which is easily got into by experience and careful observation. The general idea of photography by some people is that they can get the best possible result without exerting the slightest brain-power or thought. For myself, with over thirty years' experience, I find that I am learning something every day, and have still a great deal more to learn if I live long enough; but some people are far too easily satisfied—I suppose it is human nature. I must not forget to mention the use of stops. Never stop a lens down more than is necessary to get the amount of sharpness and effect desired.

Development.—As I am not treating on any one special make of plate, I do not intend giving any definite form of developer, although I have found a good normal developer will, with a little experience, develop all the plates in the market. In my own practice I never use anything but pyro and ammonia, and so long as I get the desired qualities in my negatives that I require, I do not see the necessity of making a change. Many read everything that is written, and try all the new notions that are brought forward, instead of settling on one established formula, and by sticking to it to thoroughly become acquainted with its working, hence the results obtained in dodging about are of the worst possible kind, as they are never content to begin at the beginning, but are continually blaming either the plates, camera, or lenses, never thinking of their own shortcomings.

Developing an interior requires very careful treatment. It is far best to commence gently, using a weak developer to start with, than to attempt to rush the image out; for should the plate be somewhat under-exposed, and a strong developer used at the commencement, the result is a hard, chalky negative, giving a very black-and-white image. A slow progressive development is by much the better way, especially for under-exposure.

It may be found that on certain portions of the image where the action of the light has been great, such parts are too intense to give a pleasing effect when printed; these parts can easily be reduced by rubbing down with methylated alcohol on a soft piece of rag. I have described this method several times in these pages, hence I need not repeat it, as I am quite aware that it is now largely practised. It is also very valuable for removing surface green fog before varnishing.

Wm. Brooks.

THE LONDON STEREOSCOPIC COMPANY'S NEW STUDIOS.

It has been well known that this Company has for a considerable time been having entirely new premises erected adjoining those in Regent-street so long occupied by them. These new premises, which occupy a corner lot, have been planned and built with special reference to the requirements of the Company, who, now that the work has been completed and possession entered upon, may be pardoned if they boast that it is the finest photographic establishment in the world; and we have a strong idea that it is so, if we compare it with the best on the Continent and in America.

The premises and studios were formally opened to the public on Tuesday, Mr. Lillie Mitchell, the general manager, having most successfully catered to several of the senses of the numerous visitors, including the providing of a high-class musical entertainment.

The shop on the street level has two doors, and both its walls and windows are richly decorated with art productions and apparatus and means for producing photographs.

Here the walls are treated in raised design finished in a soft green, which sets off the apparatus and materials displayed to the best advantage. The handsome Grecian frieze in carton-pierre attracts the eye to the ceiling which is finished in a tender green, and is of Adam's design in elegant relief. Half the shop is devoted to the display of photographic apparatus of the most modern design, and in velvet-lined cases are exhibited hundreds of lenses, suited to every photographic requirement.

In another department we find ample accommodation provided, by means of classified albums, for the display of photographs of every celebrity in whom the public evinces interest. Conveniently placed tables expose to view albums containing the most complete series of London views published by any firm, as well as views of all places of interest at home and abroad.

Facing the main entrance is the grand staircase, with a width of six feet, leading to the reception room and upper floors. It is a massive piece of work, the steps, handrail, and balusters being constructed in solid walnut, whilst the walls are decorated in Anaglypta and Calcorion material, painted in harmonious yellows and browns. Amongst the numerous specimens displayed here are some beautiful examples of the Company's new photo-mezzotype and other permanent processes, adapted for high-class book illustrations and for the requirements of advertisers.

Immediately at the foot of the stairs we see the handsome wrought iron and copper double doors leading to the commodious and elegantly fitted passenger lift. This lift was erected by the American Elevator Company, and it communicates with every floor and the two studios.

An easy ascent by either staircase or lift brings us to the first floor, and we at once enter the magnificent reception room, which is devoted to the display of portraiture in every possible style. It is an elegantly furnished room of great size, being forty feet by twenty-five feet, and is probably the largest to be found in this country devoted to the convenience of portrait sitters. We are at once struck by the quiet harmonious colouring and artistic decoration of this room, the whole being carried out after Adam's and Grecian designs. Comfortable lounges, Chippendale and Adam's chairs, Turkey carpets, and rich velvet hangings, gracefully draped in simple Grecian lines, give an air of luxury and refinement rarely met with in photographic establishments. There is an arrangement by which the whole room can be coverted into a darkened chamber, and by the help of the electric-light optical lantern be used for scientific demonstrations and lectures. Here an audience of about two hundred can be seated, and it is proposed to hold, during the winter season, a series of afternoon practical lectures and demonstrations upon popular and interesting departments of amateur photography. Two carved mantelpieces and fireplaces promise warmth and comfort to winter visitors. The walls are treated with a bold deep frieze in carton-pierre, while a Greek cornice and deep Adam's dado coloured in quiet Pompeian tones of red and sienna form an effective background for the fine specimens of photographic art displayed by the Company.

Ascending by the staircase, we find the second floor is devoted to the chemical and apparatus stock rooms, where the execution and rapid dispatch of orders goes on continually. Here also is a camera fitting and repairing room, where amateurs' requirements are attended to.

On the third floor we have an excellent suite of dressing rooms, luxuriously fitted for the accommodation of sitters; a ladies' boudoir, elegantly furnished in inlaid rosewood, with Turkey rugs and silken hangings, with its dainty alcove, concealing lavatory arrangements, and fitted with electric light, claims our first attention, while the appointments of the dressing-table, with its ebony toilet fittings, electric pendants for illuminating the figure, and the boldly framed bevelled mirrors *en suite*, swinging from floor to ceiling to show every detail of the full-length figure, give a most charming finish to the room. The large "Family Room," lighted by four windows, and doubly fitted with every requirement, accommodates groups and family parties who may wish to be together, whilst the comfort of gentlemen is especially catered for in a luxuriously fitted room for their special use. Every window is screened with decorated glass and transparencies to secure privacy; and, to assist ladies and children who may desire to change their costume, a smartly-attired lady's-maid is in constant attendance.

On the same floor the General Manager has his private room, for the use of the Directors and the reception of special visitors.

Ascending to the fourth floor we came upon an open landing, furnished as a lounge for those who are awaiting access to the large studio, which opens herefrom through decorated *portières*. Pleasantly lighted from the roof the walls here exhibit a display of amateur work, chiefly representing the winning pictures which gained medals at the Company's different exhibitions. In the large studio, from which so much of the Company's celebrated work has emanated, a group of fifty can be comfortably taken. Every appliance of modern photography is at the command of the artist, including cameras adapted to take from the modest *carte-de-visite* to pictures 30 × 24, the latter being taken by an enormous camera of the newest construction. On this floor are commodiously fitted dark rooms for the use of the artists, and a special dressing room for the convenience of sitters who are being taken in character costume, and who

can by this convenient arrangement pass to and from both studios without notice.

On this floor is the special instruction room provided for amateur photographers. By means of a series of competitive exhibitions, of which the Company bore all the expense, and contributed the whole of the proceeds to public charities, the growing interest in photography was fostered to such an extent that on the last occasion no less than 5000 exhibits were entered; and, but for the reconstruction of their premises, a fourth exhibition would have been in progress, which, it is certain, would have outrivalled all its predecessors. To meet the requirements of their amateur clients a thoroughly qualified instructor, expert in the latest processes, the doings of the Societies, and the difficulties and trials of the beginner, is engaged from morning till evening to give instruction to novices and the more advanced student.

We were particularly struck with the ingenious arrangement of the electric light with which these dark rooms are provided. The light can be instantaneously switched either into the ruby lanterns or made to illuminate the dark room itself, as the case requires. Comfortable spring folding seats are provided, also water taps, trays, and chemicals within arm's reach, so that development must become a luxury. As the dark rooms are made to communicate internally, the pupil or pupils can receive instructions and ask questions whilst at their work and without having to leave their places.

A short staircase leads from this floor to the newly erected upper studio, in which every appliance that the latest advances in the science have proved to be desirable is introduced. It is intended to devote this studio to an entirely new class of photographic productions, embodying all the ease and grace of *home portraiture*, with the exceptional facility offered by the best arrangements of studio lighting. The studio is treated as a drawing room with handsomely decorated dado and parquet flooring, to which the old Eastern rugs and Louis Seize furniture lend an air of homelike reality not usually met with in studios. Sitters for this studio will only be taken by special appointment, after interviews with the artist, who will arrange as to dress, &c.

A feature which adds to the attractiveness of the premises is the handsome electroliers in wrought iron and copper, especially designed for the decoration of each room, together with the wrought-iron gates forming the entrances to the lift.

A comfortable descent by the lift under charge of its liveried attendant brings us once more to the ground floor, where we part with the general manager, Mr. J. Lillie Mitchell, to whom we are indebted for some of the details now given, and to whose design and taste the planning, decorating, and furnishing is due, each item having been personally devised and its execution superintended by him.

We have already (page 471 of our last volume) described the Company's extensive factory at New Southgate, and are informed that the growth of the business has been so great that it has had to be considerably extended since our visit.

Foreign Notes and News.

There always appears to be a delicate vein of humour about Liesegang's way of putting things which confers a certain charm on everything he writes, no matter how abstruse or technical. Recently he has amused his readers by pointing out that Herr Veresez has competitors in the animal creation, viz., insects which are also specialists in "heliochrome." These turn out to be the caterpillars of a certain butterfly (*papilio Nireus*) which inhabits the Cape of Good Hope. These caterpillars, which principally affect the leaves of orange trees, and thus usually partake of their dark-green colour, were introduced into a chamber provided with a glass cover. One side of this chamber consisted of a red brick wall, and the bottom was of yellow wood. The caterpillars attached themselves, some of them, to the orange leaves, with which they were fed, and these remained dark green; others attached themselves to the wall, and turned reddish yellow; while those on the wood became bright yellow; while one which was half on the wood and half on the brick became half red and half yellow. "It would be interesting," writes Liesegang, "to ascertain if the skin of these insects would reproduce a coloured image projected on to them."

Herr H. W. Vogel, in his communications from the Charlottenburg laboratory, continues to discuss the dark-room glass question, urging the employment of the pocket spectroscope as the best means of testing glass when buying. He states that he has developed hundreds of plates by light transmitted through glass selected by this means, and in no single case has had any traces of clouding. The alleged defect of the pocket spectroscope, that it does not indicate ultra-violet and violet rays, Herr Vogel does not consider of much importance, as he only recommends the employment of red glass in conjunction with a petroleum lamp for dark-room practice, and petroleum lamps give out hardly any ultra-violet or violet rays.

On photographic testing Herr Vogel does not appear to approve, and he gives us his reason that red glass which the spectroscope showed to be reliable, and with which he worked satisfactorily for a long period of time, would, to judge from the results of spectroscopic testing, have been rejected as useless.

Herr Vogel sums up his conclusions by stating that a light of seven candles with a red glass found to be spectroscopically satisfactory, and which permits of ordinary print being read at a distance of about two feet, will in all cases give reliable results.

Our Editorial Table.

Die Photographie mit Bromsilber Gelatine. Vol. II.
By Ludwig David and Charles Scolik. Halle: W. Knapp.

We noticed at some length the first volume of this somewhat elaborate work on its appearance about nine months ago, which dealt, as will be remembered, with the preparation of emulsions and the treatment of the negative. The present volume is divided into three parts. The first part, entitled "Orthoskingraphie Photography"—a title which need not unnecessarily alarm the reader, as it is only the authors' way of writing *orthochromatic*—treats of the manufacture and manipulation of orthochromatic plates; the second part is concerned with failures, and the means by which they may be avoided; and the third is a collection of receipts and formulæ, constituting what is perhaps the most valuable portion of the book.

We observed on the appearance of the first volume that it appeared to us to be rather a mistake to devote so much space in a work apparently intended for the use of the practical photographer to the manufacture of dry plates and the preparation of emulsions, as if one photographer out of a thousand ever thinks of making his own plates! A similar remark applies to the present volume. A good deal of space is taken up describing the preparation of orthochromatic plates—a branch into which we venture to think very few practical photographers are likely to wander. A good deal of parade is made of scientific knowledge bearing on the subject; but when we look for any explanation as to why or how the various colours render the plates sensitive to certain rays, no answer is forthcoming. Very excellent, however, is the portion dealing with the application of orthochromatic plates to landscapes, portraits, reproductions of oil paintings, &c. The authors, in contradistinction to some authorities, lay special stress upon the employment of the yellow screen.

The second part we are inclined to regard as the most valuable of the whole work, at least to the practical man. It contains a most exhaustive catalogue of nearly all the failures and blunders that can be made, with an account of their causes and the means of preventing them. Most of us will agree with the remark by which it is commenced, that photography with bromide of silver gelatine is a ticklish business, and that it is only by careful study of the *causes* of failure that they can be avoided.

The receipts in the third part are apparently all from high authorities, though rather jumbled up together.

On the whole, the work must be regarded as a valuable contribution to photographic literature, in spite of the tendency towards "book-making" occasionally observable, and it is well provided with illustrations and woodcuts. The title-page is adorned with an excellent portrait of the Archduchess Marie-Therèze, the patron saint of Vienna photographers.

Tourist Guide to the Continent.—Walks in the Ardennes.
Edited by Percy Lindley. London: 125, Fleet-street.

Now that the weather renders it possible for intending tourists to put their travelling projects into execution, such guide-books as those above-mentioned will be found very handy. They are well illustrated by maps and numerous sketches, and so far as we are able to check it from personal knowledge, the information given is sound and reliable. The price of each is sixpence.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 10,503.—"A Device to be attached to Grave Stones, Vaults, and such like, for Displaying Photographs, and for Holding Visiting, Mourning, or Memorial Cards, Flowers, and similar Articles." C. J. Tozer.—*Dated July 7, 1890.*

No. 10,545.—"An Improved Self-capping Time and Instantaneous Shutter for Photographic Purposes, and Method of Setting and Releasing same." H. P. Tattersall.—*Dated July 8, 1890.*

No. 10,635.—"Improvements in Shutters for Photographic Cameras." J. W. SMITH.—*Dated July* 9, 1890.

No. 10,719.—"An Improved Automatic Changing Box and Holder or Dark Slide for Photographic Dry Plates for Use with a Photographic Camera." F. R. GIBBON.—*Dated July* 10, 1890.

No. 10,835.—"An Improved Apparatus for Displaying Stereoscopic Views and the like." Communicated by C. Bishop. J. P. BAYLY.—*Dated July* 12, 1890.

No. 10,871.—"Improvements in Automatic Photographic Machines." A. TOUFFREVILLE.—*Dated July* 12, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 22	Great Britain (Technical)	5A, Pall Mall East.
,, 22	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 23	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 24	Burton-on-Trent	The Institute, Union-street.
,, 24	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 10,—Mr. T. E. Freshwater in the chair.

Mr. J. J. BRIGINSHAW complained of a difficulty that he had found in mounting prints of the aristotype kind—those that are prepared with a gelatine surface. The paper was tacky and adhered to the fingers whilst moist, and this rendered the handling of it difficult.

Mr. A. COWAN said that that was because it was not alumed, as gelatine papers should be. If treated with chrome alum solution it would even bear to be washed in hot water afterwards.

Mr. R. P. DRAGE (the new Hon. Secretary) said that he would like to call the attention of the members to a paragraph in the annual report pointing out the desirability of keeping up and increasing the number of the members. He said that if people only knew the character of the men who met there week after week the room they occupied would not hold the number of adherents who would flock in.

The subject of the next lantern-slide competition was discussed, and Mr. W. E. DEBENHAM suggested that at least one plate should be furnished by each competitor from the negatives just as they were, without separate cloud printing or dodging of any kind. This suggestion was generally approved.

A number of names was given in as those of members who intended to compete, and it was arranged that each member should keep the negatives for one week only.

Mr. H. M. Hastings showed some platinum prints made on Hardcastle's direct printing-out paper. They were considered to be very good.

Mr. BRIGINSHAW proposed that a night should be fixed for the display of photographs taken in connexion with the recent meeting of the Convention at Chester, and it was decided that it should be in September, the precise date to be settled later on.

Mr. Hastings showed prints that had been sent to him from a negative in which two swans appeared duplicated, making four in the picture. There had evidently been a double exposure, and the swans had changed their position between the two openings of the shutter.

The subject for discussion for the 24th inst. was settled:—*Printing under Various Coloured Media.*

Mr. W. H. Harrison showed a specimen of photo-collotype illustrated in colours; the subject was the cover of an ancient volume in the British Museum collection.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

JULY 11.—Committee meeting held at 4, Great James-street, Bedford-row. Mr. W. Bedford, Chairman.

Messrs. R. P. Drage, G. C. Audsley, and P. J. W. Mapp were elected members.

Votes of thanks were passed to the Mayor of Chester for allowing the boxes to be placed in the Town Hall, and to Mr. Briginshaw for his kind help.

A vote of condolence to Mrs. T. J. Collins was passed on the death of her husband (our Deputy Chairman), who had always been to the fore in helping the Association.

The money collected at the Convention was 2*l.* 1*s.* 7½*d.*

The Committee trust that employers requiring assistants will make use of the Association, who have several persons desiring situations. The Hon. Secretary will be pleased to send names on receipt of requirements.

Subscriptions are now due.

HACKNEY PHOTOGRAPHIC SOCIETY.

JULY 10,—The chair was occupied by Mr. C. F. Hodges.

The SECRETARY reminded members that the monthly outing would be on the 19th inst.; and that a competition would be held in November, and that Messrs. H. P. Robinson and J. Traill Taylor had very kindly consented to act as judges.

Mr. Carpenter handed round some negatives which had holes in them.

Mr. BIRT ACRES said that they were air-bells caused in development.

Mr. HODGES said he had found that with rapid exposures he was troubled with them.

Mr. ACRES said that it was through the developer being too strong.

The CHAIRMAN then called on Mr. Acres for his paper on *Exposure and Development.*

Mr. ACRES then proceeded to say that he did not altogether agree with exposure tables, and explained that exposures varied, and gave as an example the angle of 45°, where the exposure would be increased one half, and if at right angles it would be trebled. The lecturer advocated the backing of plates with either burnt sienna ground in water or Bates's black. He preferred dull weather to photograph in glens, and when developing used plenty of light. So much having been said about not being able to develop the isochromatic plates, he proceeded to develop one by rather a pale ruby light, holding the dish some short distance off. The plate in question was a positive made by an exposure of thirty seconds to the ruby light (over-exposed, fifteen seconds would have been ample). He next developed one by the white candlelight, holding the plate above the light. In both cases there was no trace of fog.

Mr. HODGES asked why makers did not back their plates.

Mr. CAPEL asked for an approximate guide to speed of plates.

Mr. HENSLER asked whether Mr. Acres advocated the use of large or small stop.

The SECRETARY wanted to know whether any non-actinic light could be used.

Mr. ACRES, in reply, said that he did not doubt that, if required, makers would back their plates, but people had so many different tastes. Messrs. Edwards would, doubtless, if a quantity were ordered. He said plates generally ran from sixteen on the sensitometer to twenty-three or twenty-five. It was better to use as large a stop as possible with definition to avoid flare spot and flat pictures. In skilful hands any non-actinic medium could be used.

CROYDON CAMERA CLUB.

JULY 10,—Mr. G. R. White (Deputy President) in the chair.

The SECRETARY read a financial statement, showing that the affairs of this young Club are in a highly satisfactory condition.

The CHAIRMAN called upon Mr. De Clercq to notify the Council's decision in reference to acquiring a permanent home for the Croydon Camera Club.

From his statement it appeared that the Council had in contemplation the acquisition of premises situated at 56, George-street, Croydon, as being in every way suitable for the purpose.

A resolution was carried approving the decision of the Council.

It was agreed that a Sub-Committee, consisting of Messrs. White, De Clercq, Underhill, Overton, and Isaacs, be appointed to take the premises on behalf of the Club, and to enter into every arrangement which in their opinion may be necessary for acquiring the premises and adapting them to the requirements of the Club.

The Secretary was authorised to call a special general meeting on July 16 to take possession of the rooms.

After the business portion of the meeting had concluded, several of the members handed round some excellent specimens of their work during recent excursions.

With reference to the new rooms, we may mention that they are in the centre of the town. They are close to New and East Croydon Stations, and within a few minutes' walk of West Croydon. Trains pass the door. The premises consist of one large room, which will be used as a club room for meetings, demonstrations, lantern exhibitions, &c.; there are two smaller rooms, one of which will be used as a store room, and the other as a dark room, with every convenience and appliance. There is also a forecourt attached, which will, no doubt, be utilised. The Council will allow the Club to be used by tourists, cyclists, &c. Members will have the benefit of a photographic library and a place for carrying out any operations appertaining to photographic chemistry. The premises (which are exceedingly commodious) will be open daily, and afford opportunities for exchange of ideas between members, which at present the Club does not possess.

The Assistant Secretary (Mr. A. Underhill, 23A, Clarendon-road, Croydon) will be glad to receive names of gentlemen who intend joining, or to give any information. Ordinary members' subscription is 10*s.* 6*d.*; honorary members', 5*s.* per year.

IPSWICH PHOTOGRAPHIC SOCIETY.

THE monthly excursion of this Society took place on Saturday, the 12th inst., to Framlingham. Driving a two-horse brake, an early start was made at nine a.m., the route being through the villages of Martlesham, Woodbridge, Wickham Market, and Parham, where the first stop was made for the purpose of visiting the Old Hall, a famous place in the time of Cromwell, and frequently mentioned in the diary of Lady Willoughby. A quaint old place it is, surrounded by a broad moat, and away in the fields far from the roadway—a perfect gem for the artist and photographer. Continuing the journey, Framlingham was soon reached, and the party partook of luncheon at the "Crown Hotel." Time only permitted a hurried look at the Castle, and with a general regret that the programme did not permit a longer stay, a move was made for Easton (where stands the residence of his Grace the Duke of Hamilton), and thence to Letheringham Abbey, where the party were invited to tea. A pleasant drive home in the twilight completed one of the most enjoyable of the many enjoyable outings of this Society.

MANCHESTER PHOTOGRAPHIC SOCIETY.

JULY 10,—Mr. John Schofield presided.

The CHAIRMAN referred to the loss the Society had sustained by the death of one of its oldest members—Mr. R. Atherton—whose genial face will be greatly missed from future meetings.

A matter of interest in connexion with explosions of gas cylinders was brought forward by Mr. W. BROUGHTON, who said it was generally considered that carbon or a combustible substance could not find its way into cylinders of compressed oxygen, but he had found that a silencer he used to retard the

current from a cylinder became clogged, and upon opening it he discovered the slag and packing contained oil, which had evidently been introduced into the cylinder from the compressor pumps used in filling it. Mr. Broughton thought that the presence of oil in oxygen under high pressure was, under certain circumstances, quite sufficient to produce an explosion; and he suggested that some explosions may have been caused by it. To demonstrate the ease by which flame may be produced by the simple mixture of apparently harmless substances containing carbon and oxygen, Mr. Broughton mixed a few grains of permanganate of potash with a few drops of glycerine, when a brilliant flame was kindled almost immediately.

Mr. EDWARDS introduced the Eastman Company's films to the meeting, and exhibited several whole-plate negatives with prints therefrom lent by the Company, also numerous prints taken at the Chester Convention by the representative of the Company. Mr. Edwards had used the films during a recent Continental tour, and testified to their extreme rapidity, many pictures being over-exposed, although he used a very quick shutter, while the films yielded good detail in the deep shadows, where he did not expect to find any. No little interest was manifested in the negatives shown and the prints accompanying them.

Mr. FARMER showed a collection of halftype prints, and explained the process of printing and development, which gave plenty of half tone, and was considered particularly suitable for portraiture.

Mr. BROUGHTON developed some platinotype prints by the hot process successfully, and some excellent from the Company were handed round. Little was said, except that, given a good and suitable negative and quite correct printing, a good result would probably be obtained, but the numerous failures made the process rather expensive. Mr. Broughton proceeded to give an instructive demonstration of the Blanchard process of platinotype printing, and drew attention to the excellent specimens in both large and small prints, full of detail, which were shown, pleasing alike in gradation and tone.

Mr. STEVENS said he had not found the Blanchard paper always perfect throughout the sheet, but defective sheets had been immediately replaced. He sometimes used with that paper the Platinotype Company's P solution cold process, and found it give good results. Prints should be over printed, as they lose much in toning.

The Blanchard process was generally approved.

The CHAIRMAN reminded members of the Society's winter display, and expressed his hope that due preparation would be made for it forthwith. He then closed a meeting which had been sufficiently interesting to induce several collodion members to miss their usual trains and remain to a later hour than customary.

BERLIN SOCIETY FOR THE PROMOTION OF PHOTOGRAPHY.

JUNE 2D.—Professor Dr. Vogel in the chair.

The first exhibit of importance was made by Herr Standigl, who exhibited a number of views in collotype, consisting of landscapes (9 × 12), reproductions of woodcuts—said to be almost superior to the originals—and flash light expositions, which latter earned the especial praise of the meeting by the proofs they afforded of the high degree of perfection which amateurs' work in this direction is capable of reaching.

The Chairman then exhibited some new objectives by Zeiss, of Jena, consisting of a triplet, a rectilinear and aplanat-rectilinear. Both have the same aperture (20 mm.) and focus (220 mm.), and give sharpness in a field which, with the smallest diaphragm, F 30·5, is somewhat smaller than the focal length. They are absolutely free from aberration, and even with full aperture give extraordinary sharpness. The wide angle distinct gives absolute sharpness with full aperture, but showed an extraordinarily wide angle (96° of vision) and an effective field at 90°, and is quite free from light-spots even when the sun shines directly on it.

The SECRETARY then gave a résumé of extracts from the latest numbers of THE BRITISH JOURNAL OF PHOTOGRAPHY, of which Burton's method of dehydrating alcohol by means of anhydrous of potash and a receipt for arrow-root paste formed the principal. With regard to an article in which the employment of yellow screens in connection with ortho-chromatic plates was disapproved of on account of their liability to produce distortion, it was observed that this was a proof of the difficulties experienced in England of obtaining glass with parallel sides.

This the CHAIRMAN confirmed, and observed that even in Vienna the same difficulty was experienced—many Viennese photographers obtaining theirs from Messrs. Spiers & Co.

Herr CHRISTMANN then gave a short account of the contents of Belgian periodicals, including a description of M. D'Estreppe's new flash lamp, which has already been described and criticised in the JOURNAL.

A resolution was then passed with regard to the holidays, which it was determined to fix from July 1 to September 10. During this period social meetings will be held in the "Leipziger Garten Restaurant," instead of the usual formal meetings.

After a question in the question box had been oracularly answered by the Chairman, the proceedings terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE EVOLUTION OF PHOTOGRAPHY.

To the EDITOR.

SIR,—Your *critique* on my latest work, *The Evolution of Photography*, reminds me of the story of the boa-constrictor, which, after preparing its victim with slimy saliva, commenced swallowing it at the wrong end, so that when it came to the head and horns of the animal, it found itself in a dilemma. Your first paragraph is pleasant and oily enough, but the second is where the horns come in and present a difficulty.

In reply to the strictures in the latter, I beg to state, in the first place, that I did not call my work "a history of photography," though I admit that it approaches the title and character of such a work, and is perhaps, with the exception of which you complain, a more complete history than any other. In the second place, I think I "have mounted a pedestal" much higher than you imagine, for my aim was to mount the pillar of truth, and from that elevated position endeavour to do justice to all. My vision was neither blocked by a "coterie of friends," nor circumscribed by a "camaraderie," neither did I wish or intend to ignore the usefulness, influence, and high character of THE BRITISH JOURNAL OF PHOTOGRAPHY, or its able editor. If any silence on certain communications which appeared in that ably conducted JOURNAL gave rise to such a supposition, it is more unfortunate than intentional. It was neither ignorance nor malice that induced me to abstain from commenting on a certain process, and it was only after mature deliberation that I determined to do no more than record its introduction chronologically. By-the-bye, my chronological record is not the work of "another pen." For its merits or defects, excepting printer's errors, I alone am answerable.

I should have been pleased, indeed, to have commented on the many advantages of the collodio bromide process at the period of its perfection and practice in the text of my book, but I could not reconcile to my mind several discrepancies and inconsistencies in the claims of the inventors; but now that the wisdom of my forbearance has been challenged by you and others, I feel compelled to offer some explanation of my reasons for declining to introduce the subject into the text.

In the first place, I knew that Mr. Bolton's name was honourably associated with the first published account of the process; and, secondly, that the gold medal was awarded to Mr. Sayce alone. I also knew of the unhappy controversy that arose on the subject several years ago, and as it did not terminate to my satisfaction, and both the claimants are still living, I did not wish to revive the collodio-bromide discussion, or rekindle the slumbering fires of an old feud. Two important questions have often presented themselves to my mind, and I will put them here with the hope of you, or some one else, being able to answer them more satisfactorily than I can for myself.

1. If Mr Bolton did *not* invent or assist in the making and introduction of the collodio—bromide process, why was his name associated with that of Mr. Sayce on its first publication and afterwards?

2. If Mr. Bolton *did* invent or assist in the making and introduction of the process, why did not Mr. Sayce *insist* on having Mr. Bolton's name associated with the honour and award?

If these questions cannot be most satisfactorily answered, there is a very damaging aspect running through the whole affair. On the other hand, Mr. Bolton has informed me that he was not only the first to conceive the idea, but the first to make a collodio-*bromide* emulsion, while Mr. Sayce, in a recent letter to myself, appears to take all the credit to himself, and does not even mention Mr. Bolton's name. Mr. Sayce may have coined the name of the emulsion, but that does not make him the inventor, nor entitle him to the gold medal. I do not mean to say that Mr. Sayce did not conceive the idea and make a collodio-bromide emulsion; but as there are two claimants we want two proofs, and until the proofs are forthcoming the claims cannot be settled, and the best way will be for the claimants to endeavour to decide the matters in dispute by their own acts. There need not be any lengthy or acrimonious correspondence. The matter can be easily decided by each man making a statement in writing, giving dates of conception and experiment, even to hours and minutes, swearing to them in the form of an affidavit before a commissioner of oaths, and allowing the statements to be published simultaneously in all the photographic weeklies. Then the whole photographic world could act as jurors and render a final verdict. If such a thing could be done I should consider my "unaccountable omission" of the collodio-bromide process one of the most fortunate I ever made.—I am, yours, &c.,

JOHN WERGE.

11A, *Berners-street, W., July* 15, 1890.

[Had we responded in the same spirit in which he writes, to the elegant "story" with which Mr. Werge opens his letter, we would have denied horns to the animal he speaks of as being so unceremoniously treated. Of course, "every crow thinks its own bird the whitest," and Mr. Werge is at perfect liberty to think his history the best. We have given our reasons for thinking otherwise. Had Mr. Werge desired to have done justice to the revolutionary invention of Messrs. Sayce and Bolton, there was plenty of material at hand from which to have compiled it; but this he elected to ignore. It was not his duty as an historian to have suppressed a noted public invention freely given to the public by two esteemed gentlemen in the most praiseworthy and public manner merely because *he*—the historian—was ignorant of the specific part taken by each or the other; and in now trying to stir up individual and personal jealousies—thus imitating Colonel Wortley, who once tried the same—he is adopting an unwise and most reprehensible course. Mr. Werge is entirely at sea respecting the gold medal awarded to Mr. Sayce, a similar medal not having been awarded to Mr. Bolton. Will it surprise Mr. Werge to be informed that Mr. Bolton was not an exhibitor at the exhibition at which this

medal was awarded, but that Mr. Sayce was? And on what principle, then, was a medal to be awarded to a non-exhibitor? But Mr. Werge further errs in supposing that the medal was awarded to Mr. Sayce for *the* invention of collodio-bromide. It was given to him for the prominent part he took in that invention, it being well understood by the jurors (of whom Mr. Bolton was one) that this invention emanated from two gentlemen (Messrs. Sayce and Bolton), of whom only one was an exhibitor.

Although we have printed Mr. Werge's letter in full, we trust that neither of the two gentlemen so long and so honourably associated with the introduction of bromide emulsion will be so simple as to pander to the apparent desire of Mr. Werge to inveigle them into strife. Contemporaneous history has recognised their merits and done them justice, although Mr. Werge in his history, which we find he now disclaims as being intended as history, leaves them severely out in the cold. His *aim*, he tells us, was to mount the pillar of Truth, and from that elevated position endeavour to do justice to all: a laudable aim had it been carried out. The sages, however, tell us that "Truth dwells in the bottom of a well," and we must confess that the elevation from which the history appears to have been written seems to us to have partaken more of the well than the pillar idea.

Having said so much concerning one—the most important, it is true—of Mr. Werge's omissions in his historical *résumé*, we shall, for the benefit of those to whom the subject is not known, give it in a synopsised form, and we extract it from an historical article in our ALMANAC for 1879, written by the Editor who was conversant with the rise and progress of the process. In this we have omitted much, especially the original and modified formulæ, which are not here considered as relevant to the matter.

"The collodio-bromide process dates from September 3rd, 1864—a paper describing the process bearing that date. This paper was published by its authors, Messrs. B. J. Sayce and W. B. Bolton, in THE BRITISH JOURNAL OF PHOTOGRAPHY of September 9, 1864. Let us honour these gentlemen for giving their process freely to the public, and that at a time when so many patents were being taken out for real or fancied improvements in other departments of photography. Indeed, so desirous were they to let their fellow-amateurs share with them a process possessing so much simplicity, that they hastened to publish it while it was in an immature state, Mr. Sayce continuing for some time afterwards, and at brief intervals, to write letters, papers, and articles on the subject for the JOURNAL above named. As soon as successful modifications of the original process had been discovered they were immediately published by Mr. Sayce and other experimentalists; for within a few months of its advent several photographers, for the most part Liverpool amateurs, began to follow in the path thus opened out. . . . .

"On the 14th of that some month I received from Mr. B. J. Sayce a photograph from a negative containing double the proportion, per ounce, of the nitrate of silver in the preceding formula, and in reference to which I wrote at the time—'The photograph is indeed very fine, and would do credit to even any matured photographic process.' Photography *without a silver bath* was thus an accomplished fact.

"A week later a letter was received from Mr. Sayce containing a formula in which the organifier was mixed with the emulsion. . . . . It may be interesting to note here that the first editorial article on this subject which ever appeared is to be found in THE BRITISH JOURNAL OF PHOTOGRAPHY of September 30, 1864, the Editors of which had immediately recognised the immense revolution capable of being brought about by the infantile process, at that time only twenty-three days old.

"The effect produced by the excess of soluble bromide in the emulsion in causing insensitiveness was early recognised. Mr. Sayce, in a communication to the Liverpool Amateur Photographic Association (of which he was at that time Honorary Secretary), in August, 1865, recommended the use of warm water for washing as a means of imparting greater sensitiveness. In this communication Mr. Sayce also described the method of using the emulsion in a wet state, the image in this case being developed with protosulphate of iron. 'The image,' he says, 'appears quickly, and in every respect like an ordinary wet plate. . . . .'

"Up to this time Mr. Sayce had kept the ball rolling—the spirit in which he did so being one worthy of the highest admiration; for, said he, in one of his papers at the time when exhibiting certain pictures—'I esteem it not only a duty but a pleasure to detail the method by which those results have been produced.' All honour to men of this stamp who, having by patient perseverance worked to a successful issue a process of exceeding great value, freely and generously divulged its nature, seeking neither *eudos* or profit!

"Mr. Sayce had hitherto been the champion of the new process; but in November, 1865, Mr. W. B. Bolton, whose name was associated with that of Mr. Sayce in its first publication, entered upon the stage, and in a paper on the subject (communicated to the Liverpool Amateur Photographic Association) gave an able summary of the conditions under which success was to be ensured. . . . .

"With regard to the two originators of this invaluable system of producing photographs, Mr. B. J. Sayce, the senior of the two, soon after he had accomplished his great work of forcing on the notice of the public the merits of collodio-bromide, retired from photographic pursuits, and devoted his energies to mercantile purposes, in which he is now engaged with honour and success. Mr. W. B. Bolton still occupies a place in the van of progress, and important suggestions and improvements have emanated from him, as I shall show speedily; for I question if any other knows so well as I do the amount of research which has up to the present time been bestowed by Mr. Bolton upon this process, with which his name has been from the first so intimately associated."

From the foregoing extract our readers will see that there is really no mystery or ambiguity as to the introduction of the bromide emulsion of Messrs. Sayce and Bolton, and we commend it to the attention of Mr. Werge when he prepares (as we hope he will soon have to do) a second edition of his book.—ED.]

WEIGHTS, MEASURES, AND FORMULÆ.

To the EDITOR.

SIR,—In your issue of the 11th inst. Mr. Warnerke inveighs against the report of the Convention Committee on Weights, Measures, and Formulæ, and since his letter is a most extraordinary, though doubtless unintentional, misrepresentation of the report, I will ask you to allow me to reply.

Mr. Warnerke says: "We learn (what was not generally known) that the apothecaries' ounce of 480 grains, after all, is not legal, and that the legal one of 437·5 grains is divided into 480 parts, which greatly increases the already inextricable chaos." Why "after all"? The avoirdupois ounce of 437·5 grains has been the only legal ounce for ordinary buying and selling in this country for many years. No special apothecaries' ounce has been included in the *British Pharmacopœia*, at any rate since 1864; and if these facts were not generally known to photographers, they were, of course, well known to every one really acquainted with the English systems of weights and measures. How can a state of things which has existed for more than a quarter of a century fairly be said to "greatly increase" anything at this time of day? and is it not desirable that in discussing a scientific question we should avoid applying such extravagant terms as "inextricable chaos" to the comparatively simple problem of distinguishing between an avoirdupois ounce and a troy ounce, a grain and a minim? Mr. Warnerke, obviously, does not fully recognise the difference between the mode of subdivision of the ounce and that of the fluid ounce.

We never said that the metric system was exclusively used for scientific purposes, because that would not be true. In certain branches of applied science the English units are constantly used.

We are charged with throwing a gratuitous insult at the heads of thousands by stating that photographers are not intelligent enough to understand the metric system! We never said anything of the kind! We do state that "a knowledge of decimals sufficient to enable a decimal system to be used easily and accurately is by no means so widely diffused as is desirable;" but that is a very different thing from what we are asserted to have said. The statement is, unfortunately, quite true. We did not make it without first being sure that it was in accordance with the facts; and we did not limit it to photographers, because it applies to all sorts and conditions of men.

We are also charged with trying to impose on photographers two systems of weights and measures, "the metric and a modified one, in which ounces and grains differ from the old ones" (they are divided into decimal parts), "forgetting that 'photographers do not possess the knowledge of decimals sufficient to enable a decimal system to be used easily and accurately.'" In the first place, Mr. Warnerke puts between inverted commas, and passes off as a sentence from our report, a statement which does not occur in it at all! In the second place, the ounces and grains which we speak of are not new; they are the same ounces and grains that we have been using for years and years. Neither is the use of decimal parts of grains and ounces in any way a novelty; it has been the practice in many chemical laboratories and with some photographers for a long time. Surely Mr. Warnerke does not share the common misbelief that a decimal system is inseparable from the metric system, and that metric units are the only units which can be or are used decimally! Finally, in this connexion we make no attempt to impose any units on anybody, we recommend no new units, we do recommend that certain sub-units should *not* be employed, and we endeavour to show how well-established and familiar units can be used in the simplest and most intelligible manner.

Mr. Warnerke's grievance against us, obviously, is that we did not insist on the adoption of the metric system pure and simple. Several of us, like many other scientific men, whilst fully recognising the advantages of a decimal system, are by no means so enamoured of the metric units as Mr. Warnerke seems to be. The Committee endeavoured to recommend a scheme which should, in the first place, be practicable, and, in the second place, be likely to secure general adoption. We regard our recommendations relating to formulæ as the most important part of our report. It seemed to us to be undesirable to insist upon the adoption of any particular units, and it is quite of secondary importance whether any individual chooses to use in his own practice ounces, or grains, or grammes, so long as his units satisfy the condition of relation between

weight and measure which we specify, and provided always that he expresses his quantities or formula in "parts" when he wishes to communicate them to others. The fact that our recommendations as to formula are quite independent of the particular units employed seemed to us to be one of their strongest claims to general favour and acceptance.

The whole of the concluding and longest paragraph of Mr. Warnerke's letter has very little bearing on the question under discussion; it certainly has no foundation on anything contained in the report of the Convention Committee.

C. H. BOTHAMLEY.

The Yorkshire College, Leeds.

THE RECORD OF PHOTO-MICROGRAPHY.

To the EDITOR.

SIR,—I notice Dr. Lindsay Johnson's "boggling" at my words regarding aperture, magnification, and penetration of microscopic objectives. I believe my statement as made in my paper was quite correct; it is, in fact, not a matter of opinion, but of mathematics. By omitting some of my words (confessedly, for he puts dots in their place) he has spoiled my deduction, which reads thus in my paper: "It is therefore beyond argument that the more the aperture—and consequently the more the resolution—we can get *with the least magnification*" (this is the point), "the greater will be the penetration we shall obtain." I cannot help what Mr. Swift or Dr. Beale have said: facts "winna ding."

I was wrong in saying the new glass contained fluor spar, I should have said the new glasses (or objectives) contain an element of fluor spar. If Dr. Johnson is correct—and I hear the complaint not now for the first time—in his accusation against Zeiss of keeping back part of the truth regarding the apochromatic glasses, I concur with him in his criticism. My opinion of the "apos" is very high, but I did not say Zeiss glasses were superior to others for observation; English opticians, notably Powell and Lealand, and Swift are making grand objectives apochromatic. My paper was about photo-micrography, and I only mentioned observation in passing, but I do a great deal of observation, too, and I say: Give me wide-angle glasses, if possible without any diffusion of focus, which is the quality often meant when penetration is the word used.

I notice also a letter signed "T., R.M.S." Not to mention the fact that his letter is chokeful of errors, I may say that I may think of replying to it when the writer ceases to attribute to me words I did not use and attitudes I did not take, when he leaves aside quibbling and impertinence, and when he signs his name like a man. The introduction of the phrase "consulting experimentalist," which was none of my coining and the tone throughout, are pretty sure proof that this party has some personal spite against me. Even so, if the letter were not for the most part wrong on theory, I would reply to it.

As many gentlemen like Dr. Johnson as you please, Mr. Editor, but pray draw the line at "T., R.M.S."—I am, yours, &c.,

ANDREW PRINGLE.

RETOUCHING AND RESITTING.

To the EDITOR.

SIR,—In last week's number of this JOURNAL a "Photographic Artist" writes, in reaction to Mr. Rodgers' complaint about over-retouching, "That retouching is an art there cannot be two opinions upon; that it should be practised by those who have a good art training must also be admitted, that, in point of fact, it should be the work of an artist."

Mr. R. Parrott, in his articles headed *The Art of Retouching*, says, "It is usual to say that a thorough art education is necessary before becoming a good retoucher. With this I do not quite agree. I believe a man can become a very good retoucher indeed, and yet not have had an extreme artistic training. Most certainly those who possess a thorough art education will find it of very great service as they go along, and decidedly their work will be superior to the work of those who have not had one, or those who have had one to a less degree; but it is not an absolute *necessity*."

How are these two sentences to be compared? I think the "Photographic Artist" to be right, or I trust all the retouching I see by any one not versed in art cannot be considered in any way as assisting or improving a photograph. Besides this, looking on how this retouching business is generally handled, how can we expect other results as all the show-cases, &c., exhibit?—that is, in good or bad manner stippled-over photographs.

Twenty years ago no one would try to retouch a negative unless supported by a print, and, after retouching, another print was taken and compared with the first, and then, perhaps, altered what was considered necessary; and I know that the retouching of a negative half plate best took the time of one to two days generally. The fact is, that what is at present usually called negative retouching is nothing else than a certain amount of stippling, which can be done better in many cases by people who have no idea of art principles than by any artist; and as long as the photographers protect such work and are not ashamed of it, this thing will go on.

It is absolutely more surprising that such work is admitted to photographic exhibitions, and there rewarded with medals, &c. Would it not be reasonable on the part of the artist supposed to work without retouching to send in work without retouching?—I am, yours, &c.,

F. B.

POISONS AS COUNTER-IRRITANTS.

To the EDITOR.

SIR,—Several of the chemicals used by photographers serve as effective antidotes for poisoned wounds and bites and stings of insects. These, in parts of some countries over which I have travelled, were a terrible torment.

In your issue of July 4, I mentioned that if the after swelling caused by gnats or mosquito bites was punctured so as just to break the skin and a drop of concentrated solution of bichromate of potash applied, the irritation from the bite would cease.

It is well known that if nitrate of silver can be *immediately* applied to a wound from the bite of a mad dog, it is a certain preventative against rabies, probably more so than the actual cautery. How this would serve for mosquito bites I have not tried, on account of the consequent temporary disfigurement. Ammonia I have found to be of little use. If strong, it destroys the cuticle and leaves a painful sore.

An old remedy is to apply on the spot bitten the bruised twigs or young leaves of the common laurel. In the absence of these, laurel water will serve, but it must be borne in mind that taken internally this is an instant and deadly poison. The sedative effect is due to the hydrocyanic acid contained in the application.

For the same reason, if instantly on being bitten the spot is moistened and a lump of cyanide of potassium rubbed thereon, the relief and cure is immediate, and no insect will venture again to attack a part having any remains of a wash of cyanide adhering.

Of course it would be dangerous to apply this to an open sore. Whether there would be any risk in washing a considerable portion of the unbroken skin with the cyanide and allowing it to dry I cannot say.

I have tried it on the hides of saddle horses pestered with flies during a lengthened photographic journey through Syria, and found that insects avoided places that had been washed with the cyanide solution. We carried an "entomologist's bottle" containing a small lump of cyanide wrapped in cotton wool, the fumes from which effectually killed and preserved the specimens.—I am, yours, &c.,

F. H. WENHAM.

[Ammonia is stated to form a cure for the bite of some poisonous snakes. We once conversed in the Southern States with a medical man who had had considerable experience in curing the bite of the rattlesnake. He said that he immediately opened up the wound with a bistoury to promote copious bleeding, and then heaped a quantity of powdered carbonate of ammonia upon the wound and bound it on. He also dissolved some carbonate in water and gave it to the patient to drink. He states that he never yet lost a case, unless, of course, too long a time had elapsed ere he was called. Alcohol, by some alleged to be a poison, also acts as a counter-irritant in the case of the rattler's bite.—ED.]

ELECTRIC LIGHTING IN NEWCASTLE.

To the EDITOR.

SIR,—In your issue of the 4th inst. your correspondent "D. D." in *Notes from Newcastle* states that the electric light is making headway here, and that the only Newcastle photographer to avail himself of it is Mr. James Bacon. This latter statement is not correct, as I have used the electric light since its first introduction by the Newcastle and District Electric Lighting Company, Limited. I may say that my place is lighted throughout by electricity, and a main cable is run to the studio for an arc lamp. I am also on the Post-office Telephone Exchange, and, I believe, am the only photographer in Newcastle who avails himself of this useful invention.—I am, yours, &c.,

JAMES DICKINSON.

43, *Grainger-street, Newcastle-on-Tyne, July* 12, 1890.

FRENCH CORRESPONDENCE.

(*From our own Correspondent.*)

PHOTOGRAPHS IN NATURAL COLOURS.

At the last meeting of the Society M. Vallot presented some prints in natural colours. Since the experiments of M. Verezzi the attention of a great number has been drawn to this subject. M. Vallot has been repeating the experiments of M. Poitevin, and I myself cannot see that progress has been made. A few days ago (twelve years) I travelled two hundred miles to pay a visit to the father of photo-mechanical printing. While receiving his hospitality he showed me his collection of experiments of printing in natural colours. His results were far superior to what was shown last Friday, or to what had been obtained by M. Verezzi (using spots).

In case any amateur should like to procure a few proofs in natural colours, or to have a start on the road to some wonderful discovery, I will here give the results experimentally obtained by M. Vallot, which he himself gave us last Friday evening:—First strong photographic paper for three minutes on the following solutions:—

1. Water ..... 100 c.c.
   Sodium chloride ..... 20 grammes.

Dry the paper as rapidly as possible, then float it for five minutes on the sensitising bath:

2. Water ..... 100 c.c.
   Silver nitrate ..... 20 grammes.

Allow to remain a few seconds, and then wash the paper for ten minutes under a stream of water.

3. Plunge the paper for five minutes into a twenty per cent. bath of sodium chloride; wash a few minutes in running water.

Prepare the following solution:—

Distilled water	100 c.c.
Protochloride of tin	3 grammes.
Sulphuric acid	10 drops.
Of the above solution take	20 grammes.
Water	500 c.c.

4. Plunge the paper into this bath, and then take the tray containing the solution and the paper into the light and expose the paper until it becomes of a dark violet hue; wash five minutes and dry the paper. During the drying prepare the two following solutions:—

A. Water	100 c.c.
Bichromate of potash	5 grammes.

B. A saturated solution of sulphate of copper.

5. Mix equal quantities of the two solutions and plunge the dry paper into the bath, and that for two minutes. When dry, the paper is ready to be exposed. The subject before you, said M. Vallot (a transparent poly-coloured design for a stained window), was exposed three-quarters of an hour in full sun.

6. When the paper is taken out of the printing frame the colours are very faint; in order to revive them, the print is plunged into the following bath:—

Water	100 c.c.
Sulphuric acid	20 c.c.

Care must be taken not to allow the prints to remain too long a time in this bath, or the acid, after having revived the colours, would soon destroy them. The proofs are now well washed, dried, and albumenised, which give vigour to the tones.

Naturally, said M. Vallot, the image must be preserved from light, as no means of fixing it has yet been discovered.

Exchange Column.

Whole-plate Shepperd portrait lens, good condition; exchange for cabinet or Euryscope lens or studio accessories.—Address, S. J. Gannon, Chelmsford.

Will exchange landscape plates (whole-plate and quarter) or opal plates by best makers for a half-plate portrait lens.—Address, W., 30, Vicarage-road, N.W.

Rolling press, eighteen by twelve inches, nickel-plated bed and roller, equal to new; will exchange for bench lathe or good lantern.—Address, Q. 20; 2, York-street, Covent Garden.

Will exchange Bigelow's *Album of Lighting and Posing*, with *Key*, in good preservation, for Hardwich's *Photographic Chemistry* and other photographic literature.—Address, F. Dawkes, Wells, Somerset.

Wanted, Shew's Eclipse hand camera (quarter-plate), also a walking-stick stand; will exchange *The Royal Gallery of Art* (cost 5l. 8s.) and give a little cash.—Address, Edwyn Tart, Marden Vicarage, Hereford.

Quarter-plate tourist camera and three double slides, by Sands and Hunter, with Grubb's lens, best sliding stand, &c., in exchange for Swinden and Earp's or other good hand camera.—Address, W. Thompson, 8, Guy's-terrace, Blue Bell-hill, Nottingham.

Answers to Correspondents.

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

R. B.—We did not expect you.

G. M.—Have been unsuccessful as yet in finding the right person.

Landscape.—We do not know the address of any German manufacturer of cheap lenses.

Bingafield.—Send names, addresses, and full details concerning the detention of your specimens.

John W. Parker.—We have placed your complaint regarding detention of specimens on our register.

Sep.—The collotype process is not a difficult one to work, and it would probably answer your purpose better than any of the other mechanical methods.

C. C. C.—In the print sent there is no question that not only has the pigment where the picture was not shielded by the mount changed in tint, but that the paper also has changed colour and become yellow.

Landscape.—The best method of arriving at the exposure necessary is to judge from the appearance of the image on the focussing screen. We take no heed of "exposure tables," though they may possibly be useful to some.

Regular Reader.—We cannot in this column afford sufficient space to give full details of processes or methods, particularly when they have been so frequently described in recent volumes. Almost any practical photographer would give you instruction in "enamelling" *carte* and cabinet photographs.

Warder.—The quickest and at the same time the best lens for your purpose would be a *carte* lens of eight inches equivalent (six inches back) focus, with an aperture of two and a half or two and three-quarter inches. Armed with this, rapid plates, and a quick-acting shutter, you ought to be equal to your sitters.

Friolent says: "Lately I have been troubled with a sort of haze enveloping my photographs during toning, and in such a manner as to prevent them (the photographs) from toning up. Could you explain the cause? I enclose a print for inspection. I may add that I tone by both borax and acetate of soda baths, previous to which I 'neutralise' the prints by adding a small dose of carbonate of soda, or washing soda."—So far as we can judge by the print forwarded, it was washed and toned in too strong a light. Also the toning was carried beyond what the particular sample of paper would bear.

W. Dalton.—If the negative is over-exposed to the extent you say, and as the print shows that it is, we are afraid you will not do much good with it. Try the method suggested by Mr. Dunmore some time back, namely, reduce the image until you get bare glass in the deepest shadows, and then intensify up to printing density.

Mount.—We do not untertake to test mounts for correspondents. We have not time to make chemical analyses of the different mounts from time to time sent to us. Any analytical chemist will of course undertake the work for a fee. If you can conclusively prove that the mounts are the cause of the fading you can doubtless obtain redress.

C. E. Fowler.—On the face of it we fear you have been duped. It was very unwise to send the apparatus on approval without the cash or a reference. Lose no time in writing to the superintendent of the police in the district to which you forwarded the things, giving him full particulars as to dates and circumstances. We have never heard of the man before.

J. Barnes writes: "Will you kindly tell me, in your 'Answers to Correspondents,' if there is any solution for making ferrotype portraits darker when too light?"—By too light we suppose that over-exposure is meant. When a ferrotype is in any way defective the simplest and quickest plan is to take another at once. A ferrotype is not worth tampering with.

Delta.—From the description of the behaviour of the prints it is clear the water in which they were washed was contaminated with some impurity, probably from a dirty dish. It is scarcely likely that the water as it came from the main would cause such an appearance. Of course we cannot indicate what the contamination was, as there are so many things in daily use that would produce a similar effect.

A. Y. E.—If the case be as stated, your customer has no claim to the negative; but if you made a definite charge for taking it, and stipulated to supply copies at a certain rate afterwards, the case may be different. On this point different courts have given contrary judgments. The best plan is always to make a definite charge for the "proof" and so much for after copies, and make no mention whatever of the negative in any way.

Country Photographer asks our opinion as to whether it is the more economical for a photographer in a small way of business—using from one to two gross of plates per month—to make his own or to purchase them.—To answer this query we should want to know the value "Country Photographer" puts upon his time. Competition in the plate trade is so keen now that we doubt if it would pay any consumer, except on a large scale, to manufacture his own plates.

W. C. Forbes says: "I recently ordered from a London house a lens of the wide-angle type, expecting that it would have an aperture equal to most lenses *f*-8, as I wanted it for instantaneous work. I find that the largest aperture is marked *f*-16. Is this usual?"—Wide-angle lenses have, necessarily, a much smaller aperture than narrow-angle ones; *f*-16 is about the average for this class of instrument, but most will require a still smaller aperture to cover the full size of the plate well.

A. G. Field writes: "I see that Mr. George Boucher has been indulging in a wail in your columns at my expense. All that is required to refute what he has been kind enough to say about me is to tell him and all whom it may concern that I am only a journeyman, and that I therefore have no control whatever over the prices of photographs in Maidstone. I presume that the price list referred to is that of my employers, the 'Maidstone Photographic Company,' in which concern I have no interest whatever save that of a workman. I have as little to do with fixing the prices of the above Company as he has; nay, less, for it is against him and his fellows in the local trade that this Company is directing its efforts. When the local prices were 7*s.* 6*d.* per dozen for *cartes* and 15*s.* for cabinets, he came to Maidstone and commenced business at 4*s.* 6*d.* for *cartes* and 10*s.* 6*d.* for cabinets. My father runs a photographic business in Maidstone, and at the time he immediately set to work at cutting rates and succeeded in 'freezing' out three of Mr. G. Boucher's comrades. There are now eleven studios in our town of less than 40,000 inhabitants, beside photographers who live by outdoor work. Whenever a 'freeze' has been successful, the prices have been at once raised again in the establishment of the 'freezer;' but the cheap-and-nasty rates of the lowest stratum of establishments have had their effect even on the highest, the head firm here now advertising *cartes* at 6*s.* and cabinets at 16*s.* But the Company of which I speak (which represents more than any one person, and which will raise prices directly the cut-throats are dispersed) takes its stand with practically unlimited resources to rid the district of these people."

Photographic Society of Great Britain.—Monthly technical meeting, Tuesday, July 22, at 5A, Pall Mall East, at eight p.m.

The Photographic Club.—Subject for discussion, Wednesday, July 23, *Ceramic Photography*; July 30, *Printing with the Salts of Chromium*. Bank Holiday, outing to Guildford.

Ealing Photographic Society.—A meeting of the above Society will be held at the Victoria Hall, Ealing, on Thursday, the 24th inst., at eight p.m., to approve the rules, enrol members, and elect officers for the year. The Provisional Committee invite the attendance on that occasion of all those who are interested in the subject.

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MEMBERS OF THE PHOTOGRAPHIC CONVENTION OF THE UNITED KINGDOM,

HELD AT CHESTER, JUNE 23–28, 1890.

THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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REVERSED NEGATIVES ON GELATINE FILMS.

In recommending a fortnight ago the substitution of a strong solution of a soluble chloride for liquid ammonia as the solvent of the chlorised image in Mr. Bedding's reversal process, we did not, of course, expect that it would exhibit the same degree of energy. In the first place the most concentrated solutions of the alkaline chlorides are far inferior to ammonia in their solvent action on *pure* silver chloride; but when the latter is mixed with or enclosed in a film of gelatine the odds are still more against the saline solvent, for while the ammonia from its softening action upon the film is able to penetrate rapidly, the diffusion of the salts is comparatively slow, the rapidity of penetration varying inversely with the concentration of the solution. Thus it is probable that a saturated solution of any one of the chlorides would fix a gelatine plate more slowly than one of half the strength.

For this reason there would possibly be little advantage in resorting to the use of magnesium chloride, which from its extreme solubility forms a more concentrated solution than any of the other chlorides. This salt, which has recently been put forward as a fixing agent for prints, is soluble in a little over half its weight of cold water, while chloride of ammonium requires about two and three-quarter times, and the potassium and sodium salts over three times their weight. Supposing, then, that weight for weight the various salts possess equal solvent power, the most rapidly diffusible should prove the most efficacious where a gelatine film is concerned; and looking at the comparative osmotic action of the salts in question, magnesium chloride is one of the very worst that could be employed, and common salt is but a trifle better. The chlorides of potassium, calcium, barium, strontium, cobalt, manganese, and zinc, follow in the order named in gradually increasing osmotic energy, while chloride of aluminium is one of the most rapidly diffusible substances known, its energy being upwards of two hundred times as great as that of chloride of sodium.

It is needless to say, however, that the different chlorides vary in their capability of taking up the silver chloride, though we are not aware that any reliable data have been published on the subject. Of the more usually employed salts—those of ammonium, potassium, and sodium—the first-named is the most energetic solvent of pure silver chloride; but if osmotic action is to be taken into account the vastly preponderating energy of the aluminium salt should give it a strong advantage, and as it is deliquescent and readily soluble it would seem to possess the strongest claims of any.

With regard to Mr. Bedding's inability to completely remove the chlorised image by means of the solution we propose, we think it must be for want of insufficient action, either as regards duration or very possibly volume of solution. Naturally with a comparatively feeble solvent a much larger volume will be necessary, and though with ammonia a certain bulk suffices to clear a plate in a given time, a much larger quantity of chloride solution would be needful. We have often, by way of experiment, fixed collodio-chloride transparencies with solution of salt, using, of course, a large excess, but we imagine that it would be found a practical impossibility to do so by simply pouring a small quantity of the solution on and off the plate.

Turning to the danger Mr. Bedding foresees of precipitation of chloride of silver in the film by the dilution of the fixing solution in washing, we need merely point out that precisely the same danger exists in the use of hypo or any other fixing agent, if the quantity used is too small. Every tyro in photographic chemistry knows, or at least is taught in the text-books, that unless a large excess of hypo is employed an insoluble silver compound is formed during the process of fixing and washing, but that in the presence of an excess of the hypo this is prevented, or if formed is redissolved. So with solution of alkaline chloride, if just enough be used to dissolve the silver chloride a saturated solution of the latter is formed, and the first dilution with the washing water reprecipitates a portion of it. With a large excess of the fixing solution, however, there is no approach to saturation, and the silver salt remains dissolved even after considerable dilution.

The question of the comparative destructive action of either ammonia or nitric acid upon individual plates is one that can only be decided by actual trial. That many plates may and will bear the treatment given to them in Mr. Bedding's process is undoubted, but it is equally certain that others, perhaps quite as good in general properties, will not. Our proposal to substitute the chloride solution was made with a view of removing one of these elements of uncertainty.

The action of nitric acid upon gelatine in its natural state is essentially a solvent, and not, as Mr. Bedding assumes, a "rotting and shredding one." We have before us as we write two samples of gelatine dissolved at the ordinary temperature, the one in nitric acid of sp. gr. 1·42, and the other in the same, diluted with an equal volume of water. Both are as perfectly fluid as if dissolved by heat in the ordinary way, and exhibit no symptoms of mere rottenness or "shreddiness." The addition of a certain proportion of nitric acid to ordinary glue constitutes one method of preparing a permanently liquid glue of great tenacity, the latter quality being one scarcely compatible with rottenness. Other acids exert the same solvent power.

The action of ammonia is not so definite. It does not dissolve the gelatine as the acid does, but it softens it, though this cannot be fairly termed rotting, since the gelatine resumes

its normal condition when the ammonia is removed. If ammonia be added to warm solution of gelatine it decreases its setting power; in other words, it lowers the temperature at which the solution remains liquid, and decreases the hardness or tenacity of the jelly. But if the ammonia be neutralised or removed by washing, the gelatine practically reverts to its original condition.

At the first opportunity we shall try the effect of the chloride fixing solution upon silver chloride in gelatine.

STUDIOS AND THEIR BLINDS.

A CORRESPONDENT who has been, he tells us, specially interested in our description of Mr. Watmough Webster's system of blinds, wishes us to add somewhat to the fullness of the article in which we wrote of them, and he asks further questions on the subject, the replies to which may perhaps be interesting to others as well as this querist.

It is unnecessary to observe that the main object of the blinds to be seen in all studios is to shut out light with a double object—firstly, to prevent too much diffused light in the room, and, secondly, and mainly, that the lights and shades on the sitter may be arranged so as to produce the most artistic effects, and to present the features of the sitter in the most favourable aspect for the production of a pleasing portrait. It may be said that a perfect studio would be one built on the principle of an astronomical observatory, in which the roof itself moves round, the floor being stationary. As, however, in practice this would be almost impossible, it is obvious that the nearest approach in practice would be most useful if easy to work, and not liable to get awry or out of order. There is a great deal in getting used to a system: we believe that it is rather the habit of a photographer with a well-appointed studio to believe that his own system of blinds is the best, and that no other surpasses, if indeed it equals it.

There are studios whose blinds are lowered entirely by cords and pulleys; others, again, have neither one nor the other, the whole work of arranging them being done, as in the case we are discussing, simply by the aid of a long rod. From extended observation of these two opposite systems, we should be strongly inclined to recommend one whose neither cord nor pulley formed part of the arrangements for adjusting the blinds. They are generally so apt to get out of order; a state of affairs that usually happens when the maximum of inconvenience is produced.

In some studios the blinds work to and from the sitter; in others, again, the opposite mode prevails, *i.e.*, they work at right angles to the line joining sitter and lens. Some are needed on both sides of the room, others only on one; it would be next to impossible to describe every style. Many years ago Mr. Helsby, of Liverpool, had none at all: his roof had a large light in it, and the sitter was moved round the light, instead of, as usual, the light round the sitter.

Referring now to Mr. Webster's studio, we will first explain what we mean by each length being in three sections. The roof of this studio, it being ridge-shaped, is glazed nearly the whole length of the room on one side with the object of enabling a sitter to have either right or left side of his face in a similar manner by placing him at either end of the room. It is obvious that the whole of that amount of light is unnecessary—more than that, some of it is hurtful. The blinds run east and west on pairs of wires from one end of the studio to the other, they being made very "full;" hence one of the three blinds in each layer, as we may term it, may be made to screen half the roof, and the other two be left at the other end for adjusting the light in the exact direction required—one blind closing up from behind the sitter, the other closing to his front from the camera end. The blinds themselves are simple squares of dark-coloured material with rings stitched along their long edges, these rings being threaded, as it were, on the wire. These lengths of blinds overlap one another almost like slates or tiles on a roof, so that no light of any importance reaches the sitter from between the rows, the difference being that the top edge of the lowermost blind lies above the lower edge of the next higher blind, instead of under it, as in tiles.

If these descriptions are understood, it is obvious that with blinds so arranged a broad or narrow beam of light may be directed upon the sitter at any required angle from either end of the studio. We may add, further, that Mr. Watmough Webster has a further set of blinds of a translucent nature to diffuse direct sun rays when they enter the studio inconveniently later in the day, these latter being placed between the opaque blinds and the glass. It is not necessary to say that whatever aspect a studio has, the sun, at some time of the day, will send his direct rays through skylight or side-light unless intercepting screens are employed to prevent it. There is, perhaps, least inconvenience from this cause when the studio is built for the sitter to face east or west. At the same time, so much depends upon the pitch of the roof, its position with regard to surrounding buildings, and other similar accidents, that it is not possible to dogmatise as to the special suitability of a particular form and aspect. The point to be aimed at is the power to admit light in any direction and on either side of the sitter so as to ensure suitable light and shade and due *chiaro oscuro*.

THE price of metallic silver still continues to vary daily. One day last week it attained a higher price than it has for many years past, namely, over fifty pence per ounce—silver is always quoted at pence per ounce. Owing to the passing of the Silver Bill, by which the American Government will have to purchase some four or five million ounces monthly, there is every prospect that the value of the metal will be permanently enhanced. It is asserted, on good authority, that the price of the metal in future may be expected to fluctuate between forty-nine and fifty-two pence per ounce. Dear as silver now is, compared with what it has been during the last few years, it is not so high in price as it was at one time. Even so late as 1867 the market price for a long time was over sixty pence per ounce; at a still earlier date it was considerably higher.

THE greatly increased price of silver is an important matter with large consumers of the nitrate, such, for example, as the preparers of ready-sensitised papers and dry plate makers. The proportion of silver now used in either paper or plates cannot well be reduced without a deterioration in quality; hence photographers will either have to pay a higher price or the manufacturers will have to be content with a smaller profit, and this, owing to keen competition, is, we have little hesitation in saying, small enough already.

WHAT about the automatic photograph machines? Has any one seen any installed as yet? We have not. Some time ago it was stated that the one pound founders' shares were quoted at an enormous premium. The whole of the capital was payable within two months of the allotment of the shares. This time has expired, and from the enterprise shown in floating the Company one would have expected ere this that some few machines at least would have been in operation. Several photographers we know are anxious to

pay their pennies to obtain a sample of the work of pure automatic photography.

A CORRESPONDENT calls our attention to the following amusing sentence which recently appeared in a photographic contemporary, which, by the way, is always on very good terms with itself:—"We have often been asked to test lenses, and have had seriously under consideration the establishing of a testing department, but the heavy expenses to put down the requisite apparatus, &c., have so far deterred us." This is rich! Of course, the term "heavy expenses" is, after all, a comparative one. What a person of straightened means might consider a heavy expense others would think a mere *bagatelle*. Most of our practical readers know quite well that all the necessary apparatus for testing photographic lenses is a question of a few shillings only.

It may be interesting to some of our younger amateur readers to be informed as to the apparatus used for testing and correcting photographic lenses by the leading opticians of London, and probably by those of the Continent also. It is simply this:—In the shaded corner of a room is placed a little black box containing the test objects. These consist of a small oil lamp, similar to those fitted to cyclists' lamps, a watch dial or finely divided scale, and a mercury bulb or polished steel bead. For testing, a Ramsden eyepiece—the ordinary focussing glass, costing a few shillings—and the "horse" are used. The latter consists of a stout framework of wood that can be rotated horizontally on its stand or a table. An upright piece is fixed vertically on the front, into which the lenses to be tested are fixed. It is also provided with a sliding piece carrying a strip of ground glass which can be moved laterally. This contrivance is placed at the opposite side of the room to the test objects, and the optician examines the image of them, as formed by the lens, on the ground glass. Instead of the ground glass and magnifier, one leading optician receives the image direct on the surface of a Stanhope lens.

WITH the above simple appliances, in a few minutes every quality of a lens can be and daily is being tested, and all corrections made. In place of the "horse" any ordinary camera could, as a matter of course, be used, but this would be more costly, and at the same time more cumbersome. So much for the so-called heavy expenses for "the requisite apparatus." There is one item, however, we find we have omitted to mention—namely, brains to use it. Possibly these were the expensive "&c." our contemporary had in mind while writing.

THE flaming accounts given in some of the daily papers of Herr Vereasz's photographs in natural colours turn out, as most practical men expected they would, to be much over-drawn. Now that we have more reliable information as to the results, the process at present has no practical value. Herr Vereasz has accomplished no more than was achieved by others many years before. It is claimed, however, that the pictures can be made more permanent than hitherto, but it is admitted that some of the colours are less perfectly rendered than by some former methods. Still, even in the matter of fixation any gain is an advance. When announcements such as those alluded to appear in the daily press, photographers are soon inundated with applicants for pictures by the "new process," and consider the artist who is unable to produce them behind the age. We have heard of some amusing instances of this with regard to the last claim for photography in natural colours.

SPEAKING of colour photography, chromo-collotype is now attracting some little attention. There is nothing novel in this process, indeed it is an old one, and it is one by which excellent results can be produced. Some six or seven years ago a Company started working chromo-collotype in London, but it did not prove a commercial success. Chromo-collotype is analogous to chromo-lithography, collotype plates being substituted for stones. With collotype, as with lithography, a different plate has to be prepared for each colour, and there must be as many printings as there are colours.

A WEEK ago we congratulated our readers on the then unusually favourable condition of the light for photography, and mentioned that the average of sunshine during the first five months of the year had beaten the record for the previous nine or ten years. Since then, however, the weather has undergone a marked change, unfortunately for those who have been taking their annual holidays accompanied by their cameras.

A NEW PROPERTY OF GELATINE.

THE interesting observation of Messrs. A. & L. Lumière, published in last week's JOURNAL, on the solubility of gelatine in a cold solution of barium chloride is perhaps, after all, not absolutely new, since the fact has been well known for at least fifteen years that gelatine emulsion prepared with bromide of barium loses its setting power. This fact has, I believe, been mentioned in the columns of THE BRITISH JOURNAL OF PHOTOGRAPHY many years back, but I cannot at the present time recollect by whom or under what circumstances.

In 1873 and 1874, when experimenting with gelatine emulsion and employing a variety of different bromides such as were at that period used in connexion with collodion, I was frequently annoyed by the apparent decomposition of an emulsion when the circumstances were apparently not such as would lead to such a result. At length I traced the occurrence directly to the employment of the barium salt, which I supposed possessed the property of destroying the setting power of the gelatine, though I never suspected that, as Messrs. Lumière now point out, it will bring about the solution in the cold.

Since reading their remarks I have tried the experiment, and find that one ounce of crystallised chloride of barium dissolved in six ounces of water—as nearly as possible the fifteen per cent. solution they speak of—readily dissolves 120 grains of Coignet's gelatine, the time occupied being about two hours at a temperature of 65° Fahr. Probably a far larger quantity would be dissolved, but this was taken as representing the normal strength of a gelatine emulsion. The solution is opalescent and syrupy, and when spread upon glass slowly dries into an irregular crystalline layer. It does not, so far as I can see, offer any chance of utility, and the fact of this property of the barium salts is only useful as a warning to emulsion makers.

As to its application to the treatment of emulsion residues, I fail to see that it can possess any advantage over the acid method of precipitation, if, indeed, it be equal to it, for though its addition may render the gelatine permanently liquid it does not destroy its viscosity, and consequently the subsidence of the silver salts would remain a matter of considerable time. As for the possibility of developing carbon prints in the cold, practical workers will be able to judge of the probable value of that suggestion.

Another "new property" of gelatine, I may mention, is that bromide of cadmium—probably also the chloride—produces an opposite effect to that of the barium salts, namely, it renders the gelatine insoluble. I think Mr. E. Banks, of Liverpool, told me some years ago that he utilised this property for the production of an insoluble sensitive gelatine film upon opal for positive purposes, though I am ignorant of the details.

W. B. BOLTON.

THE ART OF RETOUCHING.

CHAPTER XIV.—METHOD No. I.

I THINK it may fairly be considered a disputed point as to the proper order of acquiring a thorough knowledge of, and proficiency in, the art of retouching. Some hold the opinion that *method* is the primary necessity, others that a thorough knowledge of all the minute requirements of a negative, and how it should be treated, should be the first anxiety of an intending retoucher.

Personally, I am somewhat disposed to favour the latter opinion I have always found that pupils, when once they acquire a certain proficiency in any *method* of working, cease to direct further attention to the study of the face. This has a very baneful effect in the end. The student falling into this error may secure a very pretty and effective method, but the pictures he will turn out will be thoroughly devoid of that animation and expression so necessary to a true and lifelike portrait. Now, on the contrary, when he has given his attention fully to the study of the face, and thoroughly mastered all the

effects of light and shade upon the muscles of same, he is in a safe position to start upon acquiring a method suitable to himself for the carrying out of the improvements that may be necessary on any negative which he may undertake to retouch.

As before laid down, it is impossible to know too much about the anatomy of the face, and I honestly advise every one desiring to be competent retouchers to spare no pains in acquiring a thorough knowledge of it before seeking for a *method* or style of working. By this means, too, there will be no hesitation, while wavering between one style and another, as to what you should do. You work ahead, and, working, suddenly realise the fact that you have acquired a method of your own quite satisfactory, and capable of carrying out the necessary treatment of a defective negative. Practice will, then, bring you not only proficiency, but also rapidity of execution. I do not lay this down as a hard-and-fast rule, but, if given a little consideration, I feel confident it will have, at least, sufficient weight to balance what may be, considered liberally, a matter of opinion.

As may be gleaned from these remarks, I have no special *method* which I would put forward as the only and best one to be adopted by a beginner. One retoucher may have a very widely different style from another, and yet the results be so similar that one could scarcely tell which was which. Of course, in such a case, the two retouchers must have the same sentiments regarding the treatment of the muscles of the face; if they have *not* (even if their styles be *identical* instead of broadly *different*), the most uncultured observer can discern the difference. This again proves the importance of the knowledge of the anatomy of the face, if such were still wanting. It is this same knowledge which marks the difference between the really competent and artistic retoucher and his less instructed comrade.

The first and most necessary implement used in retouching a negative, as all no doubt know, is the pencil, and the method of using same will now claim our primary attention. Having placed the negative on the retouching desk, and seated ourselves in such a position as to secure ease and comfort, we will begin our work. I will not hold exclusively to my own method, but enumerate several of the most approved systems from which a selection may be made, according to the taste or *feeling* of the student. In times gone by the negatives, as a rule, came to the retoucher ready for working upon. This was in the old wet plate time. All this, however, has been revolutionised since the almost universal adoption of the *dry plate* Now we are obliged to rub a medium upon each negative before we can begin our work, as there is absolutely no *tooth* whatever to which the plumbago will adhere. I may have something to say later on about the many kinds of medium, but for the present will be contented with saying that *a* medium must be used. This done, we begin by obliterating the apparent blemishes or transparent spots visible on the negative. Some retouchers do this by *dotting* the negative on these places, and so depositing sufficient plumbago on the film as is necessary to increase its density so as to harmonise with that of the surrounding parts. Others adopt a touch somewhat like a comma; others, still, hold that a continuous system of circles run over the face will produce the desired result. There are some, however (including many of the most capable retouchers of the day), who adopt *lines* for their leading treatment. This latter I also hold to be about the best, as by it any desired effect can be produced. I do not mean to convey that the lines are straight or rigid; on the contrary, they may be, and generally should be, slightly curved and graceful. They should, when possible, also follow the lines and muscular drawing of the face, or else we may fail to secure a harmonious result. Let us, therefore adopt this latter style in treating the negative before us. Personally (and I follow in the footsteps of a good many better men), I recommend the placing of the negative, at times, slightly upon its side, so that we can, with comparative freedom, make a downward stroke of the pencil that will make a line across the forehead. We must now fill in all irregular and transparent spots and lines (of course, without interfering with the essential markings of the face as before laid down), imparting to these spots and lines, as nearly as we think desirable, the same degree of density as the surrounding portions of the forehead. Of course, if there should be very marked wrinkles on the forehead they must not be totally taken away, although they may, with advantage, be very considerably modified. It is not at all necessary, or even advisable, to completely fill in the various spots and other irregularities we find on a negative, one or two lines, according to size of defect, drawn through them being sufficient.

By so doing we secure a double advantage: the slight shade or half tone thus left in will lend a softness, and also, when finished, impart a stippled effect to the picture. This result would be quite impossible if we were to completely block out the spots, unless we afterwards made a point of stippling the negative all over. This would naturally entail the loss of much very valuable time, and would be likely to impart an over-laboured appearance, without securing the soft and flesh-like stipple so easily attained when the touches are made as above directed. In carrying our work over a face our lines must always take the same direction as indicated by the lines of the skin and position of the muscles. Of course, when these lines run perpendicularly, owing to the contraction of the muscles, we must also modify our touches so as to be in harmony with such conditions. These effects are principally found upon the forehead, and sometimes on the upper lip.

Sometimes, through the contraction of the muscles, hard lines are produced upon the temples, and must *not* be removed in every face; they may be leading characteristic features, without which the likeness would be seriously impaired. If careless, we run the risk of producing one tint over the entire forehead, which would be ruinous; therefore, we must be sure to leave indications, however slight, of all these markings, and when the broader effects of light are put in, the retention of these indications of form will impart a pleasing and life-like character to our work, which, by other treatment, might easily be lost.

We can now turn the negative somewhat more upright, in order, following the direction of the muscle of the orbit, to soften the lines (should there be any) formed around and about the plane of the temples. We can now place the negative nearly upright while we work upon the frontal depression and also the nose. For the softening and modelling of the furrows under the eyes, certain portions of the nose, and the upper lip, the negative may be turned back so as to facilitate the firm stroke of the pencil, the direction of the stroke as laid down being always strictly adhered to. This turning of the negative I wish to be understood as *optional*, not *necessary*, and I only mention it because many, without sound reason, say it should not be done.

The treatment of the labial furrow should be very decided, sufficient density, if possible, being secured at the first application of the pencil, and executed by one long, firm sweep, covering its entire length. Wherever lines running in different directions may cross or meet each other, and necessarily leaving minute defects, it is quite allowable to fill up same with a dot or stipple made with the point of the pencil. We can so proceed, turning the negative constantly as the lines take a different direction, until it assumes an even and delicate appearance all over. The spots having been filled up or *cut* in the first instance, all after strokes used in modelling, &c., should be kept well open and equi-distant, or else the work will not be so uniform.

A stroke of the pencil must never be made *across* a line; always turn the negative, so that at a firm, downward stroke the marking may be satisfactorily filled in. In retouching the neck, long, sweeping curves should be employed, the negative being almost on its side. In cases where the subjects are very badly freckled, of course there will be necessity for a larger amount of work done with the *point* of the pencil than is above laid down. But, naturally, every would-be retoucher must use his judgment in such matters, as it would be perfectly impossible to lay down hard-and-fast rules that would govern all the conditions under which we might find every negative. I think, with these directions well carried out, we can, as far as *this* method is concerned, lay down the pencil and take up the brush.

It is very seldom that a negative does not require *spotting*, *i.e.*, removing any transparent spots that may be in the film, by whatever cause produced. This is done by filling the spot with a colour (water) made to match the film, or a little neutral tint or violet applied with a finely pointed sable brush. Should a negative have a great number of very fine holes, like pinholes, the result of some defect in the making of the plate most likely, only spot those in the face, as those in the background and drapery will not be very observable to the naked eye. To attempt to spot these out would be absolute madness, as no matter how fine we might try to spot them, we could not d[illegible]

without making a quantity of white spots visible in the print, and thus entailing more work afterwards to set them right again.

Should the negative be rather poor in quality and lack brilliancy, and so require helping in the lights, we must matt varnish it and put same in, where defective, with a fine leather or paper stump charged with plumbago. A negative is thus often rendered serviceable which otherwise would be useless. I hope these directions will prove sufficient as far as *this* method is concerned; we can then study some of the other systems as practised abroad. REDMOND BARRETT.

LIGHTING AND EXPRESSION.

"LIGHTING and expression," words familiar to all photographers, but especially to those whose attention is chiefly given to portraiture, is equally important to that other section of art workers who choose to devote their energies to the portrayal of nature, whose studio is not limited to the space enclosed between four walls, and whose skylight is not dimmed by the useful and translucent glass. Landscape and architecture, although not so commonly associated with the terms chosen for the title of this paper, owe nearly all their attractiveness to the qualifications conferred by the direction of the light and the management, so to say, of the effects of atmosphere. That lighting is the spirit of the picture is always tacitly acknowledged, and expression is lighting combined with other qualities, especially that of atmosphere; skilfully directed, that confers an indescribable something, that for want of a better name may be termed the quality of soul in our photographs. The importance of lighting, although universally acknowledged, is, like many other important things, frequently neglected; it is not looked upon as an *essential*, and the consequence is that numberless photographs, excellent in definition, and good in composition, entirely fail to give that satisfaction proper judgment in this particular would have rendered them capable of giving.

Artists, not being photographers, almost always give preference to a photograph for its chiaroscuro, and not for its detail and definition. Artistic feeling is generally opposed to photographic definition, simply because definition has been the chief point the photographer has worked for, to the exclusion of feeling. The two qualities might be just as readily combined as set in opposition to each other, and I have no doubt the time will come when they will be worked much more harmoniously together than they are now. We see signs of this at each succeeding exhibition, the standard of quality being gradually raised, and a general all-round improvement taking place. We may notice that the definition is no better than it was, and no worse; the improvement is in the aim at a better general effect, more attention being given to the lighting, and greater care bestowed on the composition. We have been so accustomed to hear splendid definition and microscopical sharpness lauded above every other quality in a photograph, that unless the picture will bear examination with a magnifier it is set down as inferior, and we are astonished when a less sharp but better lighted picture is preferred. "Naturalistic" photography, however indefinite and wild in its aspirations, has certainly had the effect of making photographers think, and the outcome of that thought will be, no doubt, to the benefit of the art.

The most simple and homely subject, well lighted and treated with artistic judgment, appeals to our instincts in quite a different manner, and much more pleasantly than when absolute sharpness throughout has been the chief and almost only consideration. Let us, as an experiment, take the trouble to carefully consider the same grouping or view under different conditions of lighting, it will be found that not only infinitely superior effects are produced at one time than another, but that the actual composition is altered; each variation of the light will bring some object into prominence that was previously hidden, and obscure others that were before the chief points in the subject. Let us suppose we are looking at a woody glade with the shadows of the trees thrown across the path, some cattle in the foreground, whose warmth of colouring contrasts well with the cooler tints of the foliage and distance. The camera is fixed and the exposure made; and we consider we have secured a gem. It was our last plate, so we will pack up and treat ourselves to a rest and a pipe under this fine old elm. The cattle remain much in the same position, lazily chewing the cud, the birds twitter, and the soft summer breeze now and again gently stir the foliage. Yet, as we look, a change gradually comes over the view. Branches and leaves we had scarcely noticed catch the light, shadows are cast from this object and the other that we were scarcely conscious of existing; a tuft of grass or a group of foliage becomes an important point, giving a life and vigour to the subject that when we exposed our plate was simply non-existent. If we had only waited, how much better it would have been!

We have secured a picture, it is true, but nothing in comparison with what we are now looking at; but regrets are useless. We can do nothing more than watch the lights change and the shadows alter. The view is passing through a series of transformations, some better, some worse, all different, and to our chagrin many of the changes are a considerable improvement on the one we thought at first so excellent; we move away, much less satisfied with our performance than when we closed our camera and sat down in the shade to rest. This is not a rare experience so far as the view goes, but one that is of frequent occurrence, and emphasises the necessity of a knowledge of lighting that would have indicated the advantage of waiting a little time before making the exposure, and have assisted us in securing a much better picture than the one we did.

There is no denying that in a great many instances the idea of the photographer is to secure as many average pictures as possible on a day's outing, instead of only exposing on subjects known from experience to be lighted in the most favourable manner. It must be confessed that some resolution is required to pass a fairly good effect, waiting for a better, and resolution is very often not equal to the occasion; when it is, the results give an amount of satisfaction that fully compensates for the forbearance. A picture, whether a photograph or a painting, may be considered a collection of foci holding their places by a series of gradations, subject to one great controlling focus, itself composed of innumerable foci of various degrees of light, which, united, make the chief light. Other lights in the picture must be kept subservient to this, and minor or accidental lights not be allowed to interfere with the breath or repose of each mass, so that the eye, being first attracted by the principal object, may be gradually led to the minor points that, as it were, support the principal one, and form an harmonious whole. In photography it is not always possible to properly effect this on the original negative, although it should always be aimed at, for much more can be done in this direction than at first sight might seem possible. Where failure takes place, doctoring the negative and dodging the print comes in to make up for it. Here I may observe, as the print being the ultimate object of taking the negative, its production should be entirely under the control of the taker of the negative, it being impossible for any one else to know what effect it was desired to render, for very few negatives printed "as they come" fulfil the expectations of the taker of the negative. But all, more or less, require management in the printing—lighter here and darker there, a light stopped out or a light put in, sometimes on the negative, and sometimes on the print. When all this is satisfactorily arranged, then, and only then, can the ordinary printer have orders to go on printing without the supervision of the negative maker.

Closely associated with lighting is expression. This may seem a term not altogether applicable to landscape work; nevertheless, expression is found in all things, animate and inanimate. A tree or a plant may assume a graceful or ungraceful position, may awkwardly interfere with the picture, or assist in making it; or expression may depend on the state of the atmosphere, or the grouping and general arrangement of the subject. I believe it was Sir Thomas Lawrence who said "a knowledge of beauty was essential to truth;" therefore, if we wish to produce beautiful landscape photographs we must not neglect to put our knowledge of beauty into a form that others can appreciate by selecting times and seasons when the power of conveying truthful impressions is most readily available. Atmosphere is a potent factor in giving expression to a picture; without it everything is apparently on the same plane. A distant object is dark as a near one, and the linear perspective fails to give the idea of distance. Generally speaking, a light should be chosen that will give as much value as possible to the different planes of the picture, so that each object sets out distinctly from that behind it. This is especially required in open and extensive views, which, if improperly lighted, will be represented by foreground and a flat distance and middle distance, almost indistinguishable one from the other. Perhaps the most effective style of lighting is when the source of light is directly in front, corresponding with our studio Rembrandt effects, but it is only suitable for special effects and special subjects; even then the lens must be protected from the source of light, or the attempt will result in fog and failure. Very pretty effects may be had with this style of illumination when it is judiciously applied. The most generally useful light is a side light a little behind the camera. With this lighting, although the most artistic effects are not always secured, still it is safe not to produce inartistic effects, so far as the light is concerned; however, so much depends on the subject and the effect desired, that it is idle, nay, impossible, to lay down any rule that would

be applicable under all conditions. It is here that the artistic perceptions of the operator come in, and in this he has the opportunity of showing the stuff he is made of, and imparting individuality into his work.

EDWARD DUNMORE.

REVERSED NEGATIVES ON GELATINE PLATES.

THE leading article which appeared recently induces me to return to this subject, although, perhaps, I can add nothing of a novel character to what has already been written. The criticisms and suggestions contained in the leader are of great value in their bearing upon the proposed direct reversal processes.

In regard to the tannin-nitric acid method, I have not met with any difficulties consequent upon the employment of the first-named substance to harden the film, although I should be chary of arguing that at the least a more or less serious staining action was not, in the majority of cases, to be feared. In my own attempts I was not visited by such a trouble to any appreciable extent. As to the risk involved in treating the hardened film with nitric acid, though my own individual experiences do not bear out the theory that its use is commonly unsafe, there is no doubt that in the generality of instances great danger would exist. Of course, the matter would be absolutely determined by the qualitative character of the particular make of gelatine film employed, a point which I sought to urge and emphasise in the first of these articles a few weeks ago. One of the most marked and welcome improvements which has taken place in the manufacture of gelatine plates during recent years lies in the provision of films which, for freedom from frilling and stability under abnormal conditions of temperature, strength of reagents, &c., are hardly to be compared to the dry plates of eight or ten years ago. Moreover, individual brands of plates are known to greatly excel their competitors on the score of this very property, and to allow liberties to be taken with them which would be fatal to the integrity of less skilfully prepared films.

I propose to defer dealing further with the tannin-nitric acid plan, which, however, I quite think, from repeated experiments, possesses the elements of a passable alternative method, and for the present will devote myself to some details of the second process, which the leading article regards as preferable, and in particular to what it considers the weakest point, namely, the removal of the chlorised image by dilute ammonia.

I assume, and I hope with reason, that the action of dilute nitric acid upon an ordinary gelatine film is not a solvent, but a rotting and shredding one; it simply tears it into ribbons. With alkaline solutions, on the other hand, a different form of danger is to be apprehended, namely, frilling and removal from the support, but neither solution nor disintegration of the film. Diluted with its own volume of water, I do not think ammonia would tear or shred the tenderest film, although no doubt it would fatally frill it. In removing the chlorised image, although it is necessary to employ the ammonia solution comparatively strong, I am of opinion, remembering what I have already said as to the undoubted improvement in gelatine films, that there is nowadays no such cause for wholesale alarm as it seems to be thought. I believe I am correct in saying that used in its most powerful state ammonia is inferior in energy upon gelatine films to either the hydrate of soda or of potash, and that the same relative difference is maintained in the dilute condition—any way, this has been my experience. In removing the chlorised image I have repeatedly applied ammonia mixed with its own volume of water with absolute safety; on the other hand, dilution down to 1:4 has answered equally as well, although "fixation" has taken proportionately longer. Personally, I think the last degree of strength to be preferred, and I have as much confidence in its innocuousness towards the gelatine film as I have of the other solvent of silver chloride, at exactly the same strength, namely, hypo. I feel convinced, despite the theoretical dangers underlying the use of strong alkalies with gelatine films, that experiment would confirm these views.

The fact that the ammonia must also remove a portion of the bromide is one that in actual practice does not, I think, carry with it any momentous disadvantage. I have never noticed any serious weakening of the final negative image, and have therefore disregarded the objection.

The advice to substitute for the ammonia as a solvent of silver chloride a saturated solution of common salt or other soluble chloride recalls the interesting circumstance which for many years past has been lost sight of by the great majority of present-day workers, if, indeed, they were ever cognisant of it, that the chlorides of potassium, ammonium, and sodium, possess the property of dissolving silver chloride with which they form double salts. Hardwich, in the 1854 edition of his invaluable work, remarks that the early photographers employed a saturated solution of common salt for fixing paper prints, but he also notes that the fixing action of the alkaline chlorides was slow and imperfect, and that their use was then obsolete. As a matter of fact, they dissolve silver chloride far less readily than either ammonia or hypo.

From several experiments made in accordance with the suggestion, I am led to question the suitability of the alkaline chlorides for the purpose of removing the chlorised image. At full strength, namely, the point of saturation, the action is exceedingly slow and ineffective. According to Hardwich, in the solution of the insoluble silver chloride by alkaline chlorides the amount dissolved is not in proportion to the quantity of the solvent, but to the degree of concentration of its aqueous solution. The double salt formed is decomposed by an excess of water, producing milkiness and a deposit of the silver salt previously dissolved. Now, if we bear in mind that while in theory saturated solutions are frequently required, but through carelessness and other causes are seldom if ever employed, we must suppose that in the example under notice a solution of alkaline chloride sensibly below the theoretical strength would tend to precipitate chloride of silver. Besides the possibility of this danger, the feebleness of the action seems to my mind to outweigh the assumed advantages of obviating injury to the film and loss of silver bromide.

With neither of the three alkaline chlorides employed at saturation point have I been able entirely to dissolve off a chlorised image, although I allowed the solution to act for fully half an hour. On the other hand, ammonia 1:4 removes the image in about a minute, and inflicts no visible damage upon the film. I am inclined to recommend the use of the latter solvent, the more strongly as I consider the risk of frilling practically non-existent, although we are of course largely at the mercy of the distinctive characteristics of the plates employed. I should be sorry to waste time by attempting to get a reversed negative on some of the cheaper plates; it would be unfair to expect them to stand the treatment.

THOMAS BEDDING.

THE NECESSITY FOR HIGHER INTENT IN PHOTOGRAPHY.

IT is eloquent of the status attained by photography that a short fifty years after its birth a magazine of popular literature should formulate in its pages the pregnant question, What are the best uses to which photography can be applied? and it is a firm conviction in the value of photography as a power in the economy of educational progress, and a desire for its more ethical application, that prompts these lines. In its early years our art science was little better than a child nursed in the lap of a few scientific men, unheeded by the busy world that went swinging along its way, careless of the additional power that lay "muling and puking in its nurses' arms." So, through an adolescence whose schooldays bespeak a capacity for giant strides, it has struggled up to a vigorous manhood, and asks to be released from the almost *dilletante* work in which it has hitherto been engaged. Portraits and views have been an efficient pabulum on which to rear the stripling, but the agents of progress have recognised in him a capacity beyond these narrow limits, and we dare hold him in them no longer. The world is calling to him to vindicate his manhood by rendering sterling service to the wants of civilisation, and he must respond to the challenge, or photography remain content

"To sink, and be
A something that the world can do without."

Hitherto the chief applications of photography have been that of domestic portraiture and topographical views, applications which, however worthy from a personal point of view, are not intimately associated with the broader sympathies of life, as all callings must be before they can rank synonymous with national interests. The rapid strides made in photography of late years, especially by securing permanency for results and correct translation of colours, have caused its employment in so many directions that we may fairly consider it an established industry; but to those who look beyond the commercial aspect, the fact must be patent that at the present time the application of photography is reduced to an infinitesimal part of its capability, and this may be due in some measure to the dogmatism that always endeavours to frown down a truth new-born. The cautious conservatism that ignored Harvey's discovery of the circulation of the blood, and ridiculed Franklin's announcement of electricity, was little likely to greet such a revolutioniser as photography with outstretched arms. The greatest need of photography at the present moment is a home. We have photographic conventions, societies, and clubs, *ad nauseam*, but of a society that shall watch over the advance of photography, and apply its usefulness alike to the broadest as more personal interests, we have none; and until we do possess such a one—until an Institute

or Royal Society of Photographers is created—photography must rest content to be as a noble craft rudderless, and have its best energies undeveloped. Such an Institute or Royal Society must be to photography what the Astronomical Society is to astronomy, or the College of Physicians to medicine—a home and "growing point," to use a botanical term. In connexion with this institute should be a museum, also a gallery of photographs forming a permanent collection, and, it is almost unnecessary to add, printed in a permanent process. Considering the adaptability of photography to educational purposes, it is marvellous and lamentable that so little use has been made of it in this direction. Here is an almost virgin departure for an energetic institute executive, for a department from which schoolmasters could obtain at moderate prices geographical and ethnographical photographs taken from life, for illustrating school lessons in geography; and a collection of animal photographs for natural history lessons would, from the writer's personal knowledge, find great favour in the eyes of the scholastic profession. Another phase of educational photography might be the incorporation with the gallery of photographs of representative views taken from nature of the scenery and peoples of foreign countries for the edification and instruction of those unable to travel. A duplicate set of all educational prints in the gallery should be made to form a circulating loan collection for provincial towns.

There is one picture in the National Gallery which, in the crowds that daily gather round it, bears mute testimony to the value of each generation, forming a record of itself: the *Derby Day* is no painter's time, nation, limned from the fancies of a fertile brain only, but a faithful transcript of the life the artist saw around him, and such pictures in years to come will be pictorial lessons in antiquarianism. It is the very realism of photography that should make it so valuable in forming a record of the aspect of civilisation in the present time; and good instantaneous photographs of our street life and architecture would be of the highest interest and importance to succeeding generations if collected and preserved by an official institute. The interest shown by the public in all pictures of historical subjects warrants the formation of such a collection, and the anomaly of an artist painting life as he imagined it to be hundreds of years before his own time is sufficiently condemned by the contradictory limning of a popular episode when attempted by several painters. That artists are alive to the value of painting *l'actualité* is shown by the increase of scenes from every-day life, and one has only to note the appreciation of the press for such works as embody a particular phase of our own times to be convinced of its importance. In this work for posterity, shall photography take no place? Shall an art that would speak to succeeding generations like a prophet from the dead stand idly by and make no earnest endeavour to prove itself capable? No! it wants but the opportunity, and photographers, amateur and professional alike, would hail it with joy. There would then be a future for their best work; a transcript of national life might become an historical picture, instead of falling into the hands of an idle tourist and depending on his caprice for existence. Given an Institute of Photography, with a permanent collection of photographs, and we should feel that our work was "something to live for here, that shall outlive us." There would then be earnest endeavour, and medal hunting become a legend of unenlightened days.

Closely associated with the above subject is that of forming a collection of portraits of those eminent in our own times, whether in the sciences and arts or world's history generally. Where now is the photograph of George Eliot, of which we read that "the rendering of the eyes was more truthful and beautiful than in any of the paintings of her?" Is not here yet another opportunity for higher intent in photography? Many of the names of eminent people whom now we pass in the street will go down to posterity on the pages of English history, and if we go to picture galleries to realise what Phillip of Spain looked like to Velasquez, it is not too much to infer that unborn curiosity would visit a collection of photographs to get some idea of the personal appearance of Stanley or Carlyle, and it would be a very bad photograph indeed that didn't give more pleasing ideas than some of the ancient masters have done. In admitting any portrait photograph to a permanent collection, it would be important that it should be a characteristic likeness, and devoid of retouching, or only bearing such small amount as the removal of defects necessitated.

In the ideal institute that is present in our minds as we write, an important department would be the collection of photographs having special interest to the various trades and professions, which in the course of time would form a valuable reference gallery. For medical men, a pathological series of micro-photographs and illustrations of surgical cases, such as are now drawn by hand and lithographed for reference plates in medical manuals; for engineers, illustrations of important points in construction, such as doubtless might have been gleaned in profusion during the building of the Forth Bridge. Indeed, the vista of usefulness opened out by these considerations, has a very remote vanishing point.

Ismar Thiusen, in his ingenious work, *The Diothas*, has projected photography among other sciences into his Utopia of A.D. 2000, and while he has failed to foreshadow such an ethical future as we may reasonably hope that photography will achieve long before the date of Thiusen's Utopia, there is one idea in his book that distinctly bears on the subject under consideration. Speaking of the city of Olim he says:—

"From many causes, not necessary to enumerate, the great library of its celebrated University was especially rich in documents relating to the history of the second and third chiliads. Among other unique treasures, it possessed photographic reductions of the files of leading journals during many centuries; during all the period, in fact, when the press was at the height of its power. I have seen a complete file of the London *Times* for a year concentrated into the space of a sheet of foolscap. By proper appliances these, again, could be thrown on a screen so as to be read off at the convenience of the investigator."

This is not an impracticable idea, nor without its usefulness as a recording medium; the news of a week or month likely to become of historical interest would occupy but a small space when reduced for a transparency, and if stripping films were used, the necessary storage room would be reduced to a minimum.

Quite a step in the right direction are the photographic surveys of the various counties by local societies. Mediæval monuments and historical buildings abound throughout Great Britain, but the buildings gradually crumble away, and the monuments are destroyed by necessity and ignorance. Turn over the pages of Dugdale's *Monasticon* and note the engravings and descriptions of historical objects of which to-day no vestige remains to be convinced that a future generation will likewise fail to find some of those objects with which we of to-day toy with the chance of immortalising. The broader characteristics of county scenery are not unaffected by the mutations of time, and should receive intelligent treatment at the hands of those societies who attempt county surveys. Each county has scenery peculiar to itself, and representative views striking the keynote of the scenery indigenous to the county should be carefully sought out and depicted—the soft sheep-bespattered undulations of the Sussex Downs, the lanes of Devon, upholstered with ferns, the broads of Norfolk, and the barren ruggedness of Carnarvonshire, are all county characteristics capable of camera representation. And if photographs of the slate districts of Wales and the coal districts of the Midlands, before mining and quarrying operations had been commenced, could be laid beside views of the present aspect of the same spots, the mind would be able to form a more vivid conception of man's agency in altering the face of nature.

Of the need for a museum whereby the early days of photography may be perpetuated, we would write eloquently. Few who are intimate with the broad reaches of some noble river but evince considerable interest in its sources on the distant mountain, and make pilgrimage thereto; and when photography has widened out and grooved for itself a deep channel in the social economy of the future, its followers will speculate curiously on its early aspect, and pay fancy prices for sliding-body cameras. To some, already, calotype specimens are a bit of hoar antiquity, and Daguerreotypes the flint implements of prehistoric photographers. We are so permeated and satisfied by our environment that it is difficult to emancipate ourselves from it for even the short time necessary to reflect that our familiar surroundings will be for future generations objects of research and collection; if we would but reason from analogy we should not long remain blind to the genuine service we could render unborn photographers by leaving them something tangible for their imagination to build upon. It is an axiom among biographical writers that no life is complete without a sketch of the subject's ancestors, and the axiom might with every advantage be introduced into all the various callings of life; for, to an intelligent man, his work should be something more than a mere method of making money; he should lose no opportunity of dignifying it and raising its status in the eyes of the world. To this end we would have a museum to perpetuate, not only the early days of photography, but the memory of those who wrought in them. It must come sooner or later—then let it be soon, before the present generation who are in touch with the genesis of photography have disappeared, and with them much relating to its early history that will eventually become of historic interest.

The growth of photography must be endogenous. Its advancement as a profession, and the dignity of its applications, rests almost entirely with its followers; if they can bring themselves to recognise the necessity for giving their energies a dual capacity—the study and research for photography as a science and an art on the one hand, and on the other the labour to apply its capacities as a factor in our social

progress—then will photography bear a new meaning for the world at large, and photographers take rank with those whose callings are essential to the well-being of mankind. GEORGE T. HARRIS.

AN INSTRUMENT FOR THE MEASUREMENT OF DIFFUSE DAYLIGHT AND THE ACTINOGRAPH.

THE actinometer which I have devised for measuring diffuse daylight depends upon entirely different principles than the instrument Mr. Ballard has just brought to our notice. In most instruments designed for measuring light the eye has to decide when two things are equal; in Mr. Ballard's instrument, when the luminosity of the paint is equal to the light coming through the blue glass, in the ordinary silver paper actinometers the eye decides when two tints are equal.

Once when examining the spectrum of nitric dioxide the thought struck me that the light absorbed by that gas must do some molecular work, and as this was not chemical decomposition, it could only result in a rise of temperature. I saw the application which could be made of this, and I found that if a differential gas thermometer was filled with nitrogen dioxide—one bulb exposed to diffuse light, the other kept in the dark—the gas exposed to the light expanded. But owing to the difficulty of finding a suitable separating fluid, one which should not absorb the gas, I could not obtain satisfactory results. Equally unsatisfactory I found an instrument filled with bromine vapours. The idea that all coloured substances would in diffuse light assume a slightly higher temperature than white or colourless transparent substances led to the construction of differential thermometers, the bulbs of which contained a red substance in one, and a white one in the other. Very sensitive instruments were obtained with red and white wool, next in sensitiveness was cotton and paper. The red substances absorb most of the rays of the spectrum, except the red ones, whereas the white substances absorb very little of any of the rays, and the absorption of the light causes a slight rise in the temperature of the red substance, which expands the air of the bulb containing this substance. The consequent increase in pressure is read off on the scale behind the syphon gauge, and, as experiments in this direction proved, this rise of pressure was proportional to the chemical action of the light on silver salts.

But instruments so made were very unsatisfactory. Beside the temporary alterations in pressure in the bulb containing the red substance there was also a permanent change, which increased with every exposure to the light, and though little perceptible in one day, in the course of a few months became so large as to completely destroy the instrument by driving the liquid out of the syphon gauge into the bulb containing the white substance.

An investigation of what this was due to revealed the fact that the oxygen of the enclosed air gradually vanished, and it disappeared faster in the white tube than in the red one. What becomes of the oxygen I am unable to say. It was clear I had to abandon organic substances.

But even when I began to use coloured glass the same difficulty still arose. I used either alcoholic solutions or benzene solutions of alkanet as indicator in the syphon gauge, and even after I had abandoned them also I still found the zero points of the instrument unsteady. It varied very little, but in the course of a year the change was quite perceptible.

A good instrument can, however, be made as follows:—Two test tubes holding from 10 to 15 c.c. are chosen; one of them must be made of very thin glass flashed inside with copper ruby glass, the other one must be of similar thin, clear, white glass. They should both be of the same weight and the same capacity, a slightly larger capacity for the white tube is favourable. These tubes must be well cleaned with nitric acid and caustic potash, carefully rinsed with boiled distilled water, dried, and fused on to capillary glass tubes. When this has been done they must be repeatedly exhausted under the air pump to remove all products of combustion which enter during the operation of fusing to the capillary. They are finally made red hot, and when cool a single drop of pure distilled water is allowed to enter into each tube, and is shaken into the bulb. The syphon gauge is filled either with a solution of potassium bichromate, or, better, with a solution of potassium carbonate, to which is added sufficient potassium iodide and iodine to give it a deep colour. The bulbs are then sealed on to the syphon gauge, two very fine hair tubes being drawn out first, through which the air can escape and enter, on either side of the liquid in the syphon gauge.

When the instrument is so far completed it is again exhausted repeatedly to remove products of combustion, and the hair tubes are sealed up, the bulbs being at the time immersed in cold water to keep their temperature alike. The instrument has then to be tested to see that it is absolutely air-tight, and that both bulbs behave alike when the temperature is raised.

The position of the liquid in the gauge must not move under the receiver of the air pump, nor when the bulbs are immersed in hot water. A temporary change during the latter operation always occurs, but it must be only temporary.

If the instrument be found good, it is mounted in a wooden box with a glass front, and to render it more sensitive the bulbs are placed in front of two concave reflectors, which are best made of silvered sheet copper and very thin. The side of the box opposite the reflectors is closed by a sheet of thick patent plate glass, coated on the outside with transparent gelatine and varnish, which helps to prevent the entrance of heat rays into the box.

A millimetre scale behind the syphon gauge, which is outside the box at the back, completes the instrument.

Yellowish-brown glass is almost as good as ruby glass, and easier to procure.

An instrument of this description will indicate the brightest diffuse daylight obtainable in this country, as reflected by the northern sky by a variation in the level of the liquid of about eighty millimetres. It is therefore possible to measure the diffuse light to one per cent. of its greatest intensity with ease, and this is more than sufficiently accurate for all photographic processes.

By means of this instrument it is quite possible in steady light to time very accurately the exposure of a photographic plate. But my friend Mr. Driffield soon discovered that a very accurate measurement of the light was not necessary, and the reason for this we decided to ascertain, and he has been my fellow-worker in all subsequent investigations.

We made self-recording actinometers by registering the position of the liquid in the syphon gauge photographically upon gelatino-bromide paper, which was fastened on a revolving drum driven by a clock. We continued to take observations for every day of the year 1885–1886.

When there was a steady light throughout the day, which seldom occurred, the curve so clearly indicated that the light was a function of the altitude of the sun that I had no difficulty in recognising the sinus curve. By measuring at the same time the diffuse light with the actinometer, and the sinus of the altitude of the sun by well-known means, we obtained the connexion between the altitude of the sun and the degrees of our actinometer.

We thus found that the diffuse light at any given hour of any given day is seldom less than 25 per cent. of the maximum light possible at that hour, except when it is foggy or raining, but under those circumstances no one thinks of taking pictures outside.

It is therefore clear that exposures of photographic plates at any particular moment under ordinary conditions vary only in the ratio 1 : 4. But as other investigations which Mr. Driffield and myself made showed that the latitude of exposure within which a good picture is possible is, in many cases, comprised in exposures varying from 1 : 2, it will be seen that accurate measurement of the light is quite unnecessary.

We therefore together devised the little instrument called the actinograph, which Mr. Ballard recommended as a calculating machine. The fact is, it is not only a calculating machine, it is, in reality, a machine for telling at any hour of the year the maximum light possible, and for converting that indication directly into times of exposures of plates of varying speed with various lenses.

The manipulation of the instrument is exceedingly simple, and it has this great advantage over actinometers, it tells beforehand what the exposure on any day, at any hour, has to be, according to the condition of the atmosphere, and the eye soon judges that. With this instrument photographic exposures can be ascertained with so great a degree of probability as to be almost equal to certainty.

The instrument has four scales: a light scale on a revolving cylinder, a slide carries the lens scale and the time scale, and on a fixed scale is marked the speed of the plate. The speed of the plate must be ascertained by the operator by a simple experiment.

The lens scale is set to the hour and date at which an exposure is to be made, the speed index is set to indicate the speed of the plate; when that is done, five different exposures in seconds can be read off at once, corresponding to five different conditions of the light: very bright, bright, mean, dull, and very dull.

To give an idea of speed, I will add that Wratten's slow plates are about 10 on our scale, and Ilford Ordinary about 15 to 20.

The degree of light and the unit of speed are chosen for the instrument as follows:—The highest possible diffuse light corresponding to the altitude of the sun, =90°, is divided into 100 equal parts, one of which we called an actinograph degree. The unit of speed is the

speed of a plate which, with one such degree of light, will take an ordinary landscape in as many seconds as the square of the ratio of the focal length and aperture indicates. Thus a plate would be speed 1, which with one actinograph degree of light and a lens of *f*-4 it would take sixteen seconds to produce a good landscape negative.

This system of degrees of light and speed of plates, I venture to say, is the only scientific one which has yet been proposed, and the actinometer I have described I believe to be the only satisfactory instrument for measuring diffuse light yet devised. The photographed records show that it is somewhat slow in following the light. Indeed, the variations of light are frequently so sudden that the use of actinometers for photographic purposes will always remain unsatisfactory, because some time must necessarily elapse between the observation of the light and the exposure, owing to a calculation having to be made.

The actinograph, on the other hand, avoids all calculation, takes into account variations in light, in lenses, and in plates, and will be a truly scientific substitute for actinometers, so long as the earth does not deviate from her time-honoured journey round the sun.

F. Hurter, Ph.D.

—*Journal of the Society of Chemical Industry.*

THE FADING OF SILVER PRINTS.

A Suggestion for a Novel Method of Mounting for Showcases, Etc.

The frequency with which the subject of the fading of silver prints crops up in photographic journals, and the numerous suggestions made for preventing fading, proves, if proof were necessary, that although bromide, platinum, and other papers by their superior permanency have dealt some heavy blows at an old friend, the "albumenised paper," it is still the most popular method of producing prints, at least amongst professional photographers, and this is not at all to be wondered at, considering that for small work it cannot be equalled for delicacy of half tone and simplicity of production, and there is no doubt but that if these prints could be made more durable the process would hold its own against all competitors. My object, however, in writing these lines is to again draw attention to a cause of fading that has already been mentioned in this Journal, viz., when mounted prints are placed behind the glass stands frequently seen both in photographers' showrooms and also in private houses. About six months ago I had some portraits taken by one of the leading photographers, one of the photographs I gave to a friend, who placed it in one of these glass stands, consisting of a piece of bevel-edged glass the size of a cabinet mount, with a spring-clip stand. Last week on examining this print I found that it was spotted nearly all over in a most unaccountable manner. At first I could not understand the cause, particularly as the print had the advantage of the protection of enamel collodion. Thinking the matter over, however, it occurred to me that the spotting was due to moisture, which probably contained carbonic acid and other compounds, condensing on the glass between it and the photograph. Another print from the same negative, received at the same time, and finished in precisely the same manner, showed no signs of fading, although it had been standing on my mantleshelf for the same length of time without a frame of any kind. This incident, and the fact that mounts and mountants have been frequently blamed during the past few years as causing fading, suggested to my mind a method of mounting prints in a manner that would be entirely free from these objections. It is hardly safe in these days to claim anything as original, and I have very little doubt but that I should be told this method was in use in pre-historic times; however, I will risk that and give the method for what it is worth. My plan is to take a piece of matt opal, say whole-plate size, for a cabinet print, placing a trimmed unmounted print which had been previously rolled in the centre, just as it would be if mounted, then place a thin covering glass over it and bind the two together in the same manner as a lantern slide and its covering glass are bound up; this keeps the print from slipping, and prevents any air or moisture from reaching it. The advantages of such a method are, that as there is no mountant employed there can be no fear of any chemical action taking place between it and the print, and as experience has shown that unmounted prints do not fade so rapidly as those that are mounted, prints fixed up in this way should be quite as permanent as the former; secondly, as the opal support is protected from the air, &c., it would never become soiled and discoloured, and if a simple, soft, brass binding were employed instead of the usual paper binding, prints could be readily changed at the bare cost of the silver print. This would soon recoup the photographer for the first cost of the opal and covering glass. This method of showing prints can be varied in many ways, as instead of opal glass an ordinary piece of glass could be covered with a thin toned paper with the photographer's name, &c., printed on it, which could, of course, be used in precisely the same way as the piece of plain opal glass, and would enjoy the same immunity from atmospheric influence. I need hardly say that the glasses must be quite flat. Plain transparency frames (without any filagree work) could be utilised in this way, as they are made with a thin, soft, brass rim for bending over the transparency when in position. I have only suggested this plan for photographers to exhibit specimens, but there is no reason why it should not be adopted generally, as the public would certainly be the gainers, inasmuch as the prints would not be so liable to fade. No doubt, if the demand warranted it, some of the photographic dealers would supply frames constructed to hold prints in this manner.

Birt Acres.

ILLUSTRATING POEMS BY PHOTOGRAPHY.

[A Communication to the Society of Amateur Photographers of New York.]

As the Venus of Milo stood before her sculptor-creator, saying to his inner consciousness "You have made me visible to men, but among them, as on Olympus, none shall question my sovereignty," so Poetry says to her various adorers, "No one shall be able to say he has sounded the depths of my soul." One approaches nearest her inmost shrine in closely following nature, and it is the part of true wisdom to study her under all the ever-changing conditions of life with a reverend worship, which will richly reward every faithful worshipper. Not to those who deny her power, or to those who try to force themselves into her most sacred penetralia, are its mysteries discovered, but to those who in spirit and in truth wait before its altar. Painters and sculptors have sought through all ages to reveal poetry by means of form and colour with all the varying expression of her changeful features, but there is no reason, it seems to me, why, among those who seek to translate into visible shape her spiritual beauty, only those should be numbered to whom heretofore the world has given the name of "artist." Why should the fact of using brush or pencil presuppose in its user the possession of artistic power or appreciation? The world does move, and people are beginning to understand that after all it matters little what tools are used if into the finished work is breathed the breath of artistic life. Our friend Dr. Emerson seems to think that by the blending of art and science in photography each is thereby weakened, that each should keep to its own sphere. Is it not possible to study science in this connexion as one does the steps in dancing, very important to follow closely at first, but gradually becoming a second nature, so that one, so to speak, forgets the letter in the spirit?

Let your work be so much a part of you that while not conscious of moving according to fixed rules, you are nevertheless largely guided by them.

Travellers abroad can purchase the poems of Scott, Burns, or others, illustrated by photographs of scenery and buildings, but few and far between are the photographic illustrations designed to specially bring out the spirit of the poem as the painter or etcher designs his special work. The photographer must, of course, labour within limits, but I believe they are more flexible than generally supposed. While it is not always possible to make one's model fit the picture; it is possible to make the picture fit the model. In other words, I believe that, after careful choice of lines to be illustrated, the intended picture should be evolved from one's brain by thinking of it, brooding over it, dreaming of it, until all is ready for the realisation. Take plenty of time to absorb into your very soul the thoughts of the poem before you, then carefully decide on the accessories, and, if practicable, discard those which are readily recognised as being in ordinary studio use. Have real curtains, chairs of wood or brass, or other material not made to simulate something else. I make an exception in favour of using artificial flowers and vines, but sparingly. If the operator is not a carpenter, one can be found to construct temporary doors and windows. They are better than the painted article, and *papier maché* is so glaringly a false deceiver. If the deception could be well done, it would be allowable, but the average rocks, walls, trees, &c., are the only too visibly unrealities. These things need not be necessarily expensive if the camerist is possessed of dramatic taste and is something of a mechanic. The professional is usually assisted during an exposure by some one to focus while he is posing, and has everything ready for the work, while the amateur portraitist has to be almost omnipresent, so that he works under much greater difficulties than his professional brother, and if he did not really deserve the name "amateur," he never would have courage and patience to continue; but the camera fever when it reaches a certain stage is incurable.

It should be the exception when pictures of outdoor scenes are taken by indoor light, even the light of the studio. It conveys a

wrong impression to the uneducated eye, and, in the branch of photography under consideration, does more harm than good. There is no need either of all the pictures being made in the studio. We are constantly seeing in such magazines as *Sun and Shade* charming bits of landscape that would admirably suit certain poems. But where interiors, fancy figures, or portraits are needed, the studio is the place wherein to make them. No hard-and-fast rule can be laid down on the mode of studying out or realising illustrations. To a great extent the artistic operator must be a law unto himself or herself, but while working in limits I believe in stretching them as far as possible, and taking advantage of everything within them. If the model when found does not entirely suit the character desired, it is often well to slightly vary one's conception of it and gain thereby, it may be, a finer effect than the one intended. There should be, and I say it from experience, a magnetic relation between sitter and operator, their minds should work together, and the words to be wrought out in the picture should occupy their thoughts to the exclusion, for the time being, of all else. As the actor or opera singer best realises a character by utter forgetfulness of self, so ought the ideal sitter to think so fully of the part to be represented that the idea never occurs to him or her that it is a "portrait" which is being taken. "You are only a part of a whole," I say in such cases; "it is not you any more than the chair you sit upon that is being photographed."

It requires a certain amount of histrionic ability to sit for an ordinary portrait; but infinitely more for an ideal subject. This is not common, but where it exists the camera can be sure of extra credit, which should be shared with the sitter. The various difficulties incipient to taking small heads and figures greatly increase when it comes to taking large ones, and justly the camerist who takes good ones is proud of them. Do not try to get a *likeness* of your model; the point is to have the picture tell a story; make it do that at any cost, and it matters nothing at all if the face is not shown or is utterly unrecognisable. Let imagination dominate your thoughts, and your work will have originality, character, and not be like that of any one else. This means, however, putting enough labour and thought on one picture to take a dozen ordinary portraits. The artistic camerist should also bear in mind by what process his work will be reproduced, and keep that thought ever before him from the instant of exposure until the negative is developed. Training in some branch of art is capital preparation for illustrating, and every picture designed is an education for the next one. The eye becomes more and more accustomed to realising in a picture certain stanzas or lines, and new ones will be constantly suggested.

There is one point more that I never have heard mentioned. In taking an interior for illustration, if done in the studio, it is possible to arrange a ceiling over the sitter so that the effect of a room can be better preserved, and the light come, as it naturally would do, from the side. It is a good plan also, where an outdoor scene is desired, to arrange either by means of a mirror, or water in a tank, to simulate a stream or lake, and prevent reflections from the roof by stretching painted canvas over it.

Such competitions as those of the National Photographic Association of America are, and should be, a great stimulus to artistic ambition; but I think it unfortunate that the smallest required size for the Grand Prize pictures is larger than any generally used by amateurs, as it doubtless prevents many of them from enjoying the benefits of such competition. Every inch increase in the size of the plate necessitates so many changes in one's outfit, from lens to developer, that a heavy majority of the amateurs are, perforce, ruled out. This subject of illustrating poems is destined to bring about some striking changes in the world of art, and "weary, stale, flat, and unprofitable" will gradually seem to the ambitious amateur all other branches of camera work. It is inconceivably fascinating, and one's brain becomes bewildered at what seems to be its destiny. The various new and beautiful reproducing processes constantly claiming attention seem created for this very purpose. The camera has a wonderful future before it, and you will need all the inspiration you can possibly gain in entering a field of work filled with so many opportunities, but which others claimed to have owned long before you.

Remember first, last, and all the time, these words from Longfellow's *Kavanagh*,—

"We judge ourselves by what we feel capable of doing, while others judge us by what we have already done."

CATHERINE WEED BARNES.

NOTES FROM NEWCASTLE.

THE first outdoor meeting was announced for Thursday, the 17th, at Marsden, Mr. Parry to take the lead. The weather, however, took a turn for the worst, and was, during the whole of the day, simply abominable. This is the invariable luck of our Society: we must hope for better things next month. Mr. Auty leads the next excursion, to Gilsland and Naworth, on the 14th prox.

I am glad to find myself corrected by Mr. Dickinson, of Grainger-street, in last week's JOURNAL, *re* the electric light; as Mr. D. is one of the most popular and enterprising of the local craft, I am not surprised that he should be one of the first to avail himself of this method of illumination. I might have added that, owing to some dispute with the Corporation, the local electric supply companies have been only recently able to commence the installations. The orders in hand will keep them busy for some time to come.

Mr. Lyd. Sawyer, of Singleton House, on Monday the 21st, submitted to public view a collection of pictures most of which will be seen at the rooms of the Camera Club in London shortly. Several of Mr. Sawyer's early works are shown, and of course all those with which he has of late years achieved so complete a reputation. Mr. Sawyer competed, I believe, for the first time at some of the earlier exhibitions of the local society, with but small success; but his latter-day triumphs will have more than compensated for these early disappointments. The series consists of enlargements in bromide and platinum prints, and includes the Castle Garth pictures, *The Rivals*, *Waiting for the Boats*, *The Boat-builders* (one of the finest examples of light and shade), and the ever-pleasing *Moonlight* picture, together with some ninety odd others. I predict for this collection a great success in London. D. D.

Foreign Notes and News.

As if there were not already a sufficient number of developers in use to confuse the unlucky photographer by their various excellences, a new member of the confraternity has recently appeared on the scene (4, Rue Pastourelle, Paris) bearing the attractive, but not particularly lucid, appellation of "crystallos."

IT is said to be a reducing agent formed from cocaine, and to form a developer of extraordinary energy. It is supplied in the form of a concentrated solution, having the colour and general appearance of grenadine syrup. It would seem to develop negatives with a rapidity that quite knocked the correspondent of the *Amateur Photographe*, and he describes it as an "*enfant terrible*" that must be given bromide to calm its nerves. As might be expected from the rapidity of the action, there is some difficulty in avoiding "yellow fog." But it is said that "crystallos" keeps well in solution.

WE are also threatened, according to the same journal, with the early appearance of another developer, bearing the uncouth title of "graphol."

HERR ANTON EINSLE, whose success in the photographic reproduction of old prints, engravings, &c., we have frequently had occasion to notice, has recently further distinguished himself by issuing a *facsimile* reproduction, page by page, of the *Biblia Pauperum*, one of the earliest of the works that issued from Gutenburg's press. The whole is said to be so well executed that the pages of the reproduction are hardly distinguishable from the original, and the whole will doubtless form a valuable addition to every antiquarian's library.

THE book bears the inevitable dedication to Her Serene Highness the Archduchess Maria Theresa, and we are solemnly informed that the "exalted lady" not only condescended to accept the dedication, but also "permitted" Herr Einsle to hand her *personally* a copy of the work.

THERE is in Berlin an institute for the popularisation of photography bearing the very appropriate name of "Urania." A course of lectures on photography has recently been added to the *repertoire*, and two have already been delivered by Herr Schultz Heneke. The first dealt with photographic processes in general and the development of photography, the second with the application of photography to art and science. At the conclusion of the second lecture Professor Schirm took a magnesium flash-light impression of the whole audience, which came out very well, and excited general admiration.

A UNION of collotypists has recently been formed in Dresden for protecting and promoting the interests of this branch of the profession. Herr Robert Ulbricht has been elected President, and Herr C. Martin business manager.

AMONG its many other meetings and conferences, the present summer is to bring with it an International Lithographic Conference, which will be held in Antwerp. Thither will flock during the month of August, from all nations and peoples of the earth, all the principal book publishers, printers,

dealers, and librarians of the modern world, and doubtless not a few book-worms and bibliomaniacs. All questions connected with the manufacture, distribution, public employment, and preservation of everything included in the comprehensive "book" will be discussed at length. Simultaneously will be held an exhibition in the "Palace of Industry" of all arts and sciences connected with book manufacture, which will comprise typesetting and stereotyping machinery, and what is of most interest to our readers—lithographic, zincographic, and phototype presses, and photographic book illustrations, and, finally, books themselves in so far as they are samples of progress in the art of book manufacture.

The following method of transferring photo-lithographs and collotypes to glass is recommended by Messrs. A. M. Villon: "A print on glazed paper is made from the block with the following colour: 3 parts stearic acid, 2 parts asphalt, 3 parts oil of turpentine. The print is then held over a saucer containing a mixture of 1 part hydrochloric acid and 4·6 parts water till the hydrochloric acid fumes have condensed upon it. It is then floated on lukewarm water till the colours have softened, when it is laid upon the surface of the glass with the image downwards, and pressed flat with an india-rubber roller. The back of the paper is then moistened with a wet sponge, one corner of it raised, and it is then stripped rapidly off. The glass is then etched with hydrofluoric acid in the ordinary way.

NEW MACHINE FOR MOUNTING PRINTS.

In these days when prices are low and competition is rife everything that tends to aid in the rapid execution of work should be gladly welcomed.

We have seen in operation a machine for mounting *cartes*, cabinets, and photographs of a similar class which has been invented by an experienced professional photographer, Mr. James Syrus Talley, of 1, Newington Green-road, N., which if generally introduced would, we think, tend to lighten labour in this direction, and considerably shorten the time involved in the operation. It is patented, but as the specification is not yet published our description will partake of a more popular than a strictly technical character.

Although the machine we saw was intended to mount only three prints at a time, yet may twice as many be operated upon with equal facility. Indeed there is no limit, in reason, to the number of prints for which the machine may be constructed.

It consists of a box of any required dimensions, divided in the middle and hinged at the back, so that one half forms a lid to the other. This is fixed firmly to the work table. On opening it, both top and bottom are found to be subdivided by partitions into as many reservoirs as are necessary for holding each a packet of mounts in the upper half, and trimmed prints in the lower compartments. When loaded, and ready for commencing to mount, the box is thrown open, and the packet of prints are found to be pressed up from below, so that the upper one is level with the upper surface of the lower compartment, and having received an application of the mountant from a slab and brush, which are found adjacent, the lid is closed, and a stirrup or foot-piece depending from the table is relieved from the pressure of the foot, by which certain springs are allowed to exercise their force, the result being that the starched prints are brought into firm contact with their respective mounts. On reopening the top the mounted prints fall out and are received into a receptacle lined with blotting paper, by which any humidity left on the face of the print is removed, after which they are dropped into a tray standing in readiness to receive them. The starch is then applied to the next set of prints, and the springs liberated by the action of the foot as before, and thus it goes on so long as any prints and mounts remain.

There are some ingenious "side issues" to the invention, such as that by which the prints after washing are gathered together, sorted, and stacked into a pile, but upon these we need not here enter. The prints are placed upon the mounts with unfailing accuracy, and a great saving of time is effected.

Our Editorial Table.

A Hand Camera Lens.

By Sands & Son, Tottenham Court road, W.

The designation above given is generic, and not that which is engraved on the mount of the lens, which is "Detective Paragon."

The first noticeable thing about the lens is its unusually great aperture, which equals *f*-4. This indicates a degree of rapidity of action four times greater than the average lens of the ordinary rapid type fairly represented by *f*-8. The focus is short, being intended for detective work, and is four and a half inches equivalent. There is therefore no doubt as to its efficiency in instantaneous work in dark alleys and slums, in which are so often to be picked up scenes well worth perpetuating with the camera, but which are impossible to be secured unless with a lens of extreme rapidity. It has an Iris diaphragm of a new form, patented by the makers, ranging from *f*-4 to *f*-45·2, several of the more commonly recognised apertures being engraved on the graduation. The fitting and arrangement of the Iris diaphragm form a beautiful piece of mechanical work, for while the mount or tube is no larger than to admit the lens cells, there is no projecting rim outside, and but very little inside, in which to stow away the blades of the diaphragm, of which there are fourteen. This allows the lens to work at almost full aperture. A small knob projecting through a slot in the mount permits of the adjustment of aperture being made, a small arrow-head pointing to the graduated scale. It is doubtless owing to the great number of blades that the diaphragm preserves its circular form with such entirety from the Alpha to the Omega of its scale. When worked with its largest aperture the definition is excellent, and is all that is needed for individualised street scenes or groups. In proportion as the aperture is reduced so does penetrative range increase, and then objects both very near to and very distant from the camera are delineated with equal sharpness.

The lenses of this objective are formed of the new Jena glass, for which Dr. R. Zeiss claims, we learn, a great degree of rapidity in combinations, as upon submitting it to spectroscopic analysis it was found by him to be much more actinic than ordinary optical glass. The workmanship throughout is of a high order of merit.

In looking over the *Figaro Illustré* (Boussod, Valadon, & Co.) of last month and this, we notice some very fine specimens of their photo-printing process. Notably we may mention a series of eighteen studies by M. Chalot, representing as it were a history of the results of a "puff of smoke." In their *printed* form they are as perfect as if made direct from the negative in the ordinary way. Their coloured pictures are, as may be supposed, far in advance of all other similar publications, the two, *La Marchande de Crevettes* and *Seule au Rendez-Vous*, being marvels of such work, are quite worthy of frames.

Views and Scenes in North Queensland.

By D. Macfarlane.

We very much prize a series of views illustrative of life and scenery in North Queensland taken by Mr. D. Macfarlane. While all the groups (mostly aboriginal natives of Australia, Kanakas, and Solomon Islanders) are interesting from the ethnographical point of view, many of them are characterised by great technical excellence; more especially is this matter for wonder when we consider the circumstances of discomfort under which they must have been taken.

But here we introduce Mr. Macfarlane himself, from whose letter we give copious extracts:—

"I have read with interest the articles in the Journal on *Photography in Japan and Norway*, and as I have been some six years in North Queensland in the employ of the Sugar Plantations, &c., a few notes about amateur photography in these parts may be of interest.

"It was my lot to be one of the first Europeans on one of the northern rivers (Bloomfield), and I have done a good deal of going about in the bush, sometimes with only a few blacks. In travelling with blacks in wild country I simply hand over my camera to them, and impress them with the awful consequences which any mishap to it would result in. These sure-footed children of nature have carried my camera through the wildest country, dense jungle, and rough rocky mountains, &c., and never once dropped or damaged it. I used to work in a very rough way when out in the bush. My plates I changed in the shade of a tree when it was a moonlight night; if I changed by day I did so by crawling under a red blanket, which in a tropical climate is no joke. At night I used to develop by sticking four sticks in the ground, tying a red handkerchief round them, and sticking a candle in the middle. I did this on the bank of a small stream, and washed the plates in the stream itself.

"I never had a lesson in photography, and never saw any one else working at it. All my information has been obtained from a book of instructions (Marion's), and from the pages of your valuable Journal. My turn-out is one of Marion & Co's. whole-plate University sets, 10*l*.

"I am now residing on the Pioner Sugar Estate, and the views I am sending you of Kanakas have been taken here. I do everything myself, and do not use any ready-mixed chemicals or prepared paper. I see in the Journal a good deal about the keeping qualities of plates. My experience of plates is that the very best brands will not keep more than six or eight months in this climate, and the more rapid they are the sooner they go. I quite agree with the writer in one of your numbers who says plates should be put up in air-tight metal boxes, and no paper wrapper round them. Many a good view I have lost owing to bad plates

I hope this flexible film of the Eastman Company is to be a success, as it will be a great boon to such as myself in out-of-the-way places."

There is much in the above that affords food for reflection, but the great lesson is that success is sure to follow pluck and perseverance.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,071.—"An Improved Method of Developing Photographic Plates or Films without the Use of a Dark Room, and Apparatus therefor." A. Watt. —*Dated July* 16, 1890.

No. 11,093.—"A New or Improved Portable Holder to Facilitate the Washing and Draining of Exposed Photographic Plates." H. L. Sworder. —*Dated July* 16, 1890.

No. 11,104.—"An Improved Method of Preparing Photographic Plates of Mica." Communicated by O. Moh. Complete specification. E. Edwards.—*Dated July* 16, 1890.

No. 11,293.—"Improvements in Photographic Cameras and Parts thereof." J. E. Thornton.—*Dated July* 19, 1890.

PATENTS COMPLETED.

Improvements in or relating to Films or Supports for Photographic Negatives or Prints.

No. 10,393.—Joseph Sinclair Fairfax, 433, Strand, London.—*June* 26, 1890.

This invention, as communicated to me by my foreign correspondent, relates to the films or supports used for photographic negatives, or prints.

Heretofore it has been customary to form the sensitised gelatine film used in the production of photographic negatives, commonly known as "dry plates," upon transparent glass. The increasing use of the dry-plate process for out-of-door photography has added to the demand for a light plate, which will reduce to a minimum the weight to be transported.

Paper has been used as a temporary support: the sensitised film being laid upon it in long strips, and apparatus provided by which rolls of this film can be placed in the camera, unrolled without opening the camera, and successive plates exposed. This improvement has lessened weight, but on account of the want of transparency in the paper, it has been found necessary, after exposure and development, to separate the film from the paper, and coat the film with collodion. The pyroxyline support, thus provided, requires skill to apply, and an accident may destroy the picture on the negative, while it has been found impracticable to thus secure anything but a very light and unsubstantial support.

Attempts to substitute pyroxyline for paper in the first instance have not proved successful, the strips of celluloid or plastic compounds of pyroxyline (either rolled or split thin) having insufficient flexibility for use on rolls. It has also been found impracticable to form these pyroxyline supports by means of ordinary collodion, the film which could be formed from a single application (unless the liquid when applied was too thick to flow) being too unsubstantial, while subsequent applications injuriously acted upon or dissolved the previously formed film. Moreover, the great contraction of collodion in drying was objectionable, as it caused the film to buckle.

The improved film or support may be made from a thin solution of pyroxyline, flowed upon a smooth surface called a "carrier," and the thickness regulated by the number of coats, when, by using a nearly saturated solution, I am enabled to apply successive coats of this pure pyroxyline compound, which heretofore has not been done. It may be made also from a very heavy solution of pyroxyline, and spread upon the carrier, the thickness being regulated by the spreader. In practice I prefer to use the heavy solution, and spread it, as it is more quickly done and cheaper than by flowing. In making these solutions I use as a solvent any liquid or solvent which will thoroughly dissolve the pyroxyline, and will not give the film a greasy surface, to which the gelatine emulsion will not adhere, nor injuriously affect the gelatine emulsion when applied. In the heavy solution it is preferred to use gum camphor as one of the solvents, and I mix with the solution any of the miscible non-solvents, such as amyl alcohol, butyl alcohol, and petroleum naphtha, which, while having little or no solvent power in themselves, are often desirable ingredients in these solutions, from their water-repellent qualities and cheapness.

Having thus outlined the invention, I will proceed, more particularly, by way of illustration, to describe some methods of applying it. I do not, however, wish to be understood as confining myself to the particular methods of application mentioned, as there are various other ways which involve merely such modifications of the solution as will be readily suggested to those skilled in the art.

For a thin solution to be flowed upon glass, or other polished carrier, the following is found to be a good formula:—

40 gallons of methyl (or wood) alcohol.
20 gallons of amyl, propyl, or butyl acetate, or mixtures thereof.
40 gallons of amyl alcohol.
50 pounds of soluble pyroxyline.

The solution is so nearly saturated that the second application thereof (which is frequently necessary to secure a sufficiently thick and substantial support) will not destroy or injure the previously formed film. The solution is allowed to flow upon glass (preferably first coated with a thin solution of indiarubber in benzene, or other suitable coating, to prevent adhesion), and when dry it is stripped from the glass or other carrier, and cut to desired sizes or into long strips to be used from rolls, for which the invention is especially well adapted.

For a heavy solution, to be spread upon the carrier by a spreading knife or straightedge, the following formula is a good example:—

55 gallons of methyl (or wood) alcohol.
20 gallons of amyl alcohol or fusel oil.
25 gallons of amyl acetate.
50 pounds of gum camphor.
100 pounds of soluble (photographic) pyroxyline.

For amyl alcohol in the foregoing formulæ, butyl alcohol or its isomer may be substituted, and for the amyl acetate, the acetate of butyl or other ethers of butyl alcohol and amyl alcohol, which are known solvents of pyroxyline, may be substituted. Also, the proportions in which the liquids are mixed will somewhat depend upon the amount of dampness in which they are to be worked, the degree of solvency of the pyroxyline employed, the consistency of the solution desired, and the amount of susceptibility to water required in the film.

The solution given in the last example is too heavy to flow, but it is distributed upon the glass or other polished carrier (prepared as before mentioned) by means of a knife or other equivalent device, as is well understood, and when the film has set or hardened I strip it from the carrier and cut it into plates or long strips to be used from rolls.

After taking the pyroxyline film from the glass or other carrier I distribute upon it the sensitised gelatine emulsion from cylinders revolving in a trough containing the emulsion, or in any of the well-known ways of distributing the emulsion upon its support. Or I may distribute the sensitised gelatine emulsion by spreading it upon the pyroxyline film before its removal from the glass or other carrier. After being coated with the gelatine emulsion the strips of coated films are placed in holders or rolled upon rollers, and are then ready for use in the camera.

If, for any reason, it is found desirable to use less pyroxyline, or to use stronger or more energetic solvents in any of the solutions named, the surplus or too active solvent power may be reduced by the substitution of miscible non-solvents in sufficient quantity to neutralise the excess of solvent, the amount of these non-solvents to be used in any case depending entirely upon the amount of unemployed solvent power which it is desirable to reduce.

It is to be understood that I do not confine myself to the particular solvents named which are enumerated as examples. For instance, in place of, or in conjunction with, amyl alcohol, or fusel oil, or butyl alcohol, or their isomers I sometimes use benzoline or petroleum naphtha or benzoline.

It is necessary, however, to use about the proportions named of non-hygroscopic menstrua to prevent clouding the resultant film, but in general any of the well-known solvents and well-known non-solvents may be employed, provided that they are not of such a greasy nature as to prevent the adherence of the sensitised emulsion to the finished film, and the choice of these depends upon the time required for the film to set or dry.

This invention may also be used as a support for photographic prints, especially in the production of transparencies.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. A transparent or translucent flat and flexible photographic negative support, consisting of a solidified solution of pyroxyline combined with a sensitised gelatine emulsion, substantially as described. 2. A transparent or translucent flat and flexible photographic negative support, consisting of a solidified solution of pyroxyline combined with a sensitised gelatine emulsion, and formed in strips or lengths suitable for use in a camera by exposure therein from rolls, substantially as described. 3. A transparent or translucent flat and flexible photographic negative support, consisting of a solidified solution of pyroxyline, obtained from a liquid or plastic mixture containing petroleum naphtha, butyl acetate or amyl acetate, and gum camphor, combined with a sensitised gelatine emulsion, substantially as described.

Improvements in the Treatment of Paper or other Fabrics to Render them Suitable for Photographic Purposes.

No. 12,309. James Williams, Willesden Paper Works, Willesden Junction, Middlesex.—*June* 28, 1890.

Paper is at the present time treated by dipping in an ammoniacal solution of oxide of copper (cuprammonium hydro-oxide) in the manufacture of the well-known Willesden waterproof paper. Such paper has, however, comparatively rough surfaces unless glazed with roller pressure.

Paper and textile fabrics have also been glazed by applying a coating of cellulose dissolved in cuprammonium hydro-oxide, but owing to the manner in which this was done the resulting surface was not suitable for photographic purposes.

I have discovered that instead of dissolving cellulose in cuprammonium, it is essential to success to first prepare a bath of strong cuprammonium hydro-oxide solution, which must be of the utmost possible purity, and I find it convenient to use from 1·5 to 2·5 per cent. by weight of metallic copper, according to the degree of brilliancy required. Upon this bath I float the surface of the paper or other fabric to be treated, taking care that only one side comes in contact with the solution, by which means I convert the surface of the paper or other fabric into a structureless film of cellulose, such film at this stage existing in combination with the oxide of copper, ammonia, and water employed. I then conduct the sheet of paper or other fabric, with as little exposure as possible to the air consistent with the setting of the film, to one or more hot rollers, taking care to lead it over the first, so that the untouched surface is in contact with it, by which means I expel the ammonia and water from the deposited film.

The material thus treated has a green tint, due to the copper hydrate contained in the deposited film. In order to remove this and render it suitable for photographic purposes, I pass it through consecutive baths of weak acid, such as sulphuric acid, which dissolves out the copper without affecting the glazed surface. I then wash and dry the paper or other fabric.

By this invention a permanent glaze, capable of withstanding the action of water, steam, weak acids, alkalies, and ordinary solvents, and with a surface closely resembling the albumenised paper used in photography, is obtained.

In place of cuprammonium hydro-oxide other suitable solvents may be used.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The process of forming a practically pure, structureless film of cellulose upon the surface of paper or other fabric by exposing it to the action of a solvent, and then removing or neutralising such solvent, substantially as described. 2. The process of forming a practically pure, structureless film of

cellulose upon paper or other fabric by floating the paper or other fabric upon the surface of a solvent, and then extracting or neutralising such solvent, substantially as described. 3. The process of forming a practically pure, structureless film of cellulose upon the surface of paper or other fabric by exposing it to the action of cuprammonium hydro-oxide and afterwards to acid, substantially as described. 4. The process of forming a practically pure, structureless film of cellulose upon the surface of paper or other fabric by floating the paper or other fabric upon the surface of cuprammonium hydro-oxide and afterwards exposing it to the action of acid, substantially as described. 5. The treatment of paper or other fabrics to render them suitable for photographic purposes, substantially as described.

IMPROVEMENTS IN APPARATUS FOR FACILITATING THE MICROSCOPICAL EXAMINATION OF PHOTOGRAPHIC PICTURES, MAPS, AND OTHER OBJECTS.

No. 18,139. HENRY DUNCAN, 16, Tokenhouse-yard, London.—*June* 28, 1890.

My invention relates to apparatus for facilitating the microscopical examination of photographic pictures, maps, and documents, and other small or microscopic objects.

My said invention is chiefly designed to afford the means whereby photographic miniatures of maps or the like, which, while occupying a comparatively small space correspond to a very large area, can be easily examined.

My said invention is particularly serviceable to bicyclists and tourists, and for military and other purposes where ordinary maps would be objectionable by reason of their bulk or by reason of the difficulty of using them, particularly in stormy or wet weather.

An important feature of my said invention is the provision of suitable means whereby the microscope may be readily adjusted relatively to the map or other object, so that any desired section of the said map or other object can be brought into the field of the said microscope. By this means, with a comparatively small lens, it is possible to examine objects which, as a whole, occupy an area very much larger than the field of such lens. For example, any desired part of a small scale map, showing an area of say 300 or 400 square miles, may be examined by adjusting the microscope as required.

In making a portable apparatus, according to my said invention, I arrange the lens or lenses in a suitable tube or holder, capable of sliding in a disc or other piece fitted to rotate in or upon the frame of the map, picture, or the like. Or I provide other suitable means for adjusting the lens or lenses in any direction relatively to the said map, picture, or the like, for the purpose above specified.

The tube carrying the lens or lenses is sometimes arranged to slide into and out of the main portion of the apparatus.

The map or the like is preferably photographed on a greatly reduced scale on a disc of glass which will fit into a suitable case or holder provided with a removable cover, and is protected with another disc of glass covered to the first-fitted in any convenient manner. I sometimes so construct these discs as to prevent rotation of the same in their case or holder; for example, I form notches in them to engage with a steel or projection in the holder. I can, if desired, provide the apparatus with any desired number of interchangeable maps, pictures, or the like, mounted in this manner.

A steel or projection is sometimes provided on the said frame to facilitate the use of the apparatus by indicating which is the top or north of the map. This steel or projection, moreover, engages with a notch in the cover of the holder for the map or the like, and prevents rotation of the said cover relatively to the said holder.

In some cases I make the map or other object adjustable while keeping the lens fixed, so that different parts of the said map or the like can be brought into the field of the said lens, or both the lens and the object may be made adjustable relatively to each other.

The claims are:—1. An apparatus for facilitating the microscopical examination of photographic maps and other objects, comprising a frame, clip, or holder for the map or other object, and a microscope or magnifier arranged to slide to and fro in an open guide which is secured to the said frame, clip, or holder, and which is capable of angular or other movement relatively to the map or the like, substantially as herein before described for the purpose specified. 2. The combination, with one or more photographs on a sheet of glass or other suitable material, of a frame or clip for supporting the same, and a lens or lenses secured in a holder, which is adapted to slide between guides provided to the said frame or clip, substantially as described. 3. Sheets or plates of glass or other material having between them a photograph of a map, and one of which is frosted or ground or otherwise prepared on its outer side, as and for the purposes above specified. 4. The clip or holder comprising the clamping plates, the guiding pins or studs, and a screw or other suitable device for pressing the said plates together with or without the compass secured in one of the said plates, substantially as and for the purposes set forth. 5. The combination, with the adjustable lens holder, of a hand or pointer for facilitating the marking of places on the map substantially as described. 6. A photograph of a map or the like on glass or other material (with or without a frame) and provided with one or more cushions, pads, or the like, for protecting the said glass or other material, substantially as and for the purposes set forth. 7. The improved apparatus constructed substantially as described with reference to the accompanying drawing for the purposes specified.

[The patentee is probably unaware that reduced photographs for microscopical examination have for very many years been before the public.—ED.]

CHANGE OF NAME.—The business lately carried on under the name of Robert Adamson & Co., at 23, Aldersgate-street, E.C., Manufacturers and Dealers in Photographic Materials, will in future be known under the name or title of Adamson & Co. At the time of the death of Mr. Robert Adamson, in July, 1857, no alteration in name was made, and it has since been carried on under the same title. No change whatever has occurred either in management or proprietorship. In future all communications should be addressed to "Adamson & Co."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
July 28	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 29	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 30	Burnley	Bank Chambers, Hargreaves-street.
,, 30	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 31	Halifax Photographic Club	Mechanics' Hall.
,, 31	Liverpool Amateur	St. George's-crescent North.
,, 31	Oldham	The Lyceum, Union-st., Oldham.
,, 31	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

JULY 22.—Technical meeting.—Mr. T. Sebastian Davis in the chair.

Photographs from paintings of eminent musical composers, sent from Munich, were handed round.

Mr. L. WARNERKE mentioned an incident showing enterprise on the part of a photographer. He said that at a seaside place where a coach was in the habit of passing on the way to a favourite place of resort a photographer was in the habit of photographing the coach with its occupants at a place where it stopped at about eleven in the morning, and on the return journey, at five in the afternoon, would have a supply of prints mounted and rolled, which he sold to the passengers. Mr. Warnerke inquired if any member could give details of Watkins's exposure meter.

Mr. H. CHAPMAN JONES said that it had been described in the *Journal of Chemical Industry*.

The CHAIRMAN inquired what was a fair time to expect commercial ready-sensitised paper to keep in good condition.

Mr. W. E. DEBENHAM said that it would depend upon how it was kept. However well it might be prepared to resist any tendency to deterioration from the constituents of the paper and chemicals themselves, there was the effect of the atmosphere—always impure in a city like London—which would spoil the silver compound in the paper. If paper were preserved from the atmosphere it might remain good for a long time, but could not be expected to do so if exposed to this influence.

Mr. WARNERKE said that he had some paper which had been kept for more than two years, and which now, with the exception of the outside sheet, which was spoiled, appeared to be as good as ever. It was kept wrapped in tinfoil. He had formerly kept sensitised paper by wrapping it in paper prepared with nitrite of potash.

Mr. JONES had found paper keep freer from discolouration when loose in a box than when rolled up.

Mr. DEBENHAM had found that commercial sensitised paper when kept loose lost the property of yielding a rich print in toning before much discolouration of the white had set in.

Mr. J. R. GOTZ said that the keeping of paper depended much upon the purity of the atmosphere of the place where it was kept. He had known paper kept in a country house keep for two years, whilst in such a place as Sheffield, for instance, it would not keep for as many months.

Mr. A. COWAN had found keeping the paper between sheets of blotting paper that had previously been saturated with carbonate of soda solution and dried very effective in preserving it.

The CHAIRMAN thought that we ought not to be limited to the one size in which albumen paper was prepared. There need be no difficulty in obtaining larger paper from the mills, but albumenisers did not appear to care to take up the matter.

Mr. GOTZ then showed and explained McKellen's new magazine hand camera, the working of which appeared to be efficient and simple.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 17, Mr. F. A. Bridge in the chair.

A notice of a photographic exhibition to be held by the Institute of the Queen's Park Museum and Library, opening on September 20, was read by the Secretary.

Mr. J. R. GOTZ, in response to an invitation which he had received from the Society, produced some negatives taken on Obernetter emulsion films. In reply to inquiries, Mr. Gotz stated that the basis of the film was not celloidin, but gelatine, so hardened as not to expand to any considerable extent in the developing and fixing solutions. The films did not curl in the developer, but lay flat like linen. After fixing and washing, the films were immersed in alcohol to which seven per cent. of glycerine had been added. They were left in this solution for from a quarter to half an hour, and then pressed between folds of blotting paper, after which they were left under slight pressure for about an hour. The film was finally a little smaller when dry than during the exposure, but if a small quantity of water were contained in the alcohol and glycerine mixture that contraction would probably be prevented.

The CHAIRMAN suggested, for keeping films flat in the camera, the use of a sticky mixture, as suggested by Warnerke, on which the films were to be squeegeed down.

A member inquired as to whether there was halation with these films.

Mr. GOTZ had not found any.

Mr. W. E. DEBENHAM observed that with a very thin film in place of the glass backing, the light was sent back so nearly to the same place as that where it passed through the sensitive compound that it mostly reinforced the image without causing noticeable halation.

A member stated that he had observed most halation with very thick glass.

Mr. DEBENHAM said that halation was strongest at a distance from the image on the plate about equal to twice the thickness of the glass. With glass of ordinary thickness the result might be that the reflection was diffused over so large a surface as not to be noticeable, in the same way that the flare spot given by using certain lenses and particular stops was lost by distribution over a larger surface when the position of the stop was altered.

Mr. A. HADDON said that some little time since specimens of sensitised paper called "iridium paper" were received by the Society. Doubts had been expressed at the time as to the applicability of the name, and he had asked his colleague, Mr. Bloxam, to analyse a piece of it. This had been done, with the result that no iridium at all could be discovered in a piece the size of a half-plate.

Mr. Gotz then showed some prints made on a new gelatino-chloride of silver paper prepared so as to dry with a matt surface. The prints were of a neutral black tone, having much the character of platinum prints upon a very fine surface.

Mr. HADDON showed a set of photographs taken at and near Chester during the recent Convention meeting there. He also, as one of the delegates of the Association, gave an account of the Convention from the social aspect, the strictly photographic matter being, as he said, already well known through the medium of the photographic press. Mr. Haddon further mentioned that recent astronomical photographs taken by Mr. Roberts showed a nebula in Andromeda to be condensing with rings like Saturn.

Mr. P. T. Chang was elected a member of the Association.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

JULY 15,—Mr. James Brown in the chair. About forty members were present.

Mr. H. M. SMITH, of the Eastman Company, attended to exhibit and explain the Kodak and new rollable transparent film. In introducing his subject, Mr. Smith said he would naturally be expected to refer to the attacks which had been made upon the Kodak, and, in fact, he was there partly for that very purpose. He emphatically protested against anonymous and erroneous statements which had appeared in one of the photographic papers, and he especially invited the writer, who signed himself "Newcastle," to come forward, if present, and argue the matter out; an invitation which, however, was not responded to. It was the intention of the Company, wherever the identity of a correspondent could be established, to go boldly to him and afford every facility for the settlement of disputed points. Had any of these anonymous gentlemen given the most cursory examination to the Kodak they would have found that the lens is not a single non-achromatic; and as to price, that was entirely a matter between buyer and seller. He wished to state, in as public a manner as possible, that in the No. 1 Kodak the lens was not a single but a periscopic—a doublet lens. It was not achromatised, but was placed so as to work at its chemical focus, and he could appeal to results to show its quality. With the sole exception of the No. 1 all the other forms of Kodak sent out by his Company were fitted with rapid rectilinear lenses made by one of the principal firms of lens makers in America, and they would bear comparison with any in the market. The focus of the quarter-plate was five and a quarter inches, and the 5×4, six and a half inches, and all were capable of adjustment to various distances. Results of exposures taken in the Kodak during the Convention were passed round, some hand exposures and others with a tripod, as well as enlargements from the same negatives. It was intended to demonstrate the development of the films, but time did not admit.

After remarks from Messrs. Dunn, Park, Pike, Hemy, the Chairman, and others, a vote of thanks was accorded to Mr. Smith for his address.

GERMAN SOCIETY OF FRIENDS OF PHOTOGRAPHY.

JUNE 30,—Professor Vogel and Captain Mensing in the chair.

After the ordinary business and election of new members, and the exhibition of some sheets from *Paris Instantané*, the meeting agreed to keep holiday till September 28, and arranged for the Committee to carry on the affairs of the Society in the interim, during which time it was also agreed that social gatherings should be held on the last Monday in each month.

Herr GAEDICKE then gave his lecture on *Collodion Dry Plates*, which was illustrated by a number of samples of the plates in question, and dealt also at much length with the historical aspect of the subject. The advantages which Herr Gaedicke claimed for the collodion dry plate were the following:—1. In consequence of the thinness of the film the image possesses more delicacy. 2. The precipitate is of finer grain. 3. Great latitude in exposure is permissible, as over-exposure is not easy. 4. The time required for developing, fixing, washing, and drying is much shorter. 5. Only half the time is required for printing. 6. The negative is more permanent. 7. Both the manufacture and development may be carried on at any time of year, as the film is insoluble in water.

Herr ACHENBACH inquired whether the grain was not too large—a matter of importance with regard to the employment of the plates for astronomical purposes; to which Herr GAEDICKE replied that the grain was finer than is the case with gelatine plates.

With regard to plates coloured with eosine, Herr E. VOGEL, jun., observed that the reddish tinge was of no consequence as far as printing on albumen paper was concerned, as only green light was absorbed thereby, which was of no importance in the process, albumen paper being only sensitive to violet rays.

Herr KRAUSE then exhibited a number of platinum prints, remarking that he prepared the paper himself according to Pizzighelli's recipe, but that, in order to obtain good deep shadows, he employed one-third more platinum than recommended by Pizzighelli. The drying (at 40°) he carried out in a sand bath.

Herr Goemann then exhibited views of the Mark and of the Alps, taken by himself on various excursions, the artistic excellence of which excited universal admiration.

The Chairman exhibited some new objectives by Zeiss, after which the discussion directed itself to the question of discount and other business matters, amongst which the proposal for holding a general meeting of amateurs and professional photographers during the autumn was canvassed.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, July 31, *Home Portraiture.* Discussion opened by Mr. W. E. Debenham. Visitors cordially invited.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

To the EDITOR.

SIR,—In reading my JOURNAL this week I came across (to me) an intensely interesting bit of news; it is the system of blinds in use in Mr. Webster's studio. But while I am interested I am also puzzled, which is no doubt owing to my ignorance, both as to the proper way to light a studio (or rather the sitter), and of Mr. Sutton's "article" in your JOURNAL twenty years ago, and also in not being able to understand your description. I think you would confer a great benefit on such an "ignoramus" as myself by giving a short "article," accompanied by a few illustrations of Mr. Sutton's "article." In the meantime I should be extremely glad if you will kindly answer the following questions in your next issue. My studio is 35×15 feet, and the length runs east and west. There is a twelve-foot north light, roof, and three feet at side; no south light. Do you mean the blinds to work east and west and *vice versâ*? or from ridge of roof to eaves northward? Can you give me a fuller description of what you mean when you say, "*So that each series is about a yard higher than its predecessor?*" And will you kindly describe what is meant by "*Each length is in three sections?*" I dare say you will think these very silly questions from one who professes to be a photographer, but my never having had any *practical* tuition must be my excuse for asking them. Trusting you will do me this favour, I am, yours, &c., HIGH PEAK.

July 14, 1890.

[See leading article. It is difficult to describe with the requisite conciseness the details of a large subject in a comparatively limited space. We believe Mr. Watmough Webster is not unwilling to give personal tuition in his own studio.—ED.]

RETOUCHING AND RESITTING.

To the EDITOR.

SIR,—I am very loath to rush into print needlessly, but I feel I am bound in duty to make a few remarks under the heading of *Retouching and Resitting*. I would most certainly not have troubled you were it not that in your last issue an anonymous correspondent has been good enough to mention my name and flatter me by a quotation from one of my articles which appeared in THE BRITISH JOURNAL OF PHOTOGRAPHY some little time back. I have no doubt whatever of your anonymous correspondent's extensive and lengthened experience in photography and retouching, yet I cannot resign myself to the position which he so kindly accords me.

The trouble seems to be the result of his trying to reconcile the two following statements—one by a gentleman signing himself "Photographic Artist," and one by your humble servant. They are as follows: "That retouching is an art there cannot be two opinions upon; that it should be practised by those who have a good art training must also be admitted; that, in point of fact, it should be the work of an artist." "It is usual to say that a thorough art education is necessary before becoming a good retoucher. With this I do not quite agree. I believe a man can become a very good retoucher indeed, and yet not have had an extreme artistic training. Most certainly those who possess a thorough art education will find it of very great service as they go along, and decidedly their work will be superior to the work of those who have not had one, or those who have had one to a less degree; but it is not an absolute *necessity*."

Comparing the two opinions, he says he thinks "the 'Photographic Artist' to be right." By this, of course, I must naturally consider myself in the wrong, and, of course, been guilty of misleading the many readers of THE BRITISH JOURNAL OF PHOTOGRAPHY who have favoured my articles by a perusal. Now this is an imputation I do not at all feel disposed to sit down under. With the gentleman who signs himself "Photographic Artist" I have nothing whatever to say, he simply expresses an opinion, which every one has a right to, and mentions no names. Not so with your anonymous correspondent, who distinctly mentions my name, imputes to me a pure want of knowledge regarding the subject upon which I am writing, and which, if lest questioned, would leave me in a very ridiculous light before your readers and my many pupils.

Not knowing the gentleman who has written this letter, I of course can have no grounds to doubt his very extensive and lengthened experience, especially as he writes about the condition of retouching twenty years ago. I wish to accord him every information he claims to possess, and then I *think* I am safe in saying he obtained it in a very poor school. My information dates back further than twenty years, but as that is the time mentioned we will limit ourselves to it.

I have had a vast experience in teaching retouching during the past twenty years, and have had as pupils both art students (students capable of painting from life down to others only beginning) and those who have *never* attempted to draw, and most certainly could not pretend to an art education; yet I have turned them out *proportionately* well, as I think my article suggested. There is nothing very creditable in making an *artist* a *retoucher*, one would think; he should do the work in a lesson or two—but he does not. He finds it very difficult, and I have known cases where success has never been arrived at. I have also had many pupils who *never* had any instruction in art (not photographic), and yet I have been in-

strumental in enabling them to gain a living as retouchers, and hold positions as such in some of the *best* London firms. I do not say this merely as a counter statement or as a means of bolstering up what I stated above, but it can be proved by the pupils themselves, whom I have no doubt, if called upon, would give their testimony. Common sense has more to do with retouching than the generality think, and I fear it is very often forgotten when writing about it. It is always well to distinguish "what *should* be done" from "what *can* be."

Referring to mutual experience twenty years ago, I fear there I am at a serious disadvantage compared with "F. B." (I was in Paris at the time, in the then leading houses), as I never met a half-plate negative bust "which took the time of one to two days" to retouch. I *never* saw a half-plate negative worthy of the name which *could* take such a time to retouch, even conceding that the head covered the entire plate. Mind, I mean in the hands of a *retoucher*: in the hands of a little child it might, with ordinary luck, remain much longer.

I fear I have trespassed rather much upon your valuable space; but my name being mentioned by a correspondent, and my contribution to THE BRITISH JOURNAL OF PHOTOGRAPHY being somewhat held up to ridicule, I must put forward as my excuse.—I am, yours, &c.,

50 Kellett-road, Brixton-hill, S.W. REDMOND BARRETT.

HINTS TO MOTHERS.

To the EDITOR.

SIR,—In a photographic journal I saw lately, it was stated that Mr. Sarony, the veteran photographer of New York, referring to the well-known fact that in the majority of human beings one side of the face is very much unlike the other, attributes "the principal cause of this to the habit of sucking the thumb in childhood. When any's chubby little thumb is in his mouth, the forefinger presses the cartilages of the nose on one side and by degrees completely out of shape." The most powerful cause of the difference in question is when mothers or nurses, from some injury to the child, or themselves, have kept the child too long sucking at one breast. Another cause is the habit many children have of putting small seeds of plants and other substances in their nostrils, some of which may remain for a time, and consequently affect the shape of the head. Sucking the thumb is merely a relic of sucking, and should be promptly stopped as soon as a child enters an elementary school.—I am, yours, &c.,

HERMES.

"EVOLUTION OF PHOTOGRAPHY."

To the EDITOR.

SIR,—Many thanks for your comments on Mr. Werge's letter of 15th inst. These have spared me the unpleasantness of replying in your JOURNAL, but it has been necessary to do so in the pages of a contemporary in which a similar letter appeared. I have sent my "Inventories" exhibit to the rooms of the Liverpool Amateur Photographic Association, 3, Lord-street, and those interested in seeing the earliest work in bromide of silver collodion emulsion are invited by the House Committee to call and inspect.

I wish to correct one remark in your extract from THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC of 1879. I did not exchange photographic pursuits for matrimonials. The latter was my vocation, but photography was my "hobby," and it was the strain of overwork in connexion with collodio-bromide experiments in the autumn and winter of 1864 that caused a serious illness in the spring, and I was compelled to give up photography and abstain from business for a year. I therefore am somewhat sensitive on the subject of Mr. Werge's suggestion, unintentional though it may be. He could have avoided controversial topics, and yet have done justice to the process which is the parent of modern dry plates.—I am, yours, &c.,

B. J. SAYCE.

Redcross Chambers, Liverpool, July 19, 1880.

FADING OF MOUNTED PRINTS.

To the EDITOR.

SIR,—In your JOURNAL of May 28 I have read your assertion that the streaks upon the photographs in question were caused by the licking. If I were to tell you that no other photographs of my production have ever become streaky, and that ninety per cent. of these 50,000 have gone bad with streaks; that I have used other mounts at the very same time as Marion's, and that all received the same treatment in the process of mounting, yet only those on Marion's mounts have gone bad. Again, I keep proof books, which contain a mounted photograph of every sitter I take. Most of these proofs are mounted on the top of rejected or faulty photographs, but some few are mounted on the card *direct*.

Now, if you found every photograph in these books which is mounted over another previously and absolutely free from *any* blemish, and all such as are mounted on the card *direct* clean, and streaking, and fading, what would you think, then, could have caused the streaking, &c., knowing that the same tongue had, without partiality, licked all the plates? I know perfectly well that many theories can be suggested for photographs fading, streaking, and spotting, but, finding some positively *none*, but these—not even a single one of a subsequent 15,000 supplied me by Marion—going wrong, would you still think that licking had caused the mischief?

I send you herewith four leaves, which I have torn out of a proof-book, and which in itself is sufficient to prove that nothing but the mount is at fault. You will observe that numbers 25,862, 29,848, 30,017, 26,031 are streaky, and not any others. These four are mounted direct on the mount, and the others are over photographs.—I am, yours, &c.,

62, Bold-street, Liverpool. A. VANDYKE.

[As this is the first time we have seen the prints which were recently in the law courts, we have no hesitation in saying that the streaks are not caused by the licking, as we had formerly surmised, but by some action between the mountant and the mount, which is heavily glazed.—ED.]

PHOTOGRAPHING THE WILD BULL.

To the EDITOR.

SIR,—With reference to your paragraph in last week's issue on the British wild bull now in the "Zoo," I may mention that before he had been there thirty-six hours I had secured a first-class negative of him, which will be published immediately in my Animal Series.—I am, yours, &c.,

GAMBIER BOLTON, F.Z.S.

Camera Club, 21, Bedford-street, W.C.

BRITISH PHOTOGRAPHIC UNION.

To the EDITOR.

SIR,—I take this opportunity of explaining the position of the above proposed organization to those who are awaiting practical results from the organizing meeting of the 16th inst.

At that meeting it was agreed that union is absolutely necessary, but that it is impossible until we can secure the assistance of men who have nothing to fear from employers, and who have enough time and money to do the active work of organization in London. Thus the proposal is effectively blocked, for all our adherents in town are workmen who dare not risk their employment for the sake of this work, and I live so far from London that I could do nothing outside correspondence and an occasional visit to some previously organized meeting. Our friends who have been waiting for a fully fledged union to hatch itself without heat will have to wait a little longer; but the main recommendation of the meeting can be put in force almost at once. It is that we should start as a preliminary step on the registration of workmen of genuine merit, and their supply to only "fair" employers, coupled with a crusade against "rabbit-hutch" cut-throats and sweaters, purloiners and detainers of specimens, and fraudulent apprentice hunters. This movement to be effected by a practical boycott, regulated by the establishment of a "black list" of both employers and workmen who are proved to be a disgrace to the trade.

The initiatory difficulties of a purely unionistic organization are insuperable at present, as the usual complicated central offices and bodies all depend on the individual pluck, ability, and steadfastness of the officials in charge. It would be useless for us to start the union with less than a hundred members and four or five organising officials; but a scheme was proposed and adopted by a majority of the meeting which can commence existence profitably with one adherent, and will not need elaborate organization, and its expansion to a membership of a hundred or a thousand before amalgamation of an ordinary trade union will be a a matter of a year or so only. After a short correspondence with the proposer of the scheme it will be announced in all the journals for discussion, and submitted for support to the Photographic Club or some such institution, by which means we are likely to secure the assistance of a few well-to-do and disinterested men favourable to the idea of the protection of the workmen.

The formation of the entire trade union is deferred to such time as our London sympathisers can produce some workman or friend of the operative photographer with sufficient pluck and ability in him to stir photographic London up to organization and the maintenance, by money and attendance, of the branches and offices. The stop-gap scheme of which I speak hinges itself on the first point of our programme—the registration and supply of workmen—and will soon attract to itself a useful working body of competent men who will form the nucleus of the union in London. Even now, if any names are obtained of men willing to do the work of organizing in London, I shall be very pleased to start them on the good work in the proper way.—I am, yours, &c.,

ARTHUR G. FIELD.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange quarter-plate hand camera for 10×8 rapid rectilinear lens.—Address, DAVIES, Troon.

Exchange Kangaroo Safety, by Bolton & Thomas, for half-plate camera, three double dark slides.—Address, H. MARTINSON, Ware.

Will exchange Grubb's A1 C.D.V. lens for 8½×6½ or 9×7 rapid rectilinear by good maker.—Address, LOVELOT, 29, Bruce-road, Harlesden, N.W.

Will exchange my whole-plate three-fold tripod stand, with tripod head and screw, for two dozen Edwards's extra rapid dry plates, size 8½×6½.—Address, G. H. ARMSTRONG, Pelaw House, Chester-le-Street, Durham.

Wanted, 5×4 Optimus portable folding camera, 5×4 Optimus rapid rectilinear lens, three dark slides (double), and tripod; will exchange fifteen-inch mahogany plate electrical machine, one pint and a half Leyden jar, and discharger, used very little. Address, DYER, 18, Holland-road, Kensington.

I will exchange posing chair (two backs), studio table, exterior and interior backgrounds (two), boat oar and water piece, forty-five parts of Virtue's *Imperial Shakespeare*, THE BRITISH JOURNAL OF PHOTOGRAPHY from 1885 to 1889, opera glasses, and chronograph watch, for studio accessories, in and outdoor.—Address, F. C. D. HURD, Photographer, Shepton Mallet.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:
James Grey, Plymouth.—*Photograph of H.M.S. "Black Prince."*

W. GOTHARD.—Mawson & Swan.

D. D.—The Secretary had already sent us a report of the meeting.

ZINCO.—Any dealer in printers' materials will supply zinc suitable for relief blocks.

F. BURGESS.—For darkening the colour of the transparencies tone them in a solution of gold.

A. L. (Napier, New Zealand.)—On the whole, No. 3 on your list possesses the balance of advantages.

F. C. D. HURD.—Send two copies of the photograph unmounted and 1*s.* 6*d.*, and our publishers will send you the form and secure copyright.

D. CUNNINGHAM.—A sample of the foreign oil was received and tried. The results were not superior to what was obtained with any good paraffin oil.

D. E. GODDARD.—The series of articles were not published in book form. On applying to the publishers you can probably obtain all the numbers containing them.

J. BRUCE.—A solution of ferrous-tartrate is certainly sensitive to light, although possibly not so much so as the ammonio-citrate, which is always to be preferred.

W. C. A. SIMS, AN AMATEUR FIVE-YEARS OLD, and C. BRAY.—The article is very funny. Thanks for the cuttings, but we had received some before yours. The subject is referred to in a leaderette.

AUTOMATON.—As soon as you have the opportunity of disposing of your shares at a premium we should say do so, though we do not profess to understand the *finesse* of financial matters beyond discounting considerably the glowing accounts given in prospectuses.

AFRICA.—1. For instantaneous exposures use the pyro solution much diluted. —2. Eikonogen has a good reputation for this class of work.—3 and 4. Plano-convex lenses are much used for landscape work, and may be obtained of any photographic dealer. The cost varies with different makers.

R. A. C. says: "I have unfortunately allowed some drops of ink to fall upon a large platinum print, which has completely spoiled it unless they can be removed. Can you suggest anything that will do this?"—Immerse the print in dilute hydrochloric acid, and if the ink be a gallate of iron one they will probably disappear.

THOS. SUMMERS.—The account of the apparatus for cooling air by manual labour has not yet been published. We aimed at something more than keeping the atmosphere of a small room at 90°, which is, perhaps, cool in India. Our figure contemplates a temperature of 55° to 60° even in India. We cannot yet say when publication will take place.

A. SHARLAND.—Yes, groups of fruit make excellent photographs. We have in our mind just now some magnificent pictures of fruit taken, if we remember rightly, by Rodger Fenton. The fruit was arranged by Lance, and the negatives were about twenty inches the longest way.. They were taken some five-and-twenty years ago, and have not yet been surpassed.

PHOTO-MECHANICAL AMATEUR.—In all works on photo-mechanical process only the principles of the different processes can be given, even if the authors could do more, which in some cases they could not. A business—and a very profitable one, too—is not likely to be learned by merely reading a work, however carefully compiled. Practical experience has to be acquired, and this may take years.

R. FRANKS.—We have heard very good accounts of the lenses but have had no personal experience with them. If they are alleged to be of foreign make they may be none the worse for that. If you purchase of any of the leading London makers you may rely upon good instruments, and if you at any time desire to dispose of them you will probably find that the higher-priced ones are the cheapest in the long run.

J. A. D. LLOYD.—The varnish you have been using is very good, and we do not think you will improve upon it with a celluloid varnish. A solution of pyroxyline and camphor ought to be transparent.

T. H. TURNER.—Although the negatives are thin from over-exposure and under-development, there will be no difficulty in obtaining good prints eventually. Press them in close contact with a sensitive plate, give a very short exposure to a gas flame, develop a rather dense transparency, from which make (by repeating the process) another negative, which, by a short exposure, will be strong and vigorous as compared with the original. Negatives are returned as requested.

NUMISMATIST asks if there is any special art in taking photographs of coins and medals, as he, although a fairly good amateur photographer, has totally failed in obtaining photographs of coins in any way equal to those issued in the journal devoted to numismatology, notwithstanding that he has used backed plates and orthochromatised plates.—No doubt our correspondent has been attempting to photograph directly from the coins, hence his failure. The prints he so much admires are not really made from the coins themselves, but from reproductions from them in plaster of Paris specially prepared for photographing; *i.e.*, the plaster is slightly tinted with umber or similar colour to counteract its extreme whiteness.

T. R. M. S. in course of a letter says: "In Mr. Pringle's letter he says *diffusion of focus* is the quality often meant when *penetration* is the word used. Diffusion of focus in a microscopic objective! the thing is, to use Mr. Nelson's expression in another place, 'ridiculous.' We are told that Mr. Pringle frankly acknowledged that he was indebted to Mr. Nelson for all his best experience in the use of the microscope. Would it not be better that he should study the instrument and its literature for himself instead of depending upon others for his facts? Let me say that my letter was written solely in the interest of your readers. He was not asked nor expected to reply to it. Further, he is entirely mistaken if he thinks I have the slightest ill-feeling towards him."

F. HAMPTON puts the following queries: "1. Will you be kind enough to give me a recipe for a good ferrotype varnish; one that will dry hard quick, and will give a good gloss?—2. Also a recipe for a good mastic varnish.—3. What is oleïne, spoken of for photo-lithographic work? I cannot find any chemist that can tell me what it is."—In reply: 1. Dammar resin dissolved in benzole in the proportion of from twenty to thirty grains to the ounce makes a very good varnish; so also does amber in chloroform. Both dry quickly and give a good surface without heat.—2. Good mastic varnish cannot, like most oil varnishes, be successfully made on a small scale; and, unless the consumption be much larger than it is likely to be for photographic purposes, it will be more economical to purchase it, as somewhat expensive appliances are necessary.—3. No doubt we are perfectly familiar with this material, but not under the title of "oleïne." No ordinary chemist is likely to know of it under that name.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.—The Chamber of Commerce handed the profits resulting from the exhibition at Drapers' Hall to the funds of the above, amounting to 2*l.* 12*s.* 5*d.*

THE PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, July 30, *Printing with the Salts of Chromium;* August 6, *New Hand Cameras.* Saturday outing, July 26, St. Albans. Train from St. Pancras at twenty-three minutes to three.

BRIXTON AND CLAPHAM CAMERA CLUB.—In future this Society will meet at Gresham Hall, Gresham-road, Brixton, S.W., opening there on Thursday, the 31st inst. The members will be glad to see any photographers residing in the neigbourhood on that occasion or at any of our meetings.

A KODAK DRINK.—Stranger (to clerk in *temperance* hotel): "You don't seem to have any bar here?" Clerk: "No, sir; but all our rooms are fitted with electric bells. You can go up to your room, if you wish, sir, and have a Kodak drink." Stranger: "A Kodak drink! What is that?" Clerk: "You press the button, we do the rest."—*Detroit Free Press.*

DEATH OF MR. C. VERNON, OF MAIDSTONE.—We are very sorry to have to record the death of Mr. Vernon (who was an occasional contributor to our columns), which took place on the 20th ult. He had been in town all that day. On arriving at his door he complained of the distance from the railway station, and turning round to enter the house he fell down dead.

MR. G. DAWSON, Secretary of the Stockport Photographic Society, *apropos* of remarks attributed to the ex-President regarding dry plates, says that it was not an address, in the proper sense of the word, that was given; it was simply a few remarks that the ex-President made, without notes or preparation, when taking the chair for the first time. Having dabbled in photography since 1853, he mentioned dry plates coming into use. This was said in August, 1889, not 1888; the Society was not formed till June, 1889.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

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PLATE MAKERS AND PHOTOGRAPHERS.

Although disputes between the makers and users of gelatine plates are not so common as they were a few years ago, chiefly, no doubt, because improved methods of manufacture on the one hand and an increasingly intelligent system of manipulation on the other have combined to simplify and perfect the practical working of the process, they still occur with what we will venture to term an abnormal frequency; and as we have of late had an opportunity of studying some curious but instructive examples of the particular variety of dispute we refer to, it may perhaps be interesting if we herein reproduce the substance of our observations, and so supply a few illustrations of the true nature of many troubles that arise from inadequate causes.

Proverbial wisdom says a hard thing of the workman who quarrels with his tools; but if the tools are bad we must in fairness allow that he has grounds for his dissatisfaction, and cannot be rebuked if the quality of his work shows a proportionate falling off. We are not going to ask whether really defective, or, rather, bad plates are ever sent out by the manufacturers; or, again, assuming such never to be the case, whether any professional photographer in these days is incompetent to make satisfactory negatives with good plates: such an inquiry could not be profitable from any point of view. It is possibly reasonable to infer that if the normal gelatine plate of the present time has a high degree of all-round technical excellence, the skill and intelligence of the average photographer gives him a control and mastery over the sensitive product quite equal to what is required of him. The balance, as we know, was not always so evenly adjusted; but granting the accuracy of the preceding inference, it is hard to understand why disputes such as those we have in mind should nowadays so often occur.

Photographers who use large quantities of plates during the season often secure a stock of them early in the year, and if the plates are of one or two batches, with the principal characteristics of which the operators become thoroughly acquainted, such a course has a great deal to recommend it, inasmuch as exposure and development must become much easier—a not inconsiderable gain. Again, before ordering, some photographers have sample packets of plates from different batches of emulsion submitted to them for trial, and this is a very sensible plan. A photographer in a large way of business recently took the latter course with a well-known maker of dry plates, and having found the sample sent quite to his liking, ordered the whole of the batch, which coated several hundred dozen plates of various sizes. To the surprise of the maker, the photographer, shortly after the delivery of his order, wrote and complained that the plates in bulk did not work so well as the sample he had had: his negatives were flat, thin, and without brilliancy, and nothing would content him but the return of the plates; suggestion and negotiation were of no avail: back to the maker those plates were sent. But it happened that the maker was hard pressed for the orders on his books, and having every confidence in the good qualities of the plates his dissatisfied client had rejected, forthwith executed a number of small orders with them, and so scattered the plates, in a manner of speaking, over the country among professional and amateur workers. Not a single complaint of any sort reached the maker. Moreover, he placed a few of the plates for trial in the hands of another photographer who was unaware of the above circumstances, and who found not the least trouble in getting a series of excellent printing negatives with them. As it was early in the summer, when the light rapidly gains its maximum of actinism, there was little doubt that the dissatisfied photographer consistently overexposed, and being—as unfortunately many photographers are—easily prejudiced against the plates, would not "waste time" in making a few experiments in order to put himself on the right track.

What are known as "repeat orders" for plates of such and such a batch occasionally reach makers. Everybody knows that the outer boxes have the distinctive number of the batch of emulsion printed or written upon them. A certain photographer who forwarded one of these repeat orders to a maker received a consignment of plates of a totally different number, and being in some way unsuccessful with them, returned them, reiterating his demand for plates of the "number" previously specified. Now, as the maker had long since sold every dozen out of that batch, it was impossible for him to execute the order, whereupon he boldly unboxed the plates that had been sent back to him, provided fresh receptacles for them, upon which he placed the "number" that was asked for, and sent them off a second time to the photographer, who was highly pleased with them. Clearly the "number" in question must have been of a magical kind.

A third case illustrates another form of dispute that often crops up. A photographer was troubled with minute blisters which appeared during development. After unsuccessfully taking a great deal of pains to obviate them, he concluded that the emulsion was at fault. Accordingly he called upon the maker and detailed his difficulty, remarking that he had brought with him some exposed plates, so that the maker could develop them and see for himself that the plates alone were to blame. Upon development by the maker, however, no sign of a blister or any other defect appeared, and the photo-

grapher was thus unexpectedly compelled to exonerate the plates and seek for the cause of the visitation in some peculiarity of his own procedure.

We might recount many similar experiences, but we believe we have fully sustained the proposition with which we started, namely, that numerous disputes between makers and users of gelatine plates often spring from inadequate, if not purely imaginary, causes. The same proposition possibly holds good in many other respects. There must, of course, be times when failures can be traced to the fault of the plates; but this is a phase of the subject upon which we cannot for the present bestow attention.

DISCURSIVE NOTES ON LENSES.

I.—Historical.

Judging from some statements in a letter which Mr. Thos. R. Dallmeyer has sent to a contemporary, there seems prevalent much what we may very mildly term lack of information concerning historical matters relating to photographic lenses of a former period and the inception of some of the present day; and we feel assured that with fuller information this gentleman would not have made certain misleading statements (no doubt unintentionally) that he has done. Mr. Dallmeyer's leading mistake is in thinking that a demonstration or rough explanation of a *possible* means of achromatising two single lenses given in The British Journal of Photography, December 8, 1865, applies accurately to Steinheil's periscope lens of that period; for at the time this demonstration was written it was no more than a possible suggestion, because then neither any lens nor any definite description of it had reached this country. All that was known was that which had been published on information from abroad, and which was summed up in the following, viz., the objective was formed of two single periscopic or meniscus lenses, that it included an unusually wide angle, that it was rectilinear, and that its visual and chemical foci coincided; and it was on those data that the diagram was drawn and the hypothetic description given of a lens which up to that time had never been seen here, and of which no mechanical or technical description had yet appeared. Our hypothetic lens turned out however, when the real lens had become accessible, to have been correctly drawn. But claims had been made by foreign correspondents, anterior to its advent in this country, as regards its working to visual focus, which could not be substantiated. We quote the late Mr. R. J. Fowler:—"This lens is composed of two crown-glass lenses of the same description. By an immense calculation and an extension of the theory of dioptrics, of which Herr Steinheil has given an account at the Academie des Sciences of Munich, July 8, 1865, he has succeeded in producing a lens giving *an image as free from coloured fringes, and as sharp as those from achromatised lenses of crown and flint glass.*" And again, from the same writer, "Herr Steinheil states in his prospectus that Herr Albert (of Munich) has taken simultaneous pictures of the same landscapes from the same point of view with the periscope and the triplet lenses of nearly equal foci, and that the image produced by the former is not only sharper at the edge, but is nearly double the size of that of the triplet." It was at this stage of publication, endorsed as the allegations were by the venerable M. l'Abbé Moigno, that we ventured to describe a lens by which such things *might* be accomplished, and, as we have said, our lens, subject to radii of curvature not having been given, turned out to be correct. We soon discovered, however, that it could not be considered as an achromatic lens in the accepted sense of the term, although, as Mr. Dallmeyer admits, it approximated somewhat thereunto. Had this gentleman cared to read farther previous to writing, he would have discovered that after the lens was forthcoming we wrote, "It will be remembered that . . . . we gave some description of a lens which we conceived would embrace the various features claimed for the Steinheil lens, and we gave a figure of the lens as we *supposed* it to be constructed, for at that time we had received no account of its construction. We find that the lens has a chemical focus which differs from the visual focus."

All the time that this was going on in this country, and unknown to all but a few *savants* in America, a lens was there being introduced by one of the most distinguished American opticians, Zentmayer of Philadelphia. In it simplicity of construction equal to those in Steinheil's lens prevailed, but with this important difference, that whereas in the latter Steinheil admitted that there was a 52nd of the focus between the focal plane of the blue and yellow rays, the claim made on behalf of the Zentmayer lens was that it produced a sharp, chemical image at its visual focus. Mr. Zentmayer himself had previously said that, so far as his knowledge of optics could govern his opinion, he thought that an objective formed of two deep meniscus lenses, with the outside surfaces placed uncentrically, and made of one and the same kind of glass, could be constructed which should be correct actinically. He afterwards constructed the lens thus foreshadowed, and when handing it to Dr. Coleman Sellers to try, observed that he was sure it was achromatic. On being tried it was found to exceed what the optician claimed for it, and a patent was applied for.

Subsequently—we quote Dr. Sellers—"A letter came from Washington with the information that after Mr. Zentmayer's patent had been granted, and the papers ordered to be issued, Herr Steinheil, of Munich, had applied for a patent for an invention involving some of the principles of Mr. Zentmayer's lens, and which, if a patent were granted to Zentmayer, would cover Steinheil's arrangement. So an interference was declared, and testimony as to priority of invention was taken before a U. S. Commissioner, resulting in the substantiating of Mr. Zentmayer's claims." This wonderful property of *practical* achromatism in a lens composed of two elements, formed of crown glass alone, was tested and favourably reported upon by several skilled scientists, among whom were Dr. Henry Morton, Dr. Sellers, Mr. M. Carey Lea, Mr. Gardner, of Washington, and others. We, too, had pictures sent for criticism which had been taken at visual focus and found them to be extremely sharp.

Now, having cited the authorities who averred that the Zentmayer lens had a coincident visual and chemical focus, notwithstanding the fact that the components of the objective were not achromatic *per se*, but were only single, deep, meniscus lenses of crown glass, it is only reasonable that we give an account, however brief it may be, of the lens itself.

The combination consists of two lenses, both of a deep meniscus form. The front lens is of larger diameter than the back one, and also of longer focus. The ratios of foci are—or were originally—40·5 to 27, 27 to 18, 18 to 12, 12 to 8, and 8 to 5·333 inches. With one mount these six lenses could be screwed so as to form five different combinations and different foci—namely, respectively, commencing with the longer pair, 18 inches, 12 inches, 8 inches, 5·33 inches, and 3·35 inches.

When any of the foregoing lenses were screwed into the mount, each one was in its proper place as regards the diaphragm. Each combination covered a field of view twice its focal length. A drawing of this combination appeared in this JOURNAL August 17, 1866, in course of an article by Dr. Henry Morton, and in the following month, on September 27, 1866, Mr. J. H. Dallmeyer obtained a patent for a lens—his now well-known wide-angle rectilinear, in which the external configuration is similar to that of the Zentmayer lens. Mr. T. R. Dallmeyer is, therefore, not absolutely correct when he says this lens was an evolution of the Steinheil lens, which was a symmetrical compound, for, as we know, it was an outcome of Zentmayer's lens. Equally incorrect is a recent historian who says it was an outcome of the American Harrison Globe lens.

But, and we mention it for the benefit of any future historian of photographic lenses, the lens of Zentmayer had been antedated by two years by Mr. C. B. Boyle, who made over to the Scovill Manufacturing Company of New York all his interests in the Ratio lens. Mr. Boyle previously discovered the principle underlying a large and long-focus front lens when associated with a smaller back of shorter focus, and had obtained a patent for his combination. One of Boyle's combinations, an achromatised front (crown and flint), was on the table of the Society of Arts when Mr. Conrad Beck gave his lecture on photographic lenses in that place in the beginning of last year; and with that lens before us as we now write, we can affirm that American opticians know how to figure and finish lenses in a style which reflect high credit on them.

As all this has arisen out of some contention as to the possibility of the No. 1 Kodak lens being or not being practically achromatised in the sense of its visual and chemical focus being nearly related to each other, we may say that after our examination of the little objective, which partakes of the dimensions of a microscopic object glass of low power, we are inclined to set it down as a cross between the Steinheil periscope and the Zentmayer lens just described.

For ourselves, we are so well satisfied with the exquisite quick-acting achromatised lenses of the present period that we rest content with them. But the lenses of a former epoch are well deserving of our serious attention, for excellent as they were or are in themselves, they are also interesting as having suggested alteration and farther steps which are fairly entitled to be called improvements.

PRINTS ON PLAIN PAPER.

HAVING satisfactorily prepared or sized the raw material, we have next to enter upon the more strictly photographic portion of the treatment. This consists, in the first place, of the salting or application to the surface of the paper of a solution mainly composed of suitable soluble chlorides, with which are often combined other substances chiefly of an organic nature.

The necessity of such organic additions arises from the fact that although the inorganic salts of silver, especially the chloride, darken rapidly on exposure to light, the depth of discolouration is limited, and consequently it is impossible to obtain sufficient vigour in the print. Many of the organic salts, on the other hand, when used alone, though they darken but slowly, acquire very considerable vigour, and such substances when combined with the chloride add greatly to the richness of the resulting print without materially affecting the rapidity of action. The citrate, tartrate, oxalate, and succinate of silver are the principal organic salts so employed, but less definite compounds arising from the combination of the silver nitrate with the sizing material of the paper, or with organic matter purposely added to the salting solution, are also frequently utilised. Such added substances, being generally of a more or less viscous nature, perform a double purpose in helping to keep the salting solution on the surface of the paper.

The treatment described in the previous article has for its object, as was stated, the filling up of the pores of an uneven paper and the neutralisation generally of any inequalities or impurities. So far as the photographic qualities of the prepared paper are concerned, without further special treatment it would be impossible to produce the best results, so far, at any rate, as regards tone, owing to the traces of alum it contains. The additional treatment is, however, of the greatest simplicity, consisting as it does in the use of a combined salting and sizing bath.

It is true a special sizing with arrowroot or similar agent may be resorted to, but this would be distinctly an addition to the labour involved, and might almost as well be substituted for the treatment already given; whereas the compound bath, while it fulfils all requirements, adds absolutely nothing to the trouble of preparation.

The most commonly employed organic substance for this purpose—at least, at the present day—is, no doubt, gelatine, though in former times caseine, as well as serum of milk, found many friends. Hygroscopic substances, such as honey or sugar, are also frequently introduced for the purpose of preventing too great dryness of the paper after salting. There may be a doubt, however, as to the wisdom of the latter addition if the salted paper is to be kept any length of time, since under the influence of even only a very slight degree of moisture the salting material is liable in process of time to sink into the body of the paper, and so destroy the brilliancy of result it is such an essential point to secure.

A little over twenty years ago a new organic substance was introduced for the purpose in the form of nitro-glucose—a nitro compound formed from sugar in the same manner as pyroxyline from cellulose. This, though admirably adapted for the purpose, has never come into general use, owing to the difficulty of obtaining or preparing the nitro-glucose; but by those who have used it, it is said to give the most magnificent tones, either in direct printing or by development.

In using gelatine it is simply allowed to swell in cold and dissolve in warm water, the other soluble matters being then added. A very minute quantity of gelatine suffices to produce a marked result upon the tone and character of the image—from four to ten grains to the ounce, according to circumstances, being about the limits to be observed for general purposes. Where other salts than chloride are employed the organifying action of the gelatine is not so necessary, and it may be reduced, but it is always well to bear in mind that its presence in moderate quantity conduces to the formation of an even layer and good body of salting. If a very stout and robust film be required for special purposes, the quantity of gelatine may be increased, but when it is beyond five or six grains to the ounce it is almost certain that the solution will have to be used warm.

Gelatine tends to the production of a red print when it comes from the frame, and when toned the colour may vary from brown to purple-brown or black if the negative be vigorous. The result will, of course, vary a good deal with the salts used

in conjunction, but the prevailing tendency, as compared with the substances, is as indicated.

For richer purple or purple-black tones the caseine or serum of milk salting solution is to be preferred. In its simplest form this consists in dissolving the salts in skimmed milk instead of in water, that is to say, in milk from which every particle of cream has been removed. This, however, is not so easy an operation as may be imagined, and any fat globules that may be left behind will scarcely conduce to the improvement of the salting solution. The better plan, then, is to precipitate the caseine, which will carry down with it any remaining cream.

To effect this, first of all remove as carefully as possible all the cream by allowing the milk to stand in a tall, narrow vessel for some hours, and then removing the lower portion from beneath the layer of cream by means of a syphon. If "separated" milk can be obtained, or milk from which the cream is removed by mechanical means, so much the better, as in addition to the fatty matter being more perfectly eliminated, the skim milk comes to hand generally in fresher condition. It will be necessary, however, to let this stand for some time, as obviously it would not be policy on the part of the milkman to remove every particle of cream.

The cream having been removed, add to the milk a few drops of acetic acid, or, perhaps, better still, a few grains of citric acid, and heat it in an enamelled saucepan or glass beaker until it "breaks;" that is, until the curd separates from the whey. Let this settle, and when cold filter the clear liquid and add to it the requisite salts. In addition to minute traces of soluble chlorides and phosphates, the serum of milk contains about five per cent. of milk sugar, which constitutes the active organic agent.

Another salting solution may be made from the precipitated caseine, which should be well washed with water, thoroughly drained, rewashed in three or four separate quantities of methylated alcohol, and lastly in a small quantity of methylated ether. In the last it should be allowed to remain for some time, the object being to remove all traces of fat, and it should then be pressed between folds of linen or blotting paper. It is then redissolved in water with the aid of a small quantity of alkali. Ammonia is, perhaps, the best to use, as the excess evaporates on drying, and the salted paper then contains no foreign matter; but where a carbonate is employed in the salting, or is not objectionable, carbonate of soda may be used to dissolve the caseine. This forms a more powerfully organic bath, similar in its reactions with silver to albumen.

The nitro-glucose method, though yielding perhaps the most beautiful results, is more troublesome in its details, but for the benefit of those who are willing to undertake the extra trouble we will give the details of the process.

Nitro-glucose may, we believe, be obtained commercially, though at the price of several shillings an ounce. Messrs. Hopkin & Williams used to keep it. It is made by treating powdered white sugar with a mixture of nitric and sulphuric acids, though the conditions necessary to success differ entirely from those that prevail in the manufacture of pyroxyline, and must be observed with the utmost rigour. These are chiefly as low a temperature as possible, and acids of the very highest strength; any departure from these, especially the latter, will ensure failure.

The details of the manufacture are as follows:—Take one ounce of best white sugar and reduce it to the finest powder; see that it is perfectly dry, to ensure which condition, place it for some time in a warm—not hot—oven. Take one ounce and a half, by weight, of the strongest sulphuric acid procurable, and an equal quantity of monohydrated nitric acid (sp. gr. 1·5), and mix them in a suitable vessel and allow the mixture to cool. Even this apparently simple operation requires care or rather thought, as if the mixture be made in an open vessel, a large quantity of moisture will be absorbed during the cooling process and the acids will be too weak. On the other hand, if the mixture be made in an ordinary stoppered bottle, the heat developed will inevitably crack it with dire results to the thoughtless operator. The only method is to use a thin glass flask, which should be immersed in cold water to hasten the cooling, its mouth being closed with a cork.

When quite cold, if possible not higher than 50° Fahr., pour the acid into a capacious basin, and sprinkle in, in small quantities, the powdered and dried sugar, stirring well with a glass rod. This should be added as quickly as possible, but without throwing in too much at once, which would raise the temperature too suddenly and cause failure. The sugar dissolves almost instantly, and the solution should remain colourless, or nearly so. If a strong yellow tinge begins to appear, something is wrong; either the acids are not strong enough, or the sugar has been added too hurriedly, and when this occurs it is next to impossible to avoid the early conversion of the basin and its contents into a temporary volcano. The sugar becomes carbonised, and dense volumes of nitrous fumes are given off, for which reason it is always wise to perform this operation out of doors.

When all goes well, however, the sugar dissolves quietly, and with very little change of colour. The stirring is continued, and in the course of two or three minutes minute white flocks commence to form in the liquid, and gradually increase, both in size and number, until at last they cohere, and the end of the rod becomes coated with a rapidly increasing glutinous mass. In five or six minutes this will cease to grow larger and the operation is complete. Remove the rod to a large tub of cold water, and there remove all excess of acid. The nitro-glucose will now be found to consist of a silky, white substance, like porcelain, hard and with a metallic sound when cold, but becoming soft and plastic when warm. To free it from the large excess of acid is the next operation, and this entails laborious kneading in lukewarm water. It is, however, next to impossible to thoroughly remove the acid, for the substance decomposes so rapidly that if free one moment it is highly acid the next. It may be dissolved in alcohol, neutralised with ammonia, and reprecipitated with water, and the kneading resumed to remove the ammonia salts, and then preserved under water, as it rapidly decomposes if not so protected. Or it may be at once dissolved in alcohol, or a mixture of alcohol and ether, in which state, though it undergoes a rapid and peculiar change at first, it appears to keep without further alteration for years. We have a sample that has been in solution for upwards of fifteen years. The method of applying this organifier will be given later on.

The variation in the salting materials is no less important than the choice of organifiers, where the question of tone is of importance; we shall therefore, in a final chapter, say a few words on the effect produced by different salts, and also give a few formulæ which have been proved by experience to work well in our own as well as other hands.

FURTHER APPLICATIONS OF CELLULOID FOR COMBINATION NEGATIVES.

In an article recently we alluded to some of the advantages that might be gained by using celluloid films in the field, and combining two or more negatives for the purpose of securing a

larger picture than could be obtained in a single one. In the present article we shall point out some other directions in which celluloid films may prove of value, particularly in connexion with portraiture in the studio. With reference to the use of films in the studio we may at once say that we do not think the most enthusiastic advocate of film photography imagines that any kind of film yet introduced will supplant glass for general work—at least, for some time to come. Still, as we shall presently show, it may be advantageous, even at the present time, to have a supply of celluloid films at hand for use on special occasions. Let us give an example.

A photographer has to take a group of five or six persons, some of them, perhaps, young children. At one time a single negative, if the artist deemed it satisfactory, was all that was taken. Of late years, however, there has been a growing tendency—and not perhaps a profitable one—to take three, four, or more negatives and submit proofs, if not of all, at least of several of them to the customer. And with what result? Usually it is that certain figures in one picture are approved of, while, on account of the expression, others are not, and so with each of the other negatives. Consequently a resitting often has to be given, and further proofs submitted, with, too often, a similar result to the first.

It is seldom that the expressions on the whole of the faces in a group are entirely satisfactory, and it follows, as a matter of course, that the more figures which are included in it the greater are the chances of this being the case. Now, if the artist had the means of removing the figures that were unsatisfactory in one negative and substituting those that were not so from another, resitting would often be averted, and expense and trouble saved, while in the end a more pleasing picture would be obtained. It is in such cases as this that celluloid films will prove useful.

Supposing the artist has to take a group, say, of half a dozen persons. He could take the negatives on celluloid quite as well as upon glass; and if there was not much variation in the pose, or if they were taken in duplicate, then if all the portraits in one picture are not approved of when the proofs are shown, it is very easy to take out the unsatisfactory ones and replace them with the more pleasing ones from the other negatives. Not only can this be done, but a resitting can be given to a single figure, and that portrait introduced in place of the faulty one. Indeed, with celluloid negatives a figure can at any time be added of a person who was not present when the group was taken in the first instance.

The method of combining the negatives is the same as that described in the previous article—namely, by superimposing the one negative on the other, and then cutting through both films with a sharp penknife. It may, however, be well to point out that it is always advisable, when possible, to make the junctions through portions of the drapery or the background rather than at the outlines of the figures.

Celluloid films will frequently prove a great advantage for outdoor groups. Apart from the convenience with which an objectionable portrait in one negative can be exchanged for another from a different one, it often happens that a group has to be taken with a background that requires a different exposure from that for the figures: for example, a wedding party or team of cricketers in light costume against a background of dark foliage. Here we have the opportunity of taking one or more negatives, giving the exposure best suited for the figures, and afterwards taking another in which the exposure is timed entirely for the background. Negatives thus taken are readily combined, and a harmonious whole secured; whereas, if only a single negative is depended upon, under the above conditions, unless exceptional skill is exercised in the exposure and development, either the background proves too heavy and lacks detail, or the figures are too light or chalky.

It is scarcely necessary to remind our readers when taking group negatives, which may afterwards have to be combined, that neither the lighting nor the position of the camera should be altered between the taking of the different pictures, or that the same exposure should always be given; otherwise an incongruous result will necessarily obtain.

Here is another direction in which celluloid films may prove of utility. In photographing the interior of a cathedral or church, for instance, the exposure necessary for one portion of the building, say the stalls or pews in the foreground, is generally widely different from that required for another, such as the chancel and windows. But one negative can be taken, exposing for the foreground, another with the exposure timed for the chancel, and even a third for the windows. Then, with judgment, the different negatives can be combined to form one harmonious picture.

The celluloid films now in the market are, for the most part, to be relied upon, and they certainly are an additional power in the hands of photographers for the purposes indicated, if used with discretion.

From a letter we recently received from Mr. G. M. Whipple, Superintendent of the Kew Observatory, he says that the Committee have for some years past had under consideration the establishment of a photographic lens-testing department, but until recently have not found themselves in a position to entertain the matter. He adds that at their last meeting it was suggested that the Lens Standard Committee of the Photographic Convention should be communicated with in order to their co-operation, but unfortunately they were misinformed as to the date of the Convention's meeting, and the letter was sent too late for this year's action; therefore the matter is in abeyance. Mr. Whipple, in the meantime, asks our co-operation in assisting. He has favoured us with a brief outline of the proposed line of action, although not for publication. No doubt when Mr. Whipple and the Committee have consulted with practical men, such as those composing the Convention, material alterations of and additions to their proposed scheme will be made.

On another page will be found the report of the Executive Committee appointed by the Photographic Section of the Chamber of Commerce to carry out the exhibition at Drapers' Hall. In addition to what there appears, we are favoured with some further details by Mr. Bird, the Chairman of that Committee. It had been intended that should there be sufficient surplus of receipts as against expenditure, such should be divided among the exhibitors. Now, although there *was* an overplus, and it is most creditable to the Executive that there was, it was only of a small amount, viz., 2*l.* 12*s.* 5*d.*, which, if divided among the exhibitors, would have amounted only to twopence in the pound. They therefore very generously decided to hand this amount over to the Photographers' Benevolent Association, feeling assured that by so doing this step would meet the warmest approval of every one. The preliminary expenses of printing, stationery, postage, and the services of an Assistant Secretary, amounted to 68*l.*; those consequent upon the *soirée*, including music and refreshments, came to 104*l.*; while the screens on which to hang pictures, the services of a gentleman to superintend the hanging, together with advertising in the daily papers, slightly exceeded 140*l.* We consider that much credit devolves upon the Committee for the excellent way in which everything was done, and can easily see with what readiness and pleasure the Section passed the accounts and tendered their thanks

to the Drapers' Company, and to their Beadle and other servants, for the great courtesy with which they received the Section and assisted in promoting the success of the exhibition.

To those interested in the photographing of lightning flashes, a subject which of late years has attained considerable importance, a suggestion which appeared on page 197 of the current volume of *Nature* will possess very great interest. It is, in fact, founded on an acknowledgment of the same principle that is utilised in pinhole photography. If a photograph could be obtained of the lightning flash theoretically supposed possible, it would be of great value, and would certainly be "acknowledged with thanks," it might be expected, by painter artists. The lightning photographs hitherto produced have shown a very different appearance from that usually depicted by artists, the latter usually being "forked," as it is termed, and the former more like the underground ramifications of a plant. The suggestion we refer to is over the signature of Eric Stuart Bruce, and is contained in the following sentence, which we extract from his letter, and quote verbatim:—"It is fairly well recognised that sheet lightning is the reflection of a flash upon a cloud, for example; but if there happens to be the presence of a cloud with a small opening in it somewhere between the actual flash and the distant surface of clouds, then, instead of 'sheet' lightning appearing on the latter, there will be projection lightning—that is, the image of the flash, whose shape will depend upon the shape of the cloud upon which it is cast."

We call attention to a notice issued by Professor Pickering, of Harvard College, regarding the establishment of a fund in aid of astronomical research. Miss C. W. Bruce is the donor, and in sums of not over five hundred dollars the money will be allotted. As there is no restriction whatever likely to limit the usefulness of the gift, it is obvious that photography as applied to astronomy may form an important branch of the aid to research offered.

Mr. Feil, the manufacturer of the huge discs of glass for the Lick telescope, has made those for the lenses of the Pulkova Observatory, but unfortunately they are not considered available for photography owing to the construction adopted. There is a curious defect in the flint glass which, with bright stars, introduces streams of false light. The defect is a minor example of the difficulties met with in making these large discs of glass; it consists of a number of air bubbles collected near the centre of the lens, a quarter of an inch from the surface, and forming congeries an inch and a half long by an eighth broad. It appears to us that instead of submitting to the occasional ill effect described, the lens might be made practically perfect by grinding the surface of the glass away till the bubbles were reached, and then filling up the cavity produced with black pigment, or indeed merely varnishing it with asphalt. The diminution in the intensity of the light would not be perceptible, and it is not very probable that any "strain" would be produced in the glass itself.

The use of chlorate of potash is happily becoming more infrequent every winter, compressed oxygen having almost superseded the home-made article from the chlorate. We say happily, for so many deplorable accidents and loss of human lives have occurred through the careless or ignorant use of oxygen retorts and chlorate of potash. The danger of the manufacture of gas from this salt is, strangely enough, not even known by many who have employed it. Perhaps the most singular accident ever chronicled was one that occurred lately at Messrs. Muspratt's works at Flint. A workman engaged in this department had his clothes perfectly saturated with the salt, and not knowing or thinking of this or its danger, he struck a match to light his pipe by rubbing it in the usual manner against his "corduroys." The moment the match ignited, it fired the clothes, and the unfortunate man was soon enveloped with fire. A man promptly threw him in a pool of water, but the burns were so severe that his life was despaired of.

Many of our readers will have noticed at the time of the Postage Jubilee Exhibition the wonderful achievements of the "Electrophonoscope," an instrument by which, in an imperfect manner, the speech and the very lineaments of the features of a distant person were transmitted by electricity and brought before the observers. Two or three only could be permitted at one time to see the demonstration of this marvellous invention. The real truth of the matter is not generally known. The phenomena were not genuine science, but a bit of "hanky-panky" work, nothing, in fact, but clever fooling and conjuring. Photography, by the uninitiated, was supposed to form an important stage in the process.

THE STAINING AND CLEARING OF GELATINE FILMS.

[A Communication to the Photographic Society of Great Britain.]

The use of clearing solutions as usually recommended has led me so often to doubt their efficacy, that I determined to make a few experiments on the subject. The developing reagents investigated are the four in common use—namely, pyrogallic acid, eikonogen, hydroquinone, and ferrous oxalate.

In order to get suitable solutions for producing stains with, and to see whether the depth of the darkening of the developer may be taken as a guide to its staining power, three solutions each of pyrogallic acid, hydroquinone, and eikonogen were prepared containing ten grains of the substance to the ounce, the first with no addition, the second with an equal weight of caustic soda, and the third containing twenty grains to the ounce of sodium sulphite as well as the caustic soda. A rapid current of air was pumped through each of these for two hours, and the solutions were bottled. After a few days the plain pyrogallic acid was amber-coloured, the plain hydroquinone was sherry-coloured, the hydroquinone with soda and sulphite was a rich reddish brown, and the rest were black because of opacity. To observe further changes a part of each was diluted to a hundred times its bulk with water, and the order of the depths of the tints was approximately as follows:—

1. Pyrogallic acid	Colourless.
2. Hydroquinone	"
3. Hydroquinone, soda, and sulphite	Sherry red.
4. Eikonogen, soda, and sulphite....	Pinkish brown.
5. Hydroquinone and soda	Reddish brown.
6. Pyrogallic acid and soda	Brownish yellow.
7. Pyrogallic, acid, soda, and sulphite	" "
8. Eikonogen and soda.....	Greenish brown.
9. Eikonogen	Dark brownish red.

After four days' exposure to the air in vessels lightly covered, the colour changes appeared to have ceased, as exposure for three days more had no visible effect. The pyrogallic acid solutions behaved exceptionally throughout. The plain pyrogallic acid darkened so rapidly as compared with the others that it became the fifth instead of the first in the order of darkness, while the pyro and soda, and the pyro, soda, and sulphite, at first the sixth and seventh, continued darkening so slowly that they became the second and third. After the very early stages of darkening, the sulphite appears to make very little difference in the pyrogallic acid and eikonogen solutions, but with hydroquinone it retains throughout a very strong influence in preventing colouration. There was practically no deposit in any case, but the sealed-up specimens showed deposits after three months in those numbered 1, 2, 3, 5, and 7. This non-appearance of turbidity was surprising. To discover the possible cause of the muddiness that so often appears when a developer is kept rather long in the dish, I passed a rapid current of carbonic acid through a diluted part of each solution for thirty to forty minutes, still no turbidity was produced. The only apparent effect of the carbonic acid was to reduce the depth of colour in the pyrogallic acid and eikonogen solutions containing the alkali both with and without the sulphite. A small quantity of each was then allowed to dry up spontaneously, and the residue in every case dissolved completely on adding water to it. A solution containing ten grains of pyrogallic acid and ten minims of concentrated ammonia to the ounce was aerated and treated as described above; but although a small amount of insoluble matter appeared to separate, the quantity was quite insufficient to account for the well-known muddiness produced during development. But by diluting some of this solution to three times its bulk, a well-marked turbidity was produced on exposure, and when further diluted to about ten times, the turbidity was fairly copious, and accompanied by a scum. A similarly diluted solution containing soda instead of ammonia gave neither turbidity nor scum on exposure to the air, and it was found that caustic soda had a more marked solvent effect than ammonia upon the dark substance that precipitates when a pyrogallic acid solution gets turbid by oxidation. No difference could be detected when tap-water was used instead of distilled.

To get an approximate idea of the staining power of the prepared solutions, and also whether they would have any effect upon the silver that forms the image in an ordinary negative, a plate was developed until a thin uniform deposit was obtained, and then fixed and well washed. Parts of the plate were allowed to remain for thirty-five minutes in the solutions mixed with an equal bulk of water, and then washed for about an hour. A ferrous-oxalate developer was prepared, and aerated and tested with the others. A part of each stained plate was soaked for fifteen minutes in sodium hyposulphite of usual strength and washed. There appears to be no reason to suppose that the oxidised solutions affect the silver, or that the sodium hyposulphite increases the stain. Those parts that have been immersed in the fixing bath are a little lighter than the others, but this is accounted for by the extra washing they have received.

The plates used in the subsequent experiments were gelatino-bromide plates with the silver salt removed by sodium hyposulphite. One experiment indicates that the staining power is approximately proportional to the strength of the solution and the time for which it acts, if the washing is thorough, in those cases where any staining takes place.

To test the efficacy of clearing solutions, a plate was cut into three strips, which were partly immersed in the full strength of pyrogallic acid, hydroquinone, and eikonogen solutions respectively, containing soda and sodium sulphite. The limits of the solutions on the gelatine films were slightly altered from time to time, to imitate the conditions when development takes place with an insufficiency of liquid. The strips were then thoroughly washed, and to be sure that the washing was thorough, a part of each was further washed for a whole day, but without producing any visible change. The eikonogen left no stain whatever; the pyrogallic acid left a slight, even stain, with no darkening at the place where the solution extended to; and the hydroquinone left a well-marked stain, darkening very considerably at what had been the limit of the solution. The eikonogen strip was not further experimented with. Parts of the other two were treated with various clearing reagents for twenty minutes each with subsequent washing, but in no case was there any reduction of the stain. The solutions used were a saturated solution of common alum, the same with one per cent. by volume of concentrated hydrochloric acid, and the alum solution mixed with an equal bulk of a saturated solution of sulphurous acid. I thought that this was a sufficient variety, but as much has been claimed for ferrous sulphate in this connexion, I afterwards took parts of the plate and soaked them for twenty minutes in a mixture of equal volumes of saturated solutions of alum and ferrous sulphate, in which citric acid had been dissolved in the proportion of one ounce by weight to ten measured ounces of the mixture. This, so far from reducing the stain, made it more pronounced by giving it a blacker tint.

Thus it appeared that clearing solutions, so-called, do not affect stains that plain water will not remove, but it was possible that they might be useful in quickening their removal. In order to test this, strips of a fixed-out and well-washed plate were soaked equally in the pyrogallic acid, hydroquinone, and eikonogen solutions, each containing soda and sulphite, and one in the pyrogallic acid and ammonia, the strong solutions being diluted to four times their bulk. The strips were washed for one hour with frequent changes of water, the only variation in the washings being that after the loosely adhering coloured solutions were removed, instead of putting water upon all the pieces of the strips, water was put upon a piece of each, a saturated alum solution upon another piece, the same with one per cent. by volume of strong hydrochloric acid upon the third piece, and the same saturated with sulphurous acid gas upon the fourth piece of each strip, and after five minutes the washing with water was continued. The plain alum in every case retarded the removal of the stain, perhaps by acting the part of a mordant to it, or perhaps merely by making the gelatine film less penetrable. The alum and hydrochloric acid, and alum and sulphurous acid, showed a little advantage with the pyrogallic acid and ammonia and the hydroquinone stains, but this advantage is more apparent than real, for dilute alkali at once restored the full depth of colour, showing that these solutions had not removed more of the stain than plain water. With the stain produced by pyrogallic acid with soda and sulphite, the acids used appear to prevent the alum from exercising its retarding influence. The eikonogen stain rapidly disappeared in the alum and sulphurous acid, but the real effect of the solution was to fix the staining matter, only temporarily decolourising it. Before the film was dry it had turned red. Alum fixes the stain of eikonogen remarkably, and in the presence of acids turns it red. Dilute alkali allows the red stain to be easily washed out.

As I had uniformly failed to get any stain with eikonogen that plain water would not remove, I coated strips partly with various eikonogen solutions, allowed them to dry up, then well wetted the parts, and again allowed them to dry spontaneously. The solutions used were the three strong solutions above described, containing eikonogen alone, with soda, and with soda and sulphite respectively, and two developers of five per cent. strength, one with caustic potash after Warnerke's formula, and one with sodium carbonate after my own formula. After washing, there is no stain at all on three of the strips; Warnerke's developer has left a very slight stain, and the plain eikonogen a rather deeper colour, but I have no doubt that a few hours' more washing would remove all trace of the first, and probably a day's further washing would clear away the other.

These experiments are not exhaustive, but I believe they are typical, and their teachings bear out in a much more conclusive way than was anticipated the observations made during practical negative making. In drawing the following conclusions, I do not wish them to be understood as universally applicable, but rather as probably the safest guides that one can accept:—

1. That of the solutions examined—namely, pyrogallic acid with soda and with ammonia, hydroquinone, eikonogen, and ferrous oxalate, with the variations of them stated—eikonogen is the only reagent that never leaves a stain after washing.
2. That hydroquinone gives the darkest and most uneven stains.
3. That hydroquinone is remarkably active in causing frilling.
4. That the best stain remover is simple water, alum being positively detrimental, and the slight apparent gain given by acids of an uncertain character; and that the efficacy of clearing solutions is often if not generally due to the additional washing that the negative must perforce receive.
5. That the staining power of different reagents is not proportional to the darkness of their solutions.
6. That a stain able to resist simple water will also be unaffected by clearing solutions.
7. That clearing solutions do not quicken the removal of stains, though acids may temporarily lighten the colour of that part of the staining matter that is soluble in water, and therefore can be washed away by simple water.

H. Chapman Jones, F.I.C., F.C.S.

ON THE NATURE OF THE INVISIBLE IMAGE.

I.

In all speculations regarding the invisible or developable image, its composition, and the forces which directly produce it, any line of reasoning which, without sufficient cause, attempts to ignore or cast doubt on well-established facts which militate against the acceptance of the hypotheses advocated must necessarily do little to convince those who are most conversant with the numerous and intricate problems which the study of photography in all its branches presents for solution and reconciliation.

Before calling the reader's attention to the results of certain experiments recently performed by the writer, which tend to show that "under-exposures" may be so treated as to yield abundance of detail, even in the deepest shadows, it will be as well to specify briefly the beliefs upon which they were founded, and the points upon which they were expected to throw light.

Belief No. 1.

Certain haloid salts of silver, under certain conditions, darken when exposed to light.

Belief No. 2.

This discolouration is accompanied by the liberation of a part or the whole of the halogen.

Belief No. 3.

The ultimate product of this reduction is metallic silver.

Scheele, Draper, Guthrie, Davanne, and Girard have so riveted these links together that no serious attempt has ever been made to tear them asunder in so far as they apply to the production of the visible image, although Abney has inferentially doubted that metal results, and Bothamley that halogen is liberated.

Llewelyn, Hardwich, Maskelyne, and Hadow in their "Report" (The British Journal of Photography, August 15, 1860), which, perhaps, did more to popularise the "sub-salt" hypothesis than any other paper, say:—

"Is the result a sub-chloride of silver? or are the chlorine and the silver completely dissevered, the gaseous elements going away, and the metal remaining mixed with, or rather encrusting, particles of unaltered chloride? Certainly, the weight of authority is in favour of the latter view."

Belief No. 4.

Either the initial stage partakes of the nature of the final action, or it does not.

Point No. 1.

The idea that the essential products both in the invisible and visible "image" are the same is at once logical, scientific, and simple; and all the objections which can be urged against "allotropic silver" are at least equally applicable to any other explanation.

Let us, for instance, take this "allotropic silver" along with, say, "sub-chloride of silver," and see if there is no parallel.

Analysis has given silver in the print, analogy has suggested the same element as essential to development. Let us grant, for the time being, that analysis has proved the existence of sub-chloride of silver, and analogy has suggested the same compound as essential to the formation of the developable nucleus.

Carey Lea has recently introduced, not merely several forms of sub-salts, but several forms of silver to our notice. To which, then, are we to give the preference? Are the chemical tests conclusive? Scarcely, we think. The tests of silver are, among others, that it shall dissolve in dilute nitric acid, that it shall not dissolve in "hyposulphite," and that in contact with a halogen it shall form a haloid salt, white or yellow.

An invisible or feeble "image" is generally removed or weakened by dilute nitric acid, it is "split up" by "hypo" ammonia and by several soluble haloid salts into the same well-known mixture of normal salt which dissolves and an element which does not; and an exposed but undeveloped Daguerreotype exposed to coloured light (red, orange, or yellow), or to the gaseous fumes of iodine, recovers its virgin sensitiveness. Frankland refused to accept the chemical (elementary or compound) theory in the following words:—

"Much variety of opinion has been expressed respecting the nature of the change occurring in the first stage, some regarding it as an actual or an incipient chemical change, others as a purely molecular one. I think the balance of evidence is entirely in favour of the latter view, for if the change were a chemical one it must be attended by the separation of iodine, bromine, or chlorine from the silver with which they were previously combined; all these elements are very volatile, and they must consequently either combine with the organic matters present on the sensitive surface, or evaporate in the surrounding atmosphere; in either case it would be obviously impossible to recombine these elements with the silver; but M. Claudet and M. Becquerel have proved that after the first stage has been induced by the action of white light, a subsequent exposure to red, orange, or yellow light restores the surface to its original state; this fact I think perfectly inexplicable on the supposition that the chemical combination of the silver with iodine, bromine, or chlorine is broken up, either totally or partially, by the first action of light."

In the same article he acknowledges also that his assistant, Dr. Guthrie, has proved that the final product of insolation is metallic silver, and, deny it who will, the liberation of the halogen is a fact beyond all reasonable doubt.

We can tell an exposed from an unexposed plate in the dark by simply breathing on or moistening the surface and smelling it; the smell of bromine is familiar to all emulsion makers when a spoiled batch is exposed to the light. A film exposed to sunlight for a week under a negative will smell of bromine for hours afterwards, and only a trifle stronger than the negative and printing frame; and a sealed tube containing emulsion and silver foil will, when exposed to the light, show that the salt has darkened in colour, that the foil has taken a coating of salt, and if the tube be broken quickly after removing it from the light the smell of bromine will be very apparent.

The experiment of Claudet and Becquerel might not succeed so well on a film of bromide of silver exposed for a "reversal" for from two to three weeks.

Moser's images also—if they prove anything at all directly connected with photography, showing as they do that polished normal silver becomes "allotropic" and capable of forming a developable image in the dark without contact with the impressing body, behaving in this respect in a similar manner to the silver salt itself—lead us not to the conclusion that the latent image is essentially chemical in origin and sub-salt in nature, but rather suggest the thought that even when the "latent image" is produced *in* light it need not be *by* light.

In short, at this moment, after the lapse of 113 years, we have no proof that the invisible and visible, the developable and printed-out images, are of the same nature, or are due to the same cause. If, however, we were to grant that they are, the simplest explanation might be found in the simplest manner.

Hugh Brebner.

THE PRESERVATION OF SENSITIVE CELLULOID FLEXIBLE PLATES.

[A Communication to the Société Français.]

It is recognised that this new substance destined to replace glass, and give a light support, flexible and completely transparent, is about to obtain an important position in photography.

Although spoken of many years ago by M. Fortier, it has only been manufactured commercially for a little more than a year, chiefly in America and England. It has not then been possible as yet to test its qualities of keeping. It will be interesting, we think, to give the result of an experiment which we made with the object of elucidating this question.

In the month of December, 1888, thanks to the kindness of M. Franck La Manna, of the Photographic Academy of Brooklyn, we received a packet of preparations with celluloid of American origin, and called ivory film.

These preparations were tested comparatively with Lumière plates (blue label), recognised as excellent for quality and rapidity.

Then the rest of the plates were stored away in our laboratory at Salpêtrière until February 7 of the present year. These preparations thus remained nearly fourteen months in a place rather humid, and in the vicinity of a chemical laboratory where acid vapours are prevalent. The conditions of the experiment were absolutely unfavourable. We had, however, made it intentionally.

Then we made the exposure under the same conditions as in December, 1888. We made use of a hand apparatus of M. Dessoudeix, making an instantaneous *cliché* at speed II. of the shutter. It was a dark day, at 2.30 p.m. (In the first, made in the month of December, we took the speed I.; for the second, the season being more advanced, we took a greater speed, in order to place ourselves in almost identical conditions).

In the development, which was made in presence of the Marquis de la Ferronays and M. Q. Rolland, the plate came normally, giving us as satisfactory proofs as possible under the conditions of the experiment. The plate was not changed in any way, nor did the rapidity seem diminished.

From this first experiment we may then conclude that celluloid, as the support of the sensitive coating, seems to have very genuine qualities of conservation.

It would, however, be well, in our opinion, to make new experiments on the various commercial preparations. In effect, the composition of the divers celluloids varying somewhat, the duration of conservation might probably be modified in certain preparations.

Albert Londe.

EXHIBITION AT DRAPERS' HALL.

Photographic Section.—June, 1890.

Report of Executive Committee.

The Executive Committee appointed by the Section to organize the exhibition promptly commenced its duties by issuing a circular to the trade, and efficiently assisted by the Secretary of the Chamber carried it through with a fair measure of success in the manner you have witnessed.

There were seventy exhibitors, eleven hailing from the provinces, and fifty-nine representing the Metropolis. A large and interesting display of apparatus was made, and a representative collection of photographs and processes of printing gathered together at Drapers' Hall, every available foot of space in the noble suite of rooms lent to us being occupied. The *soirée* was numerously and influentially attended, and in its arrangements a success. The visitors to the exhibition were mostly city men and their friends, the numbers averaging about 1200 a-day for the ten days it was open. Many of the visitors took quite a practical interest in the apparatus, and showed a lively appreciation of the photographs displayed. Some amount of business issued directly from the exhibition your Committee knows, and considered commercially one may safely say that the trades represented enjoyed a peculiarly efficacious advertisement at a moderate cost.

The statement of receipts and expenditure now submitted witness to a small balance in hand. The Treasurer of your Committee availed himself of the convenience of passing receipts and expenses direct through the Chamber, which received 840*l.* 6*s.* 6*d.*, and paid away 832*l.* 18*s.* 7*d.*, handing to him a balance of 7*l.* 7*s.* 11*d.* This balance became increased to 8*l.* 8*s.* 5*d.*, from which 5*l.* 16*s.* was refunded to exhibitors who had paid for more space than the Committee were able to allot, leaving a net surplus of 2*l.* 12*s.* 5*d.*, the disposal of which you will determine. Of the total receipts the sum of 18*l.* 17*s.* 6*d.* was contributed by the Chamber, which levied a small tax on its members outside the Photographic Section in the shape of a charge on tickets for the *soirée*. On the whole conduct of the exhibition your Committee has had the benefit of the knowledge, experience, and influence of the Chamber.

(Signed) W. S. Bird (*Chairman of Ex-Committee*).
Thomas P. Watson.
Frank Bishop.

A TOUR IN ICELAND.

While sitting in the Liverpool Photographic Club Room enjoying an afternoon weed, my eye fell on an advertisement which attracted my attention. It was to the effect that the steam yacht *Myrtle* would sail for Iceland almost immediately with some thirty passengers for a pleasure cruise. Yes! I felt I must go; something seemed to say—"Look sharp, not a moment is to be lost." It was in vain that I argued with myself that I could not ride and positively hated horses, I felt compelled to go. At length my inner man gave in, and in less than no time everything was provided that could be wanted for the journey. I soon found out that I was not to be the only photographer on the expedition, for the President himself of a well-known society appeared on the list with three more companions of the camera as his special friends. In fact, we found that the President proposed to boss the whole show, and as such a position usually involves some trouble, we willingly handed over to him the management of affairs. As a party, our hopes and prospects of a rare time of it in the yacht received a severe shock at the start when we were informed that after all the *Myrtle* could not go, and that our only chance of reaching Iceland was by the mail steamer from Leith. What could a party of nine energetic men do under the circumstances? to retreat, impossible! "Onward" was our watchword, and to Leith we departed, making the best of our disappointment over the loss of the yacht. The mail steamer *Magnetic* was by no means inviting at first sight, dirt and mess of all sorts to be seen everywhere, which, coupled with a nasty wind, gave promise of every possible discomfort on the voyage. Whether the sound of the wind or the dirt on the steamer did it I cannot say, but one of our party was so overcome just before starting that he relanded his luggage and left us to continue the journey without him. We left Leith on a stormy afternoon, and in a short time after starting most of us were quite prepared to hand over all available cash if it could secure an immediate return to dry land.

I must here refer again to the *Myrtle*, and explain some of the details connected with the origin of the expedition. An Icelander, by name Mr. Thordahl, conceived the idea of chartering a first-class yacht and personally conducting parties of tourists through Iceland. Unfortunately, his name being unknown, and having no experience in handling the British public, his scheme fell flat, and instead of a party of some thirty people only nine responded to the invitation. This naturally meant a heavy loss over the charter of the yacht, and in trying to come to more favourable terms with the owners the charter fell through altogether. Mr Thordahl, however, promised us, that though affairs in England would not go straight, if we would proceed per *Magnetic* he would guarantee success in Iceland, and, as mentioned above, it was resolved to follow Mr. Thordahl to his native home, taking him at his word.

The voyage to Iceland was much the same as any other, and the first sight of the ice mountains caused the usual excitement. After nearing the mainland we approached the Westmann Islands, a curious collection of volcanic rocks which appear to have been shot up in a hurry, and though offering a home for a small population of 150 men and women, are chiefly noticeable for the innumerable quantity of sea birds which appear from every corner of the rocks on firing a shot. Here photography began, and the President, with his hand camera, commenced a smart attack on all within range, while another of our party, Dr. R., armed with a whole-plate camera, in the bows of the steamer, occasionally fired a carefully aimed shot. The captain of the steamer proved most obliging, going out of his way several times to give us a shot at a passing fishing schooner, even slowing the engines until the well-known voice of the President shouted, "All right; I have got it." (N.B.—We decided to leave all the shooting to the President, as he had an exceptionally powerful voice, and was always glad to use it.) A few hours' steaming left the Westmann Islands far behind, and we were not long in reaching Reykjavik, where we had the pleasure of seeing the sun set over the great Snaefells Jokul at about 11.30 p.m. We had already forgotten that there was such a thing as night, for though the midnight sun was not to be expected, there was a very short period between sunset and sunrise.

Our stay at Reykjavik was somewhat long, as our large party naturally required a great number of ponies which had to be collected from the neighbouring farms; consequently we had plenty of time for photographing, and taking a preliminary ride just to accustom ourselves to the saddle. The town itself has no pretensions to beauty, all the houses being built of wood, and painted according to the simplest rules of architecture. On landing we proceeded to the "Hotel Iceland," where a fine billiard room was found, to our surprise, and signs of civilisation which had fair for comfort after the miserable time we had gone through on the *Magnetic*, where coal dust was served regularly as a sauce for every dish—the bread was fairly buttered with it, and beer and whiskey were the only refreshments which were free from it.

So far the climate was all that could be desired, and though clouds now and then covered the sky they rapidly cleared off, and after a stay of two days we had all in readiness for the start. But who is he who now stops the way? Why, our old friend the policeman, who politely reminds us that it is Sunday, and that we must not start earlier than 3 p.m., or else pay a fine for breaking Sunday regulations. We managed to get the pack ponies off, however, early in the morning, and waited patiently till the man in blue gave us permission to depart. Accordingly at 3.30 p.m. the army mounted and set off at a rapid pace for Krisuvik. After a few miles the road ended, and our track took us over miles of lava beds of the wildest description. The appearance of the lava was exactly like granulated zinc on a giant scale, and many were the expressions of disappointment that all the cameras had been sent on ahead, the guides having clearly stated that we should find nothing on the way to photograph. A halt was made about half way for refreshments by a mountain torrent, and before going further we inspected the first curiosity of the island, for to our surprise, at a short distance from where we were seated, the whole river disappeared into an earthquake crack in the ground, and no further trace of it has ever been discovered. (The guide gave the name of the river as Kalda.) We were getting mad about those cameras, and determined to follow the pack ponies with all speed. Several hours climbing steep mountain sides and scrambling down others brought us in view of our baggage, which we caught sight of among clouds of steam, clearly indicating that we were near the boiling sulphur springs, and the end of our first day's march. We had come some twenty-nine miles over the worst ground we were likely to ride over, and were very thankful when our tents were pitched and dinner ready, time 11 p.m. A short walk round the springs, the sulphurous steam from which almost choked us, and then to bed, where we slept the sleep of the weary, if not of the just. Early next morning we were up betimes, and under a broiling sun sought out a pleasantly warm stream for a bathe. How we enjoyed that bath! packed like sardines in a narrow pool, till one ventured too near the boiling source, and retired with a yell of pain. Breakfast, and then for photography. The long and pale face of the President showed something wrong, and the sight of his hand camera was woeful. The lens having got loose had practically smashed everything inside, and each one of us turned with fear and trembling to examine our own apparatus. All right was the joyful discovery, and a couple of hours with a pocket case of tools and sheets of tin cut from our meat tins once more saw the hand camera in shape for work. Meantime a heavy shower drove us into the tents, where we were confined for a couple of hours or so, with the exception of our artist, Mr. K., who, clad in mackintosh and sou'wester, painted away in oil colours quite regardless of the inconvenience to which we of the camera were put.

While smoking in the tent with our guides we for the first time learned of the magnitude of the expedition, which stood as follows:—61 ponies, 7 guides, 25 packing cases, 3 tents, and 8 of our own party. Our head guide, Thorigmur Gudmunsen, proved a most excellent companion, being a schoolmaster at Reykjavik, a good English speaker, and, having travelled in England and on the Continent, had very good ideas of our requirements.

As soon as the rain passed over we tackled the spot from all sides: one went for the camp and another for individual subjects, but before long all the battery of cameras were concentrated on the boiling springs, where, regardless of the possible, if not probable, effects the sulphurous steam would have on dry plates, shot after shot was taken from various points, not forgetting a view of one of our guides boiling the camp kettle over a spouting rush of boiling water. The ground in the neighbourhood is a perfect curiosity in the way of colour, varying from pure yellow sulphur to the deepest red powder, which our artist plainly admitted he could not match with his paint box. The strongest spring threw up water about one to two feet high from the violence of the boil, but the most interesting by far was the blue-mud cauldron—a hole in the ground about four feet deep to the surface of blue mud, which boiled slowly, emitting clouds of steam as each huge bubble slowly burst on the surface. I tried a shot at it, but have little hopes of reproducing the faintest idea of the horrible pit.

About mid-day, having photographed everything of interest, we struck camp and, having sent the baggage on ahead, rode a few miles to the sea coast to see the show of sea birds. I cannot refrain from mentioning that the President was the only one who knew where we were going, and quite omitted to tell the others to take their cameras, consequently he was somewhat abused, both by the photographers and our artist, who were furious at missing the wild cliffs which lay before us. I need hardly say that after the smash the President's camera had to be carried on the back of the chief guide for fear of further damage, which does not say much for the quality of the work put into the machine.

Our second day's resting place was Vogsósar, which lies close to the sea; in fact, our journey all day was along a lava bed, against which the waves were breaking. Many a time did we long to have seen the time when this vast river of lava drove back the sea with a roar quite unimaginable. As we were late in starting we were naturally late in arriving at our camping ground for the night, and it was nearly 11 p.m. before we pitched our tents. We did not travel more than eighteen miles, but it was harder work than fifty miles on the level. Here we had nothing to delay us, and next morning saw us in the saddle by 11 a.m., and ready for the track after a delightful bathe in a lake adjoining which we pitched our tents.

Our third day's journey bid fair to be an easy one, and for some time we proceeded at a rapid pace, but, as usual, lava beds came in our way, and we were again reduced to a walk along a most uncertain track. Towards the end of the day's march we halted at a farm to let the ponies cool, preparatory to a swim of some three-quarters of a mile across the River Olfusa; here we indulged in a drink of milk from the farm, and then started for the ferry. As luck would have it, there being about a couple of miles of hard sand to cross, it was impossible to hold the ponies

in, and racing was the order of the day till yours truly, meeting a nasty patch of lava, attempted to stop his pony, when the left stirrup leather gave way, and man and pony came down among the rocks. Our medical man was on the spot in an instant, but beyond knocking my pipe out of my mouth and scratching it there was no damage done, and we were soon at the ferry, which was easy enough for us in a boat, but we did not envy the ponies their swim in the cold glacier water. Here the hand camera showed its advantage in securing the ponies as they were driven into the river—a subject quite out of the question when a tripod and focussing have to be taken into account. Once on the other side we were close to our destination for the night, and being told it was only ten minutes' walk, we agreed to walk rather than mount our drenched ponies; but the ten minutes proved to be a whole hour's walk over heavy sand, and those of our party who wore long sea boots bitterly repented their rashness, and there was pretty general satisfaction when we set foot in Mr. Le Folii's garden at Eyrarbakki, where our head guide had got permission for us to camp. Mr. Le Folii proved most hospitable, and handed over to us all his available stock of bottled beer—a most acceptable present after living on nothing but whiskey. The undersigned, finding that champagne could be bought at Mr. Le Folii's store, determined to celebrate his recent narrow escape, and a truly jovial dinner was the result, followed by an invitation to spend the evening in Mr. Le Folii's house, where, after a further mutual gathering round the festive table, we all tarried till a late hour over songs and instrumental performances. We were much amused to see how refined and well-bred these new friends of ours were, and Madam Le Folii's performance on the piano, together with her singing, showed an amount of training scarcely to be expected in such an out-of-the-way place.

BROWN SLICK.

(To be continued).

PHOTOGRAPHING THE COMET "BROOKS" AT THE OBSERVATORY OF ALGIERS.

I PROFITED by the recent installation of the photographic equatorial, Gautier-Henry, at the Observatory of Algiers, to obtain on May 22, 1890, a proof of the comet "Brooks." This operation naturally presented the difficulties already signallised by M. Rayet in the *Comptes Rendus*. The displacement of the comet in relation to the crossing of the threads of the network being continuous, the observer should be able to displace the instrument with the same continuity; he is hindered if the brilliancy of the star is too slight to permit of a proper lighting of the field. It will suffice in future to remedy this inconvenience to add to the network threads of greater diameter.

The positive proof on glass which I have the honour to present to the Academy reproduces almost exactly all the details of the coma furnished by the negative during a two hours' exposure. One could only obtain this fidelity almost perfect of the positive proof by exposing the plate to the action of a very intense light during a very short time. I made use for this purpose of a pencil of parallel solar light, and of a shutter with a narrow chink driven with great speed. By keeping account of the width of the chink and the speed of the obturator, one finds that the proper duration of the exposure was about 0·005.

I proposed also to determine on the original negative the positions of the comet. For this object I had, by stopping the movement of the clockwork of the equatorial, marked the direction of the diurnal movement by allowing the image of a rather fine star to pass over the plate for fifty seconds. There was thus on the plate everything necessary for the determination of the co-ordinates. The measurements were made by means of a linear network applied on the plate. The value of the scale being obtained by two stars of which the co-ordinates were known, and the comet as well as the comparison star having been compared, in right ascension and declination, to two determined lines of the network, it sufficed then to measure the distances of these lines.

The results of four measurements are as follows:—

Stars for Determination of the Value of the Scale.

Stars.	Sine.	Right Ascension Apparent.	Apparent Declination.
a. B.D.+49°, No. 3229	9·3	20 h. 10 m. 3·87 s.	+ 49° 27′ 23·0″
b. Radcliffe, No. 4729	8·0	20 h. 15 m. 24·83 s.	+ 49° 8′ 55·7″

Positions of the Comet by Star a.

Dates, 1890.	Average Time of Algiers.	Comet *a*. Right Ascension.	Comet *a*. Declination.	Right Ascension of Comet.	Declination of Comet.
May 22	11 h. 16 m. 14 s.	+ 3 m. 3·09 s.	− 9′ 10·4″	20 h. 13 m. 6·96 s.	+ 49° 18′ 12·6″
,,	13 h. 13 m. 10 s.	+ 2 m. 43·71 s.	− 4′ 20·9″	20 h. 12 m. 47·58 s.	+ 49° 23′ 2·1″

Positions of the Comet by Star b.

Dates, 1890.	Average Time of Algiers.	Right Ascension.	Declination.	Right Ascension of Comet.	Declination of Comet.
May 22	11 h. 16 m. 14 s.	− 2 m. 17·70 s.	+ 9′ 17·2″	20 h. 13 m. 7·13 s.	+ 49° 18′ 12·9″
,,	13 h. 13 m. 10 s.	− 2 m. 37·46 s.	+ 14′ 5·4″	20 h. 12 m. 47·37 s.	+ 49° 23′ 1·1″

The differences between the determinations made by means of two stars are slight, for their values are:—

In right ascension ..... 0·17 s. and 0·21 s.
In declination ..... 0·3″ and 1·0″.

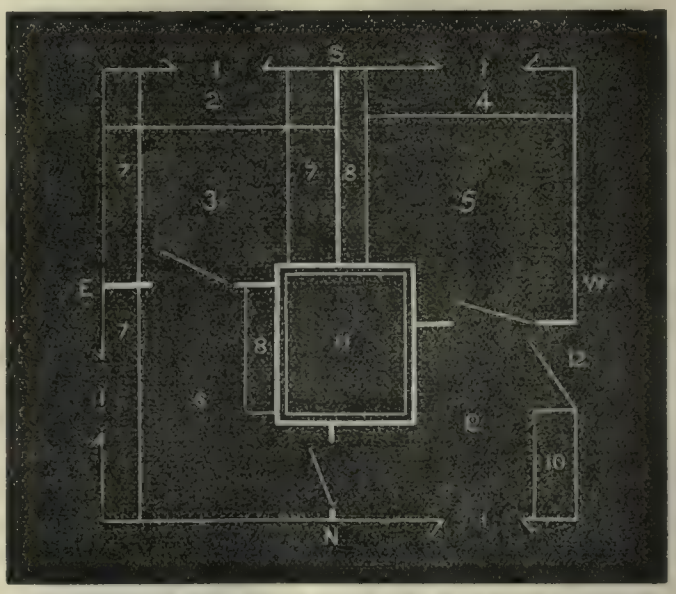
But there is some uncertainty about the precise instant to which the measurements relate. To determine this instant, one is obliged to keep account of the star's movement in right ascension and declination. It is an inconvenience which seems to me difficult to avoid in measurements of this kind.

CH. TRÉPIED.

—*Comptes Rendus.*

NOTES FROM THE CAPE.

THE new photographic telescope for work in conjunction with other Observatories taking up the International Celestial Survey has not yet arrived, but as it cannot be much longer delayed, every preparation has been made here to get the work under weigh as soon as the instrument can be erected and adjusted. The building is ready for its reception, a building in which every advantage has been taken of previous experience, so that few difficulties may be met with. For instance, it was found that when the instrument was too near the ground the shelter afforded by neighbouring trees and shrubs, whilst affecting favourably the observer's comfort, contributed to the rapid dimming of the lens by dew. The telescope had therefore to be mounted above the ground floor, its support being a solid brick and cement pier founded on the solid rock. The space below the Observatory and dome was to be requisitioned as a dark room, &c., and the question arose how might this queer space, nineteen feet each side, but with seven feet by six feet of the centre occupied, be best utilised. The arrangement I have endeavoured to show in the accompanying sketch. The pillar is not exactly in the centre, as not the centre



1. Windows. 2. Sink. 3. Dark Room. 4. Desk. 5. Study. 6. Chemical Store and Laboratory. 7. Benches. 8. Shelves. 10. Cupboard. 11. Brick Pier for Telescope. 12. Entrance.

of the stand of the telescope, but the centre of motion has to occupy the middle point. A half-brick wall is built round the pillar at a distance of two inches from it, so that no vibration of the building by people moving in it may affect the telescope; half-brick walls partition off the various rooms, and the height of each room is about nine feet. Entering at the north-west corner of the building, we come into a space set apart as a general store. In one corner of this is a large cupboard for holding dry plates, &c. To the right is a study, ten feet six inches by nine feet six inches, with a spacious desk, &c., and a stack of shelves on which are, or will be, seen grooved plate boxes for storing the finished negatives. Opposite the entrance is a door leading into the chemical store, the stack of well-filled bottle-shelves on one side, on the other a bench twenty-one inches wide, and a window which can be closed by a sliding shutter. Closing the door and window of the chemical store we are able to enter the dark room, no matter what the occupant may be about. I may be accused of conceit, I call it pardonable pride in this instance, when commencing another paragraph I proceeded to describe this under the title of—

A MODEL DARK ROOM.—In point of size these may be larger, for the space is barely ten feet square and the height nine feet, but it has never been my fortune before to be the possessor of a dark room fitted completely to my liking. The window faces the door. Along each side is a

bench twenty-one inches wide at a height of three feet two inches from the ground. The sink under the window is two feet in width and six feet in length, made of wood, well lined with thick sheet-lead. It is five inches deep—a depth quite sufficient for comfortable work, the edges being at the same height as the side benches. A portion of each bench as wide as the sink is raised with a slight slope and covered with sheet-lead, leading into the sink, allowing plates, bottles, measures, &c., to drain. In front of the window, at a height of about twelve inches from the bottom of the sink, runs a copper pipe for the supply of water, and into this pipe are inserted four taps of three-eighths of an inch aperture—small taps such as are used in marine engines for letting off steam. These taps are placed about a foot apart, and two of them are fitted with roses, or sprinklers as they are often called, for the better washing of the plates, the plates resting on home-made galvanised wire stands, the tops of which are a few inches below each sprinkler. Alum and fixing solutions are held in dipping baths at each side of the sink on the leaden-covered part of the benches. Above the window is a narrow shelf running from wall to wall to take the bottles of developing solutions. Water is supplied from a tank inside the dark room and next to the roof. This tank, of fifteen cubic feet capacity, is supplied from a filter outside the building, which separates all iron oxide, fine particles of clay or peaty matter, &c., contained in the mountain spring water with which the Observatory is supplied. The window is altogether forty inches wide by twenty inches high, and has its three outer panes glazed as follows:—To the left, a sheet of ordinary glass; in the centre, a sheet of stained orange; to the right, a sheet of ruby. Covering this window are two sashes running horizontally in grooves; one of them is glazed with ruby, and the other—that nearest the operator—is glazed with stained orange and covered on the side furthest from sink, and therefore not liable to be splashed, with white tracing cloth. Thus no materials are used which are effected by light or damp. The result is a very bright but safe light, darkest at the right-hand side where the development is carried on, and moreover a very even light; as the window faces the south (we are below the equator remember) no direct sunlight enters. By moving the sashes, red, yellow, or white light can be admitted at will. The walls of the dark room (dark room is really a misnomer) are painted light-yellow—stone colour—for with good walls, and ceiling impervious to stray rays, black is unnecessary. Development in such a room is comfortable and pleasurable. Wires for the electric light are let into every room, but we are at present awaiting the arrival of the secondary batteries; a description of my artificial lighting arrangements must wait until they have stood their trial. A few drawers and a small cupboard complete my dark-room fittings.

A Handy Water-fitting for the Dark Room.—I have lately seen in a dark room fitted up by an enterprising Capetown dealer in chemicals and photographic stores a very handy kind of tap. I have never seen it used by photographers at home, but I have, I fancy, seen it in use at hair-dressers. At all events, it is an article of commerce. In shape it is like a funnel pivoted about its centre. When placed horizontal, the water is cut off; when turned with the broad part down, the water is distributed from the rose or sprinkler; when the rose is turned upwards, the water comes from the stem of the funnel as from an ordinary tap.

Some Experiments with Developers.—I have seen it stated frequently that eikonogen will give more detail than pyro, and once I have met the statement that eikonogen will give one sensitometer number more than pyro. I have also seen the statement, and by no less an experimenter than Mr. A. Cowan, that one sensitometer number more can be got with a developer containing carbonate of lithium than with pyro and ammonia. Now one number more on the sensitometer means one-third more rapidity, and in astronomical photography this is infinitely more important than in portrait or landscape work. To reduce exposure from forty minutes to thirty would be a great boon, but I had hitherto found that increase of rapidity must be looked for in the plate itself; the developer made little difference in that respect, provided it was the strongest the plate would stand without more than slight veiling. If the above experimenters are right, then by properly combining eikonogen with lithium carbonate one ought to increase rapidity $\frac{1}{3} + \frac{1}{3}$, that is to say, reduce exposure nearly one half. I resolved to investigate the matter, and I give here the results, without the complete details, which would be tiresome, of over forty different combinations of chemicals.

1. *Method.*—I discarded the sensitometer method as untrustworthy. Not only do the screens vary in different sensitometers, but in my own sensitometer the tablet has deteriorated in parts. More important still, no plate I have ever yet tested has been found to be equally sensitive all over its surface; for proof—expose a plate to the least possible amount of light that will with forced development affect it, and see if the veil produced by the developer is perfectly even over every part. I therefore placed a candle at a distance of twenty feet from the dark slide, and at every swing of a one-second pendulum I drew the shutter out about three-eighths of an inch. The plate was then cut into four strips, each one and a half inches wide, and placed in a developing solution till the small portion left unexposed began to veil. Time of development was of no object: rapidity, gradation, and density only were considered in the comparison of results. When four plates (sixteen strips) had been developed, another plate was exposed, and the developers of each best of the four sets were tried on the new strips. This fifth set gave the best result of sixteen modifications of developer, and confirmed results obtained by the four sets. Then another set was taken, and so on.

2. *Plates.*—Wratten & Wainwright's drop shutter.

3. *Chemicals.*—Made up into ten per cent. or two per cent. solutions according to solubility. On account of its slight solubility, the carbonate of lithium was dissolved with the Rochelle salt, which assists solution; the solution held ten per cent. Rochelle salt and two per cent. carbonate of lithium. A separate ten per cent. solution of Rochelle salt was also made up. The sulphite of soda crystals were washed and dried rapidly in the sun to purify the compound from decomposition products. The eikonogen was in clean yellowish crystals.

4. *Results.*—The best pyro developer I found to be proportioned—

Sulphite of soda	20 grains.
Pyro	3 ,,
Carbonate of potash	15 ,,

Made up to one ounce with water.

No advantage was to be gained by increasing the pyro or potash beyond these limits—density was rather weakened and gradation destroyed. With smaller quantities of pyro the density was not so good—smaller quantities of potash gave less gradation.

The best eikonogen developer I found as proportioned—

Sulphite of soda	20 grains.
Eikonogen	12 ,,
Carbonate of potash	10 ,,

Made up to one ounce with water.

I fail to see where the economy of eikonogen comes in. Many plates may be developed in it, it is true, but the same may be said of pyro. I think it undesirable, however, to develop more than three or four in the same solution, or more than one only when the negatives are at all important. Better to stand the trifling extra cost than to run the risk of spoiling a valuable negative with some contamination from plate, dish, or finger. With the greatest cleanliness accidents may happen. That eikonogen is equal to pyro in its results I admit, but I have not found it to be superior; and I may incidentally mention that with discoloured eikonogen it is as possible to stain a plate as badly as with discoloured pyro.

When I proceeded to try a lithium carbonate series I was surprised and disappointed. With the formula given in the *Photographic Review*, but with the sulphite slightly, but only slightly, reduced—

Sulphite of soda	20 grains.
Pyro	2 ,,
Tartrate of potash and soda	25 ,,
Lithium carbonate	1 grain.

Made up to one ounce with water—

it was a long time before the plate made a sign; not until I increased the lithium carbonate to five and to ten grains did I get out as much as with the previous developers, and with the five grains the image was weak. I tested the Rochelle salt, only to find it absolutely neutral.

Here I stopped. I did not think it advisable to try lithium carbonate with eikonogen. For the present I shall stick to the pyro, sulphite, and potash developer given above. As to carbonate of lithium, its slow effects were just what might be expected with so refractory a substance, and the good results obtained by others must have been due to alkali in the sulphite, as pointed out by Mr. Haddon.

So far I have only experimented with extra-sensitive plates; what the effect is with an ordinary plate I have yet to see. No doubt I shall find many of your readers differing from me on various points; even doctors differ, and photographers more so. I have done my best, however, to keep out impurities, &c., and have given my plan of proceeding in full.

The Metric System.—The above experiments were worked out on the old system in order to compare them with the results of others and make them intelligible to the ordinary run of readers, for in spite of the resolution of the Photographic Club some of its members express themselves elsewhere in grains and ounces. I confess myself to being in a transition stage, but the metric system adapts itself well to the making up of ten per cent. solutions; no need to trouble one's self about how many grains to the ounce, and with ten per cent. solutions to work with, an English formula is easily computed. In any formula expressed in grains to the ounce, I multiply the number of grains by three, call them cubic centimetres of ten per cent. solution, and make the whole up to 144 cubic centimetres which equals five ounces and a trifle over. This will develop a whole-plate comfortably without fear of bubbles and streaks.

Celluloid Films.—It is claimed for celluloid supports that they give no halation. Don't they! I deny the statement most emphatically. The back of a glass plate does not reflect back *all* the light scattered by the particles in the film; it transmits them until the critical angle is reached. A celluloid film, especially if rough at the back, scatters it in all directions and fuzzes the whole picture, and not merely those parts next to the high lights. Try a group of young niggers in white frocks, and you'll see practice going with theory. "What we want," said my friend Mr. Allis, as we discussed the question, "What we want is a film with a black coating at the back that will strip off before development." Manufacturers, please note.

Horseshoe Frames for Vignettes, Etc.—I heard a story about an old gentleman in these parts who never passed a horseshoe in the road, but always took it home for luck; likewise of some small boys who were aware of the said gentleman's weakness, and found a few old shoes and a spirit stove afford a half hour's open-air amusement and exercise.

I thought of those boys the other day when my wife brought home a stock of old iron in her reticule, but I have since found that her madness had a method in it. The old horseshoes, some scraps of silk and plush, and some of my odd specimens, add a little variety to the usual class of frames on my walls, and whether this idea be new or old it is still worth a note.

C. Ray Woods.

Royal Observatory, Cape of Good Hope.

THE PHOTOGRAPHIC IMAGE.

[A Communication to the Royal Institution of Great Britain.]

The history of a discovery which has been developed to such a remarkable degree of perfection as photography has naturally been a fruitful source of discussion among those who interest themselves in tracing the progress of science. It is only my presence in this lecture theatre, in which the first public discourse on photography was given by Thomas Wedgwood at the beginning of the century, that justifies my treading once again a path which has already been so thoroughly well beaten. If any further justification for trespassing upon the ground of the historian is needed, it will be found in the circumstance that in the autumn of last year there was held a celebration of what was generally regarded as the jubilee of the discovery. This celebration was considered by many to have reference to the public disclosure of the Daguerreotype process, made through the mouth of Arago to the French Academy of Sciences on August 10, 1839. There is no doubt that the introduction of this process marked a distinct epoch in the history of the art, and gave a great impetus to its subsequent development. But, while giving full recognition to the value of the discovery of Daguerre, we must not allow the work of his predecessors and contemporaries in the same field to sink into oblivion. After the lapse of half a century we are in a better position to consider fairly the influence of the work of different investigators upon modern photographic processes.

I have not the least desire on the present occasion to raise the ghosts of dead controversies; in fact, the history of the discovery of photography is one of those subjects which can be dealt with in various ways, according to the meaning assigned to the term. There is ample scope for the display of what Mr. Herbert Spencer calls the "bias of patriotism." If the word "photography" be interpreted literally as writing or inscribing by light, without any reference to the subsequent permanence of the inscription, then the person who first intentionally caused a design to be imprinted by light upon a photo-sensitive compound must be regarded as the first photographer. According to Dr. Eder, of Vienna, we must place this experiment to the credit of Johann Heinrich Schulze, the son of a German tailor, who was born in the Duchy of Madgeburg, in Prussia, in 1687, and who died in 1744, after a life of extraordinary activity as a linguist, theologian, physician, and philosopher. In the year 1727, when experimenting on the subject of phosphorescence, Schulze observed that by pouring nitric acid, in which some silver had previously been previously dissolved, on to chalk, the undissolved earthy residue had acquired the property of darkening on exposure to light. This effect was shown to be due to light, and not to heat. By pasting words cut out in paper on the side of the bottle containing his precipitate, Schulze obtained copies of the letters on the silver chalk. The German philosopher certainly produced what might be called a temporary photogram. Whatever value is attached to this observation in the development of modern photography, it must be conceded that a considerable advance was made by spreading the sensitive compound over a surface instead of using it in a mass. It is hardly necessary to remind you here that such an advance was made by Wedgwood and Davy in 1802.* The impressions produced by these last experimenters were, unfortunately, of no more permanence than those obtained by Schulze three-quarters of a century before them.

It will, perhaps, be safer for the historian of this art to restrict the term photograph to such impressions as are possessed of permanence. I do not, of course, mean absolute permanence, but ordinary durability in the common-sense acceptation of the term. From this point of view the first real photographs, *i.e.*, permanent impressions of the camera picture, were obtained on bitumen films by Joseph Nicephore Niepce, of Châlons-sur-Soâne, who, after about twenty years' work at the subject, had perfected his discovery by 1826. Then came the days of silver salts again, when Daguerre, who commenced work in 1824, entered into a partnership with Niepce in 1829, which was brought to a termination by the death of the latter in 1833. The partnership was renewed between Daguerre and Niépce de St. Victor, nephew of the elder Niepce. The method of fixing the camera picture on a film of silver iodide on a silvered copper plate—the process justly associated with the name of Daguerre—was ripe for disclosure by 1838, and was actually made known in 1839.

The impartial historian of photography who examines critically into the evidence will find that, quite independently of the French pioneers, experiments on the use of silver salts had been going on in this country, and photographs, in the true sense, had been produced almost simultaneously with the announcement of the Daguerreotype process, by two Englishmen, whose names are as household words in the ranks of science—I refer to William Henry Fox Talbot and Sir John Herschel. Fox Talbot commenced experimenting with silver salts on paper in 1834, and the following year he succeeded in imprinting the camera picture on paper coated with the chloride. In January, 1839, some of his "photogenic drawings"—the first "silver prints" ever obtained—were exhibited in this institution by Michael Faraday. In the same month he communicated his first paper on a photographic process to the Royal Society, and in the following month he read a second paper before the same Society, giving the method of preparing the sensitive paper and of fixing the prints. The outcome of this work was the "Calotype" or Talbotype process, which was sufficiently perfected for portraiture by 1840, and which was fully described in a paper communicated to the Royal Society in 1841. The following year Fox Talbot received the Rumford Medal for his "discoveries and improvements in photography.†

Herschel's process consisted in coating a glass plate with silver chloride by subsidence. The details of the method, from Herschel's own notes, have been published by his son, Professor Alexander Herschel.‡ By this means the old 40-foot telescope at Slough was photographed in 1839. By the kindness of Professor Herschel, and with the sanction of the Science and Art Department, Herschel's original photographs have been sent here for your inspection. The process of coating a plate by allowing a precipitate to settle on it in a uniform film is, however, impracticable, and was not further developed by its illustrious discoverer. We must credit him, however, as being the first to use glass as a substratum. Herschel further discovered the important fact that while the chloride was very insensitive alone, its sensitiveness was greatly increased by washing it with a solution of silver nitrate. It is to Herschel, also, that we are indebted for the use of sodium thiosulphate as a fixing agent, as well as for many other discoveries in connexion with photography which are common matters of history.

Admitting the impracticability of the method of such subsidence for producing a sensitive film, it is interesting to trace the subsequent development of the processes inaugurated about the year 1839. The first of photographic methods—the bitumen process of Niepce—survives at the present time, and is the basis of some of the most important of modern photo-mechanical printing processes. [Specimens illustrating photo-etching from Messrs. Waterlow & Sons exhibited.] The Daguerreotype process is now obsolete. As it left the hands of its inventor it was unsuited for portraiture, on account of the long exposure required. It is evident, moreover, that a picture on an opaque metallic plate is incapable of reproduction by printing through, so that in this respect the Talbotype possessed distinct advantages. This is one of the most important points in Fox Talbot's contributions to photography. He was the first to produce a transparent paper negative from which any number of positives could be obtained by printing through. The silver print of modern times is the lineal descendant of the Talbotype print. After forty years' use of glass as a substratum, we are going back to Fox Talbot's plan, and using thin flexible films—not exactly of paper, but of an allied substance, celluloid. [Specimens of Talbotypes lent by Mr. Crookes exhibited, with celluloid negatives by the Eastman Company.]

If I interpret this fragment of history correctly, the founders of the modern photography are the three men whose labours have been briefly sketched. The jubilee of last autumn marked a culminating point in the work of Niepce and Daguerre, and of Fox Talbot. The names of these three pioneers must go down to posterity as co-equal in the annals of scientific discovery. [Portraits by Mr. H. M. Elder shown.] The lecture theatre of the Royal Institution offers such tempting opportunities to the chronicler of the history of this wonderful art that I must close this treatment of the subject by reminding myself that in selecting the present topic I had in view a statement of the case of modern photography from its scientific side only. There is hardly any invention associated with the present century which has rendered more splendid services in every department of science. The physicist and chemist, the astronomer and geographer, the physiologist, pathologist, and anthropologist, will all bear witness to the value of photography. The very first scientific application of Wedgwood's process was made here by the illustrious Thomas Young, when he impressed Newton's rings on paper moistened with silver nitrate, as described in his Bakerian lecture to the Royal Society on November 24, 1803. Professor Dewar has just placed in my hands the identical slide, with the Newton rings still visible, which he believes Young to have used in this classic experiment. [Shown.]

Our modern photographic processes depend upon chemical changes wrought by light on films of certain sensitive compounds. Bitumen, under this influence, becomes insoluble in hydrocarbon oils, as in the heliographic process of the elder Niepce. Gelatine mixed with potassium dichromate becomes insoluble in water on exposure to light, a property utilised in the photo-etching process introduced in 1852 by Fox Talbot, some of whose original etchings have been placed at my disposal by Mr. Crookes. [Shown.] Chromatised gelatine now plays a most important part in the autotype and many photo-mechanical processes. The salts of iron in the ferric condition undergo reduction to the ferrous state under the influence of light in contact with oxidisable organic compounds. The use of these iron salts is another of Sir John Herschel's contributions

* "An Account of a Method of Copying Paintings upon Glass, and making Profiles by the Agency of Light upon Nitrate of Silver. Invented by T. Wedgwood, Esq. With Observations by H. Davy."—*Journ. R. I.*, 1802, p. 170.

† For these and other details relating to Fox Talbot's work, necessarily excluded for want of time, I am indebted to his son, Mr. C. H. Talbot, of Lacock Abbey.

‡ *Photog. Journ.* and *Trans. Photog. Soc.*, June 15, 1872.

to photography (1842), the modern "blue print" and the beautiful platinotype being dependent on the photo-reducibility of these compounds. [Cyanotype print developed with ferricyanide.]

Of all the substances known to chemistry at the present time, the salts of silver are by far the most important in photography, on account of the extraordinary degree of sensitiveness to which they can be raised. The photographic image, with which it is my privilege to deal on this occasion, is that invisible impression produced by the action of light on a film of a silver haloid. Many methods of producing such films have been in practical use since the foundation of the art in 1839. All these depend on the double decomposition between a soluble chloride, bromide, or iodide, and silver nitrate, resulting in the formation of the silver haloid in a vehicle of some kind, such as albumen (Niepce de St. Victor, 1848), or collodion on glass, as made practicable by Scott Archer in 1851. For twenty years this collodion process was in universal use; its history and details of manipulation, its development into a dry plate process by Colonel Russell in 1861, and into an emulsion process by Bolton and, Sayce in 1864, are facts familiar to every one.

The photographic film of the present time is a gelatino-haloid (generally bromide) emulsion. If a solution of silver nitrate is added to a solution of potassium bromide and the mixture well shaken, the silver bromide coagulates, and rapidly subsides to the bottom of the liquid as a dense, curdy precipitate. [Shown]. If instead of water we use a viscid medium, such as gelatine solution, the bromide does not settle down, but forms an emulsion, which becomes quite homogeneous on agitation. [Shown.] This operation, omitting all details of ripening, washing, &c., as well known to practical photographers, is the basis of all the recent photographic methods of obtaining negatives in a camera. The use of this invariable vehicle, gelatine, was practically introduced by R. L. Maddox in 1871, previous experiments in the same direction having been made by Gaudin (1854-61). Such a gelatine bromide emulsion can be spread uniformly over any substratum—glass, paper, gelatine, or celluloid—and when dry, gives a highly sensitive film.

The fundamental problem which fifty years' experience with silver haloid films has left in the hands of chemists, is that of the nature of the chemical change which occurs when a ray of light falls on such a silver salt. Long before the days of photography—far back in the sixteenth century—Fabricius, the alchemist, noticed that native horn silver became coloured when brought from the mine and exposed. The fact presented itself to Robert Boyle in the seventeenth century, and to Beccarius, of Turin, in the eighteenth century. The change of colour undergone by the chloride was first shown to be associated with chemical decomposition in 1777, by Scheele, who proved that chlorine was given off when this salt darkened under water. I can show you this in a form which admits of its being seen by all. [Potassium iodide and starch paper were placed in a glass cell with silver chloride, and the arrangement exposed to the electric light till the paper had become blue.] The gas which is given off under these circumstances is either the free halogen or an oxide, or acid of the halogen, according to the quantity of moisture present and the intensity of the light. I have found that the bromide affects the iodide and starch paper in the same way, but silver iodide does not give off any gas which colours the test paper. All the silver haloids become coloured on exposure to light, the change being most marked in the chloride, less in the bromide, and least of all in the iodide. The latter must be associated with some halogen absorbent to render the change visible. [Strips of paper coated with the pure haloids, the lower halves brushed over with silver nitrate solution, were exposed.] The different degrees of colouration in the three cases must not be considered as a measure of the relative sensitiveness: it simply means that the products of photo-chemical change in the three haloids are inherently possessed of different depths of colour.

From the fact that halogen in some form is given off, it follows that we are concerned with photo-chemical decomposition, and not with a physical change only. All the evidence is in favour of this view. Halogen absorbents, such as silver nitrate on the lower halves of the papers in the last experiment, organic matter, such as the gelatine in an emulsion, and reducing agents generally, all accelerate the change of colour. Oxidising and halogenising agents, such as mercuric chloride, potassium dichromate, &c., all retard the colour change. [Silver chloride paper, painted with stripes of solutions of sodium sulphite, mercuric chloride, and potassium dichromate, was exposed.] It is impossible to account for the action of these chemical agents except on the view of chemical decomposition. The ray of light falling upon a silver haloid must be regarded as doing chemical work; the vibratory energy is partly spent in doing the work of chemical separation, and the light passes through a film of such haloid partly robbed of its power of doing similar work upon a second film. It is difficult to demonstrate this satisfactorily in the lecture room, on account of the opacity of the silver haloids, but the work of Sir John Herschel, J. W. Draper, and others, has put it beyond doubt that there is a relationship of this kind between absorption and decomposition. It is well known, also, that the more refrangible rays are the most active in promoting the decomposition in the case of the silver haloids. This was first proved for the chloride by Scheele, and is now known to be true for the other haloids. It would be presumption on my part, in the presence of Captain Abney, to enlarge upon the effects of the different spectral colours on these haloids, as this is a subject upon which he can speak with the authority of an investigator. It only remains to add that the old idea of a special "actinic" force at the more refrangible end of the spectrum has long been abandoned. It is only because the silver haloids absorb these particular rays that the blue end of the spectrum is most active in promoting their decomposition. Many other instances of photo-chemical decomposition are known in which the less refrangible rays are the most active, and it is possible to modify the silver haloids themselves, so as to make them sensitive for the red end of the spectrum.

The chemical nature of the coloured products of photo-chemical decomposition is still enshrouded in mystery. Beyond the fact that they contain less halogen than the normal salt, we are not much in advance of the knowledge bequeathed to us by Scheele in the last century. The problem has been attacked by chemists again and again, but its solution presents extraordinary difficulties. These products are never formed—even under the most favourable conditions of division, and with prolonged periods of exposure—in quantities beyond what chemists would call "a mere trace." Their existence appears to be determined by the great excess of unaltered haloid with which they are combined. Were I to give free rein to the imagination, I might set up the hypothesis that the element silver is really a compound body invariably containing a minute percentage of some other element, which resembles the compound which we now call silver in all its chemical reactions, but alone is sensitive to light. I offer this suggestion for the consideration of the speculative chemist.* For the coloured product as a whole, *i.e.*, the product of photo-decomposition with its combined unchanged haloid, Carey Lea has proposed the convenient term "photo-salt." It will avoid circumlocution if we adopt this name. The photo-salts have been thought at various times to contain metallic silver, allotropic silver, a sub-haloid, such as argentous chloride, &c., or an oxyhaloid. The free metal theory is disposed of by the fact that silver chloride darkens under nitric acid of sufficient strength to dissolve the metal freely. The acid certainly retards the formation of the photo-salt, but does not prevent it altogether. When once formed the photo-chloride is but slowly attacked by boiling dilute nitric acid, and from the dry photo-salt mercury extracts no silver. The assumption of the existence of an allotropic form of silver insoluble in nitric acid cannot seriously be maintained. The sub-haloid theory of the product may be true, but it has not yet been established with that precision which the chemist has a right to demand. We must have analyses giving not only the percentage of halogen, but also the percentage of silver, in order that it may be ascertained whether the photo-salt contains anything besides metal and halogen. The same may be said of the oxyhaloid theory: it may be true, but it has not been demonstrated.

PROFESSOR RAPHAEL MELDOLA, F.R.S.

(*To be concluded.*)

* I have gone so far as to test this idea experimentally in a preliminary way, the result being, as might have been anticipated, negative. Silver chloride, well darkened by long exposure, was extracted with a hot saturated solution of potassium chloride, and the dissolved portion, after precipitation by water, compared with the ordinary chloride by exposure to light. Not the slightest difference was observable either in the rate of colouration or in the colours of the products. Perhaps it may be thought worth while to repeat the experiment, using a method analogous to the "method of fractionation" of Crookes.

Foreign Notes and News.

In case any of our readers should contemplate a summer excursion to Germany, it may perhaps not be amiss to remind them once more that the annual summer meeting of the German Photographic Society will be held this year in Eisenach, from August 27–29 inclusive. The reception of the guests will take place on the afternoon of the previous day.

It may be as well to point out that in addition to the programme of festivities and the exhibition which we have already mentioned as having been arranged, an excursion will take place to the Wartburg. This excursion will afford admirable opportunities of taking exposures of the celebrated castle and neighbourhood, and will finish up with the more or less inevitable concert. It will be remembered by lovers of German history and Wangerian opera that on the Wartburg was held the celebrated "*sänger-krieg*," or contest of minstrels in the twelfth century, in which Tannhäuser played a part. Later on Martin Luther found there an asylum for a while, and it was in one of the rooms of the castle that, in a heated theological discussion with the Evil One, his enthusiasm led him to emphasise an argument by hurling his inkstand at his antagonist's head. The ink marks are still shown upon the wall, and there would certainly attach much interest to a photographic impression of this historic smudge.

The amateur *versus* professional appears to be as much agitating photographic circles in Germany as in this country. An article on this subject showing a good deal of *animus* appears in a recent number of the *Wochenblatt*. From the fact that the writer styles the amateur "a noxious weed" one may perhaps conclude that he is a professional.

One suggestion made by the writer has, it must be admitted, something to be said for it. He proposes, namely, that all so-called amateurs who

accept money for their work should be obliged to pay the industrial tax. This might be practicable in Germany, where all trades, however small, have to contribute income tax, but in England, with its 200*l.* per annum limit, it could scarcely be carried out.

We alluded last week to the impending appearance of a new developer. It seems, however, that "graphol" is not really a new invention, but is merely a powder containing eikonogen and such proportions of alkalies and other salts as when dissolved shall form a proper developer. The mixture is supplied by Mercier, of Paris.

M. Leon Vidal has recently pointed out the disadvantages of being confined to the employment of coloured glass screens for orthochromatic work. It is, he says, of the greatest importance to be able to vary the intensity of the screen according to circumstances. Gelatine films are unsuitable for the purpose owing to the deleterious effects of moisture upon them. Collodion is seldom homogeneous, and can only with difficulty be removed from the glass. M. Vidal consequently recommends a solution of pyroxyline in amyl acetate which also dissolves erythrosine or aurantia. This solution is poured on a flat glass plate and permitted to dry for a couple of days, after which the plate is placed in water, by which means the film is readily removed, and after drying with blotting paper is fit for use.

With reference to this proposal Dr. Stolze remarks that the pyroxyline amyl acetate solution is protected by patent, but that perhaps a solution of camphor in amyl acetate might be employed instead.

That ever-recurring question—the shock to the camera resulting from the impact of the instantaneous shutter—has again been recently dealt with by M. A. Goderus in the *Bulletin Belge*. This gentleman points out the terrible consequences that must necessarily ensue from the cause in question—how the front of the camera is liable to kick up when the objective is released, and to be knocked downwards when it finishes its course, and a variety of other results too unpleasant to mention. To read M. Goderus' paper one would think that to attempt to obtain a correct instantaneous exposure must be a perfectly chimerical project. Instantaneous photographs, and even occasionally good ones, are however obtained, M. Goderus notwithstanding.

To obviate these evils M. Goderus proposes to have the camera arranged on one stand and the objective on another, and to have them united by an indiarubber tube. This is very good, doubtless, from the theoretical point of view, but sometimes when one wishes to make an instantaneous exposure one is in a hurry, and in such cases M. Goderus' arrangement would be likely to lead to profanity of language.

Our Editorial Table.

The Stereoscopic Manual.

By W. I. Chadwick. London and Manchester: John Heywood.

Our readers are aware that Mr. Chadwick, in 1888–89, contributed to our pages a series of articles on the stereoscope. These he has collated, and, subject to certain additions and alterations, they now form the booklet issued by the author as *The Stereoscopic Manual*. There is much useful matter in the manual, and the younger body of photographers who have taken up the art since those times when stereoscopic photography was so well kept to the front will acquire valuable information by an attentive perusal.

The Encyclopædia of Photography. Part II.

London: Iliffe & Son.

Part second of Mr. Woodbury's *Encyclopædia* shows a marked improvement upon the first part. He carries his subjects forward from "Background" to the "Coffee Process" of M. de Constant.

The Photographic Instructor. Second Edition.

This, as we have stated when noticing the first edition, forms one of "The Scovill (New York) Photographic Series." The fact of a second edition having so soon been demanded speaks well for the popularity of the volume. The topics treated are numerous, and are contributed by various writers on the west side of the Atlantic, including the names of Miller, Spaulding, Klauser Hull, Carbutt, and Mason, in addition to those of the editors, Messrs. Adams and Ehrmann, the latter of whom gives as an appendix a concise and descriptive summary of the chemicals in most common use in photography. The topics which come in for treatment embrace the dark room, exposing, developing, intensifying and reducing, printing on various kinds of paper, retouching, copying, colour-sensitive photography, and other things equally useful. 215 pages. Price one dollar in paper covers.

Leçons Elémentaires de Chimie Photographique.

Par L. Mathet. Paris.

This work, published by the proprietors of *L'Amateur Photographe*, 24, Boulevard, Saint Germain, Paris, treats pretty exhaustively of the chemistry of photography. Processes, products, and materials are arranged in alphabetical order, and each subject is treated with fairness and as much fullness as possible. For instance, in the threescore of pages devoted to emulsions, we have a condensed history of emulsion photography from the earliest days, together with a more detailed description of the ramifications of the process. The subjects of developing, fixing, toning, &c., are treated separately—a plan which, although seemingly disjointed, is perhaps more convenient for reference. A very complete list of chemicals and their properties must render this a work very useful to photographers. 730 pages. Price 5 francs.

Photogravure.

By W. T. Wilkinson. London: Iliffe & Son.

In this pamphlet Mr. Wilkinson describes one of the several methods of photo-engraving that have been published. A plate of copper having been carefully polished is dusted over with a mixture of very finely powdered resin and asphaltum, which is melted by heat so as to adhere to the plate. Other methods of laying etching grounds are specified. Upon a plate thus prepared a carbon image is developed, and when dry is etched by being placed in a fluid consisting of—

Sat. sol. (in methylated spirits of wine) perchloride of iron	5 ounces.
Water	10 „

The operation of etching must be watched carefully; it occupies only a few minutes. After being etched the plate is cleaned by the removal of the resist and varnish, and is then ready for being printed from. The directions given seem practical, and are carefully written. It has an illustration by W. L. Colls. Forty pages. Price 1*s.* 6*d.*

Loafing and Loving.

Fun Office: 153 Fleet Street, E.C.

This is the latest addition to the *Fun* shilling series. It comprises a number of amusing articles and sketches pleasantly written.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,420.—"Improvements in Paper Used for Photographic Printing," J. Lewis.—*Dated July* 22, 1890.

No. 11,431.—"Improvements in and relating to Photographic Apparatus." H. Simpson.—*Dated July* 22, 1890.

No. 11,476.—"Improvements in Photographic Apparatus." G. Mattioli.—*Dated July* 22, 1890.

No. 11,478.—"Improvements in Photographic Film Holders." J. R. Gotz.—*Dated July* 22, 1890.

No. 11,566.—"Improvements in and applicable to Photographic Cameras." P. Bebbington.—*Dated July* 24, 1890.

No. 11,648.—"Improvements in the Construction of Adjustable Tables and Supports suitable for Photographic Stands, Engraving Tables, and other Uses where Variation of Height and Angle are required." H. D. Buttrum.—*Dated July* 25, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 14,220.—"Photographic Focussing Magnifiers." Bishop.—Price 6*d.*

No. 14,270.—"Photographic Shutter." Trunberry.—Price 8*d.*

PATENT COMPLETED.

An Improvement in Photographic Focussing Magnifiers.

No. 14,220. Frank Bishop, 22 and 23, Soho-square, London.—*July* 5, 1890.

My invention has for its object to provide a means whereby a focussing magnifier, sometimes used in focussing a picture in the photographic camera, may be temporarily fixed against the focussing screen in position for viewing the image, so that the hand of the operator, instead of being occupied in holding the magnifier, is at liberty to make the necessary adjustments of the camera.

The invention consists in the combination with the focussing magnifier of a suction device, in the form of an indiarubber capped disc, which when pressed flat against the focussing screen remains adherent thereto by atmospheric pressure, in the manner of a sucker, with sufficient tenacity to support the focussing glass in position against the screen and permit of its being shifted about thereon.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 5	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 5	North London	Wellington Hall, Islington, N.
,, 5	Holmfirth	
,, 5	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 5	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 5	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 6	Coventry and Midland	The Dispensary, Coventry.
,, 6	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 7	Leeds	Leeds Mechanics Institute.
,, 7	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
,, 7	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

JULY 24.—Mr. H. M. Smith in the chair.

The subject of *Printing through Coloured Media* had been announced, and Mr. Scholzig was expected to open the discussion. He sent, however, two strips of albumenised paper which had been printed under glasses of different colours—green, orange, and ruby—and toned and fixed in the ordinary way. The portion printed under green glass had toned greyer than that which was unprotected. On one of the strips was written, "Showing the comparative actinic value of the different coloured glasses, toned with tungstate bath, and exposed for the same length of time, showing that browned, orange, although transmitting a good moment of light, is the most non-actinic and, consequently, the best suited for dark-room windows." Mr. Scholzig also sent some prints on matt-surface paper.

Mr. F. A. Bridge said that at a recent meeting he had stated that coloured media had been recommended years ago for printing through. He found that it was in the year 1875 that he had published an article on the subject, of which he now read an extract to the meeting. It was coloured gelatine that he then used, and he found that with some weak collodion negatives of grey colour he got richer prints by printing through a green or pale red medium.

Mr. A. Cowan inquired whether Mr. Bridge attributed the greater brightness in the prints to reducing the speed of the printing.

Mr. Bridge thought that that was probably the reason.

Mr. W. E. Debenham said that he thought that those who put forward the theory that the relative opacities of the negative were not the same in a weak light as in a strong one, and that, consequently, a negative would give a rich print in a clear light and a feeble one in a bright light, ought to produce something more than the statement that they had found it to be so. He had on a previous occasion shown prints on the same piece of paper, toned, from the same negatives, where one print had been printed in three minutes whilst another had been done in such a subdued light that it had taken two days to print, and members had acknowledged that they could not tell which was which. In the case of using lights of strongly different colours, however, other considerations might step in to influence the result. He now showed a piece of paper with four prints from the same negative upon it. One had been printed without covering glass in ten minutes—the light had not been very bright or it would have printed quicker; the second print had been printed under rather light green glass, and had taken fifty minutes: a third print, under dark glass, had been done in thirty minutes; and the fourth, under brownish-yellow glass, had taken twenty hours. This last print, instead of being the richest, was the weakest of the whole. It was greyer in colour, and had more the effect of a salted paper print with a glazing of albumen over it. This suggested the idea that the organic compound of silver present in albumen paper, which gave the characteristic richness and gradation in the deep shadows, was, compared to the chloride of silver, particularly insensitive to the light passing through the yellowish-brown glass, and that, consequently, the print was essentially a chloride and not an organic silver one. The other three prints differed but little from each other.

The Chairman, on examining the prints, thought that the best print was that obtained with blue glass, then followed that without coloured glass, next the one under green glass, whilst that under the slow-printing yellow-brown glass was far inferior.

Mr. Bridge endorsed this opinion.

Mr. W. H. Harrison thought that the conditions laid down by Scholzig had not been followed, and the experiment therefore proved nothing. The printing glass should be dark green and that matt surface paper should be employed. Mr. Scholzig's contention was that with green glass a green print was obtained resembling platinotype.

Mr. Debenham replied that his experiment was with regard to coloured media generally, and not exclusively in reference to Mr. Scholzig's propositions. The green glass had been sufficiently strong in colour to cause the printing to take five times as long as without it, and he did not think photographers would care to go much beyond that; but if the print was greyer and not so powerful, that was not the idea with which coloured glass for printing had been generally recommended.

Mr. A. Haddon said that any one could repeat the experiment and prove whether the advantages claimed for coloured media were real or not.

Mr. T. E. Pendlebury showed some views taken at the last Saturday outing of the Association at Wanstead.

The Chairman gave a narrative of some of the proceedings of the Convention at Chester, where he had acted as deputy of the Association.

The next outing was arranged for Bank Holiday, August 4. Trains to St. Albans from St. Pancras at twenty minutes to eleven, and from Liverpool-street half an hour earlier.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

JULY 24.—Mr. W. J. Harrison in the chair.

Mr. W. Griffiths read a paper on *Stereoscopic Photography*, in course of which he described the different apparatus required, mode of working, &c., and illustrated his remarks with a number of slides on paper and glass.

The Chairman was sorry a larger number of members had not availed themselves of the pleasure of hearing the paper.

A discussion followed.

The result of the first photographic competition towards the Warwickshire Photographic Survey was announced. A gold medal was offered by Mr. S. G. Mason, a silver medal by the Society, and a bronze medal by Mr. A. Constantine for six photographs taken in Warwickshire at places accessible to the general public; to be taken between March 1 and June 30; three to be opal landscapes, part of each to be a river or stream, and three to be of a rustic cottage or cottages: the six prints to be exhibited on one mount. The awards were offered for excellence of the group of photographs artistically and technically, and the negatives of the prize photographs to be placed at the disposal of the Committee of the Photographic Survey of Warwickshire. The pictures were sent to Mr. George Bankart, President of the Leicester Society, to judge, who awarded the prizes as follows:—Gold medal, "Light and Truth," Mr. Benjamin Karlesse; silver medal, "Cannon," Mr. Arthur J. Leeson; bronze medal, "Avon," Mr. W. Jerome Harrison.

On Saturday last a good number of members and friends took part in the monthly half-day excursion, Warwick being the *rendezvous* for the afternoon. A very pleasant time was spent under the leadership of Mr. George A. Thomason, when over one hundred plates were exposed by the party.

BATH PHOTOGRAPHIC SOCIETY.

On Saturday, the 26th ult., the Society met at Prior Park, by invitation of the Rev. Canon Williams, the Principal of the College. The grounds are some two hundred acres in extent, and present many picturesque subjects for the camera. Most prominently among these stand three handsome piles of buildings—the mansion, one hundred and fifty feet wide, with its grand Corinthian portico of six columns, and two wings used as colleges, dedicated respectively to St. Peter and St. Paul. A church has also lately been added for the convenience of worshippers in the district. The interior of this sacred edifice is richly ornamented with carving in alabaster imported from Rome. It is lofty and well lit, a large and valuable Vandyck of the Saviour being easily photographed along with the interior. When quite finished the floor will be of white marble throughout. There is also a private chapel or Chapel Royal in the mansion, said to have been intended for the use of George III. It is quite unique. These buildings take the form of a crescent, are situated on a slope four hundred feet above the Avon, and considered to command a landscape full of Italian beauty. Far away down this slope, so richly fringed with woods, and spanning the extensive fishponds, stands the celebrated Palladium Bridge, so well known to visitors to the Queen of the West. At five p.m. the party assembled under the portico of the mansion, where the worthy Canon heartily welcomed and entertained his fellow members to a repast he was pleased to call a "modest cup of tea, to cheer but not inebriate." Mr. and Mrs. Austin J. King and Miss King assisted in dispensing hospitality to the guests. After tea more photographs were taken, the swimming bath, Priory, and other points of interest visited. The sky being cloudy with occasional showers, the light was not suitable for many subjects, but some very good and picturesque photographs were obtained.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

A CURIOUS INSTANCE OF FRILLING.

To the Editor.

Sir,—A few weeks ago mention was made at a meeting of the London and Provincial Photographic Association of a curious case of frilling which originated in the alum bath and disappeared in the hypo. I have been waiting in the hope that some of your readers would have a word to say on the subject, as a friend—a pupil—of mine has complained for a long time that the alum bath causes his plates to frill. I have never met such an experience myself, and have always laughed at the idea, but now he has the laugh at my expense, or thinks so. Can you say if there really is anything in it or not?—I am, yours, &c.,

B.Sc.

[With regard to the curious instance mentioned by Mr. Teape at the meeting of the London and Provincial Photographic Association referred to, of the disappearance of frilling caused by the alum bath when the plate was transferred to the hypo solution, it was a familiar fact to old workers with gelatine that that substance was frequently rotted, or even completely dissolved, by alum solution, where plain water, under precisely similar conditions of temperature, had no ill effect. The late Mr. Woodbury showed us some years ago a number of Woodburytype prints that had been utterly ruined by immersion in the ordinary alum hardening bath. Bichromate of potash solution, too, will dissolve some samples of gelatine at a lower temperature than water alone. Somewhat analogous to the case noted by Mr. Teape was the behaviour of a specimen of gelatino-bromide paper that once came into our possession. The prints passed through

development and washing in perfect safety, but in the alum solution became soft, and sometimes absolutely "slimy;" they were at this stage always so tender that the utmost care had to be observed in handling them, and remained so during the washing that followed the alum. Almost instantly, however, they were immersed in the fixing solution the gelatine film resumed its original firmness and all trouble ceased. This appeared to us a complete reversal of the usual state of things.—Ed.]

RETOUCHING AND RESITTING.

To the Editor.

Sir,—Mr. Barrett's reply to my letter is, indeed, a curious specimen of an answer to the questions relating to negative retouching.

"This over-retouching has become a perfect nuisance," writes a "Photographic Artist;" and I corroborate this verdict. And it does not concern the matter if Mr. Barrett *thinks* I obtained my information in a very poor school, or at a "leading house" in Paris; the question remains all the same, viz., is it possible to have the retouching satisfactorily done by persons who have no art education, or should it be the work of an artist?

"Common-sense," writes Mr. Barrett, "has more to do with retouching than the generality think, and I fear it is very often forgotten when writing about it." My common-sense tells without hesitation distinctly that all retouching must be the execution of an artist. Mr. Barrett's common-sense inspires him to write that the work of an artist is decidedly superior, but a thorough art education is not an absolute *necessity* thereto.

I hope we all have the development of the photographic art at heart, and why, therefore, fall in a fury about any one's contradiction of a sentence who, when true, will hold her stand by herself; if not, we must be content, and remember that we are not, at least not all of us, infallible.—I am, yours, &c., F. B.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange Vever's six and a half inch burnisher and Vever's portable distillery for a whole-plate three or four-fold tripod stand.—Address, H. Bartholomew, Great Linford, Newport Pagnell.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. Greenwood & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

W. A. (Melton Mowbray.)—Received.—Next week.

S. C. W.—The maker in question has a good reputation, and all the lenses we have tried of his manufacture bear it out.

W. H. Sedgwick.—The cause of the "smuts" on the prints during burnishing is no doubt due to the smoke from the lamp. This will not arise if you use alcohol.

C. Preston.—According to your account it looks very much as if the mounts were at fault. Just at the present time there is a tendency to charge the mount with being the cause of more fading than it in all cases deserves.

W. B. R.—Copal and oil varnishes generally are difficult to make on a small scale, and on a large one too, without proper plant. Better purchase what you require; it will cost far less than making it, even if you were successful.

S. J. W. asks whether, if he purchases a wide-angle landscape lens, he can use it during the winter months as a lantern objective.—With a powerful light, if the lens be of short focus, he may do so; but it will be much inferior to the ordinary combination.

P. Charlton.—To make two gallons of enamelling collodion, take one gallon of methylated ether (equal to about eight pounds), specific gravity, ·720, and one gallon of methylated spirit of not less strength than ·825, and from five to seven ounces of pyroxyline, according to its character.

Gelatine.—Your proposed plan will answer very well. There is no occasion for the carbolic acid if you prepare the solution of gelatine fresh every day. We advise you to put on the backing with the same gelatine solution as you employ for mounting, and avoid the use of common glue altogether.

Ginger.—1. Almost any shutter will answer the purpose. Perhaps the most convenient to use is a simple flap shutter worked with a pneumatic ball. Marion & Co. supply such shutters.—2. We know of no such medium which will work satisfactorily. Water would cause the gelatine to soften and swell up.

W. Scaife.—Cyanide of silver is a white salt which is obtained by precipitating nitrate of silver with cyanide of potassium—both salts in solution. Although somewhat sensitive to light, this salt has not been successfully used as a sensitising agent. Your experiments are interesting; we should advise you to continue them.

Dextrine writes: "Can you tell me how to make dextrine; that is, how to mix it? My people have tried all methods and failed with each."—There ought to be no difficulty in mixing dextrine with water. Perhaps the best method is to put some cold water in a vessel and then to add the dextrine a little at a time, stirring well the while.

E. E. Bennett.—Manufacturers and dealers in photographic goods have a perfect right to charge what they like for them. It is simply a question with the would-be purchaser whether he buys them or not. What would be the use of publishing such nonsensical letters as yours? If you consider the apparatus too dear, simply do not purchase it.

A. W. says: "I have been trying mounting with gelatine for some time past; I employ a fine quality of French gelatine and use the solution thin. My difficulty is that when the solution is applied it will not lie evenly on the print, but appears to be repelled in places by it, as if the surface were greasy. Can you tell me the reason?"—The cause lies with the gelatine. If a little of it were flowed on a glass plate it would be found to "pit" as it set. Try a fresh kind of gelatine, preferably one of English make; say Nelson's "No. 2 soluble." This is one of the most suitable gelatines for mounting purposes.

E. Bennett says: "1. Will you kindly inform me the best lens to use for whole-plate up to 12×10 groups in studio—the most rapid combined with greatest covering power and least distortion, but rapid enough to take ten or twelve children in about one second? What is used in the leading studios? —2. Can as good prints and tone be got from prepared paper as on that sensitised fresh every day without a preservative? What is used by the best men?"—1. A portrait lens would be the most rapid, but a lens of the "Group" or "Universal" type is now taking its place for groups and large pictures in the studio.—2. Yes, on some papers, but not on all. Most of the large houses prefer to sensitise the papers for themselves.

Photographic Club.—Subject for discussion, Wednesday, August 6, *New Hand Cameras;* August 13, *On Extemporising Apparatus.*

Dark Room for Amateurs.—Mr. Stewart Hardwick, 21, Commercial-road, Bournemouth, writes that those tourists desirous of changing or developing plates should apply to him.

On Saturday last Mr. Charles Knight, of the Royal Studio, Newport, Isle of Wight, took panel portraits of H.R.H. the Duke of Connaught. The Prince wore the uniform of the Rifle Brigade, of which he is Honorary Colonel.

Mawson & Swan's Monthly Diary.—We are glad to perceive that this handy pocket diary, which we had missed during the past two months, is once more to the fore. It contains blank pages for daily jottings interleaved with the business announcements of the firm.

London and Provincial Photographic Association.—August 7, the subject of *Home Portraiture* will be opened by Mr. W. E. Debenham. Visitors cordially invited. Bank Holiday outing, Monday next, August 4, at St. Albans. Special cheap train from Moorgate-street at twenty-four minutes past ten, St. Pancras at twenty minutes to eleven.

Conventionalisms.—We thank Mr. Seaman, of Chesterfield, for a beautiful cabinet group of a number of Convention "worthies," taken at the Chester Railway Station on the occasion of an exodus for London, when metropolitan friends were being seen off by their *confrères*. Mr. John Milne, Aberdeen, also favours us with a group taken at the door of one of the hotels when certain friends were starting on a picnic.

Trade Catalogues.—Messrs. Lancaster & Son, Birmingham, send us a new edition of their beautiful and comprehensive catalogue. It contains a list of all their manufactures and specialities, and is in itself a fine specimen of the printer's art.—Mr. C. C. Vevers, Leeds, has also sent us his new price list, in which are many articles of manufacture peculiar to himself.

Mr. Alfred Watkins sends us a print from a properly exposed negative. Mr. Watkins says:—"The print which I enclose is taken from a negative which Mr. Ballard, of Ledbury, has handed me, and which was referred to in an advertisement of my exposure meter. Of course the point of interest is the lateness of the hour; both Mr. Ballard and his friend, Mr. Clare, testify that the cap was not taken off the lens until immediately after the church clock had struck nine at night. The exposure was twenty-five minutes, Ilford Ordinary, and the time was estimated with the actinometer, which was exposed at the same time. I estimate the light (A. twenty-five minutes) to have been one-two-hundred-and-fiftieth of the light on the same subject at mid-day."

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

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PRINTS ON PLAIN PAPER.

We now come to a consideration of the inorganic or other salts employed in the preparation of the paper, and as regards the chlorides in general use we may practically confine ourselves to two—namely, those of ammonium and barium—as, though the potassium and sodium salts are sometimes employed, they present no special features to recommend them in preference to those just named. Chloride of ammonium is undoubtedly the best for all purposes, as, while its general tendency is towards rich purple or black tones, it readily yields to modified treatment if other varieties of colour are desired. The barium salt is chiefly noted for its leaning towards pure brown tones and shades varying between those and black, and it is also to be recommended for the preparation of paper that is to be kept any length of time after sensitising, as, owing to the non-deliquescent character of the nitrate of barium formed in sensitising, it remains drier than paper prepared with the ammonium salt. The nitrates of ammonium and sodium are both more or less deliquescent, and papers prepared with them are more liable to deterioration from damp. The nitrate of potash is a pretty stable salt when dried, and is therefore preferable to either of those when the marked brown tones of barium are objectionable; and chloride of sodium may sometimes be employed as a matter of convenience or from motives of economy, though, as has already been said, neither it nor the potassium possess any marked features of their own.

As regards the strength of the salting solution, it will depend upon the character of the negatives to be printed and the tones required. If chloride alone is to be used, ten grains of ammonium chloride to the ounce of solution will make a very good average solution for general purposes and negatives of ordinary density. The thinner the negatives, or the stronger and blacker the tones desired, the stronger may be the salting, and *vice versâ*, a corresponding difference being made in the strength of the sensitising bath. The greater the proportion of organic matter present the lower may be the strength of the salting bath without loss of vigour, while if any of the salts of the organic acids be used in combination the quantity of chloride *must* be reduced, or heavy prints, altogether lacking in brilliancy, will be the result.

In substituting any of the other chlorides for that of ammonium, it will be needful to modify the respective quantities in order to secure identical results; the equivalent quantities of the various chlorides to ten grains of chloride of ammonium are—of chloride of sodium, eleven grains; chloride of potassium, fourteen grains; and chloride of barium, twenty-two and three-quarter grains.

Of the organic salts, the citrates, tartrates, and oxalates find favour in the order named. The great fault of the first-named lies in their deliquescence, for we think the printing result is indubitably finer. Tartrates come next, and the combination of chloro-tartrate of silver is manageable, gives pleasing results, though the range of tones is not so wide as with citrate. The oxalate combination is slow in printing, but where a black tone is desired it can be recommended, though the prints require very thorough washing before toning, owing to the reducing action of the oxalates upon the gold bath. Very sparing use must be made of these organic salts in combination, owing to their powerful action in adding vigour and density to the image.

Other organic salts, such as the succinates, malates, lactates, and many more, have been recommended from time to time, but insufficient benefit appears to accrue from their use to make up for their extra cost. The serum-of-milk process owes its particular features, no doubt, to the lactates and milk sugar it contains.

Of inorganic salts other than the haloids that have been used at one time or another the phosphates and carbonates may be briefly mentioned. Phosphate of silver found some favour in the earlier days of paper printing, but what its special advantages were we do not at present remember. It was objectionable, however, on account of its yellow colour. Carbonate of silver in conjunction with the chloride has been well spoken of as tending to the production of a keeping paper. One method of its application consists in floating the paper after sensitising on a bath of alkaline carbonate by which the free silver is converted into carbonate. Such paper, however, requires fuming with ammonia before it is printed, and even then the results are noted for their delicacy rather than their vigour.

A soluble carbonate may be introduced into the salting bath if desired, with the result that black or grey tones are produced according to the extent to which it is used. The carbonate of ammonia is the best to employ, as the presence of ammonia salts of any kind seems to help the vigour of the resulting prints.

The following formulæ will be found typical ones of their kind, and may be varied according to circumstances, as already detailed. For brown to black tones, or for general range of colour, let the salting solution consist of—

Gelatine	120 grains.
Chloride of ammonium	200 ,,
Liquor ammonia	5 minims.
Water	1 pint.

Dissolve the chloride in the water, warm, then add the gelatine previously swelled, and when that is dissolved allow

it to cool and add the ammonia. In cold weather this will have to be warmed before attempting to float the paper. It is suitable for paper of a smooth, hard texture. For very porous paper, unless specially prepared as described in our first article, the quantity of gelatine may be doubled with advantage.

In printing on the rough surfaced drawing papers, which, by the way, are scarcely suited for any but large work, where great boldness rather than delicacy is desirable, the proportions of gelatine and chloride may be modified as follows :—

Gelatine	30 grains.
Chloride of ammonium	280 „
Liquor ammonia	5 minims.
Water	1 pint.

The paper should be floated at least three times as long as a thin paper, so as to allow it to absorb a good quantity of the liquid, as it is not so essential to keep the image on the surface in large work. The sensitising bath may be used from a quarter to one-third stronger than what we shall describe as the normal, though this is not absolutely necessary, as for the same reason just given the paper may be floated on the ordinary bath for a longer period without detriment to its brilliancy.

Where decidedly brown or sepia tones are wished for the ammonium salt may be replaced in equivalent proportions in either of the above formulæ by chloride of barium. From the recently published observations of M. Lumière, it seems possible that some use might be made of the solvent action of barium chloride upon gelatine for purposes similar to the present.

For purple, purple brown, and black tones, a good working solution is made by heating a pint of carefully skimmed milk with a few drops of acetic acid added until the curd separates, allowing it to settle, and pouring off the serum. To this add for each ounce ten grains of chloride of ammonium, and sufficient liquid ammonia to render it slightly alkaline.

A more highly organic result is obtained by using the precipitated and redissolved caseine prepared as described in last article. Effects are produced in this way that closely resemble matt albumen prints. The caseine is redissolved with as small a quantity of ammonia as possible, to make up about the same volume as the milk from which it was thrown down, and the chloride afterwards dissolved in the solution so formed. The ammonium salt answers best with this organifier, and may be used at normal strength, namely, ten grains to the ounce. This is specially applicable to thick, rough papers, as a strong body may be applied to give vigour without producing gloss. Any excess of ammonia is given off as the paper dries.

The method of using nitro-glucose as given by the late Dr. van Monckhoven many years ago was as follows :—The nitro-glucose was dissolved to the extent of 176 grains in a pint of alcohol, and kept at a temperature of 43° Centigrade (109° Fahr.) for about ten days, by which time it has decomposed to such an extent as to give a precipitate with nitrate of silver. The paper was passed through this solution and hung up to dry, and then immersed in the salting bath for a couple of hours and again dried. This method was intended for printing by development, but as a means of *salting* is equally applicable to "printing out."

For the latter purpose we have secured very satisfactory results in combining the salting with the nitro-glucose in alcoholic solution. The formula employed was as follows :—

Nitro-glucose	180 grains.
Chloride of calcium	400 „
Clean methylated spirit	1 pint.

We took no special means to bring about the decomposition mentioned by Dr. Monckhoven, but used the solution just as made. In our hands the paper was floated, not immersed, and hung up to dry, which it did very quickly. The sensitising was performed upon a silver bath of sixty grains to the ounce in equal parts of methylated spirit and water, the floating being for five minutes. Paper so prepared prints rapidly of a rich purple colour and keeps well. Dr. Monckhoven states that it will keep after sensitising for several months.

In using citrate, tartrate, or oxalate, the quantity of soluble chloride should be reduced by nearly one-half, and a suitable proportion of the organic salt added. As an example of the proportions required take the following :—

Gelatine	90 grains.
Chloride of ammonium	120 „
Citrate of potash	40 „
Water	1 pint.

It is not by any means certain that, except for special effects, any advantage is gained by using these ; but where special vigour is desired, a short trial will settle the best proportions.

The sensitising is performed with all the formulæ we have given on a sixty-grain bath, and two to three minutes' floating, except in the case of nitro-glucose, the impermeable character of which requires special provision. Where any departure is made from the strength of salting given, alter the strength of the sensitising bath in the same proportion, namely, about six grains of silver to the ounce for every grain of chloride. Let the bath be always neutral or slightly alkaline.

The strongly alkaline or ammonio-nitrate bath had and has many friends for plain paper which has no albumen gloss to be destroyed. It is said to print more rapidly, and to give equal vigour with a weaker bath, and various other advantages are claimed. It is made by dropping gradually into a fresh and perfectly neutral solution of nitrate of silver strong ammonia, stirring continually until the dense black precipitate just formed has almost redissolved. The solution is then filtered. We may note that a solution of silver that has already been in use cannot be converted in this manner, as the addition of ammonia causes no precipitate, the nitrate of ammonia (or soda or potash) in the solution preventing the throwing down of oxide of silver.

The toning and fixing of plain paper prints is performed with the same solutions as those employed for albumen paper. Any good toning bath used a little weaker than for albumen will give the similarly characteristic tones, but perhaps the best are the phosphate and carbonate baths used cold, or nearly so.

To amateur photographers desirous of a change from the beaten track of albumen, platinotype, and gelatino-chloride, we cannot recommend a better and more pleasing departure than the one which has formed our subject.

DECLINE OF PROFESSIONAL OUTDOOR WORK.

It is sometimes said that professional photography has seen its best, or, at least, its most profitable days, and although we refuse to believe that this is correct in the general sense, there are some departments of the art of which it is plain the professional man has not the hold he once had. Without either a spirit of pessimism, or a desire to rekindle the embers of the perennial amateur *versus* professional controversy, we select this opportunity of shortly considering how far some of the fluctuations of time and circumstances have, in our view, adversely

affected the skilled professional photographer. The use of the latter term assumes to the individual a complete practical grasp of every branch of photography, such as, we fear, is none too common nowadays; but in our remarks we shall imagine the abstract entity as fulfilling those conditions.

There is no denying that the photographer has lost a great deal of outdoor work. Of old, he was employed by numerous professional men. Thus, an architect would want photographs of buildings in course of erection, alteration, or completion; of cases showing ancient lights, and so forth; nowadays, he is probably a photographer himself, or numbers one among his assistants, so that "the office" takes the negatives, perhaps as well as a professional man, and doubtless much cheaper. Auctioneers with houses and estates to let and sell also do their own photographs now, and we have heard it suggested that this explains the inferiority of quality which those pictures usually display.

In the hands of solicitors, surgeons, and many other professional people, photographic knowledge is of peculiar value, and it is expecting too much of human nature to think they are going to patronise a photographer out of sentiment now that they can do without him.

Landscape work—which, although not strictly coming within our proscribed scope, will serve to throw a side light on one or two of our points—landscape work which used to be so lucrative a "line" to many is also rapidly slipping out of professional hands. We have been told that one extensive establishment, which until recent years maintained a considerable staff of outdoor operators, cannot at the present time find work enough for one. Folks take their own views and groups nowadays. Seaside people say that trade in seascapes is exceedingly small. Why is this? The consumer consumes just as much, but he has become his own producer. Several firms who did large businesses in producing landscapes have either gone, or are going, quite out of notice. Keen competition among themselves, as well as the transformation of consumer into producer, have made the game, in the popular phrase, hardly worth the candle. We have heard of a gentleman who was in the habit of annually visiting the Continent to expose a great number of large-sized plates there, which he would send home for development, receiving so much for each negative produced, whose terms have been so frequently reduced that he has at last declined any further commissions.

We cannot and do not impute this displacement of professional work to the influence of amateurs, as such; the point we desire to emphasise lies far beyond these confines. The outdoor photographer was once appealed to as a specialist, and is not so now because his clients, and many who would have been clients, have become as skilled as he is. The average amateur does not, we firmly believe, injure the professional photographer in the slightest degree. The real disturbance arises from many circumstances, such as that now at railway and engineering works, in shipbuilding yards, in numerous large manufacturing establishments, one or more of the regular *employés* undertake whatever elementary photography is required, while formerly a professional photographer would be called in as occasion demanded. We have seen many pictures of ships, locomotives, foundry ware, cabinet work, warehouse interiors, patented goods and specialities, porcelain, in fact, most of the principle products of industry, taken—and well taken—by members of permanent staffs.

The photographer whose business consists mostly of portrait work and its concomitants has, of course, not been greatly affected by this swing of the pendulum; it is the man who one day is copying a deed, the next taking a horse, or a bridge, or a landscape, who photographs everything or anything, in short, whose practice has been of a miscellaneous kind, it is this man who suffers. It almost seems as if professional photography will soon revert to what it was when it was first followed as a means of livelihood, namely, portraiture pure and simple. It is consoling to know that in that department the position of the professional is unassailed, and we allege the undoubted circumstance as a good set-off against what may have seemed a too darkly drawn picture.

He is wise in his generation who accepts the accomplished, and who, finding his outdoor connexion slipping away from him, seeks means to replace it with work of another description. In drawing attention to these disagreeable phenomena, which, unfortunately, are attendant upon the diffusion of knowledge in other walks of life besides photography, we are moved by a wish to be of service to many of the old school of photographers who are happily still among us, but who seem to be reluctant to go with the times, and are consequently less flourishing than they might be. Despite the fact that as regards outdoor work and one or two minor departments professional photography is undoubtedly on the decline, the industry taken as a whole is an expanding and a growing one, and there is no substantial reason why photographers generally should not advance with it.

The number of letters we are constantly receiving with reference to the copyright in photographs proves, if further proof were necessary, that the law, as it is at present, is utterly inadequate to give protection to pictures taken in the ordinary course of business: therefore they are being pirated in every direction, particularly by the illustrated press. Still, after all, photographers are very apathetic in the matter, and take no steps whatever in attempting to get the law amended. It is true that three or four Bills on the subject have, in years past, been introduced in Parliament, but at the end of the session they have always suffered in the "slaughter of the innocents."

While the Bills were, however, before the House, and they contained clauses which would have materially affected the profession if passed, no movement was made by it towards bringing about an alteration. It was thought at the time that the Photographic Society of Great Britain was the proper body to take up the subject. But *they* did not, or they had not the energy to do so. Now we have a Photographic Section of the London Chamber of Commerce, surely the subject of copyright in photographs is one well within their province, and one that they might well take in hand for the benefit of the profession generally. Any proposition coming from such a body, we feel assured, would have considerable weight in the House.

The price of silver is still rising. According to the money article in a daily contemporary one day last week, "a corner" in this metal seems to be designed in view of Treasury purchases when the American Silver Bill comes into force next month. It is also asserted that just now the market is entirely under the control of American speculators. Be that as it may, bar silver is being quoted at 51¼*d.* per ounce, the highest price it has attained for many years past.

The Camera Club has issued with its August *Journal* a set of drawings, including plans and elevation, of the premises being prepared for them in Charing-cross-road. Everything that can possibly conduce to the comfort and requirements of the members has been provided for, including even a workshop fitted with a table, cabinet-maker's bench, and a complete set of tools. The building is of red stone and red brick, and has a frontage of 51 feet on the Charing-cross-road, and 50 feet in Cecil-court. There are five floors, the principal room, in which the ordinary meetings will be held, being 43 feet by 26 feet,

with a height of 14½ feet. In this room a wall space, 9 feet square is painted white in order to show lantern slides.

A CONVENIENT photographic studio has just been erected in connexion with the Record Office. In this building the documents can be taken whenever photographs of them are required. There is a studio attached to the Patent Office where the drawings lodged with the different specifications are photographed prior to their reproduction by photo-lithography. At the British Museum also there is a photographic studio for the use of those who desire to copy any of the prints or manuscripts there.

WHEN will there be a photographic studio connected with the National Gallery? If a photographer now has to copy a picture he is compelled to work at the greatest possible disadvantage, and always in the building. Every one knows, in copying a painting, that a successful reproduction depends upon the picture being judiciously lighted, and this is often an impossibility at the National Gallery under existing conditions. Some few years ago an enterprising Continental firm was permitted to put up an unsightly iron structure in front of the main building, into which they were allowed to remove the pictures for copying—a privilege no one else, either before or since, has been accorded. As we have just said, the works are not allowed to be taken out of the building, and sometimes even they have to be copied *in situ*. If a studio with its convenience is required at the British Museum, one is doubly so at Trafalgar Square.

DETECTIVE cameras appear to be coming into use amongst detectives—that is, private detectives—if one may judge by an advertisement appearing in the "agony column" of some of the daily press. It runs as follows:—"Instantaneous photography, for secretly securing photographs of persons when together or separately, for identification and corroboration." In some recent law suits, particularly in the Divorce Court, the evidence of private detectives has been somewhat severely handled by counsel, and it is quite possible that photographs produced under their auspices might be similarly dealt with.

AT one period photography was looked upon in the Law Courts as being immaculate, but of late years it has been accepted with more or less suspicion, and sometimes even not accepted at all. The different courts are beginning to learn that photography can be made to lie, and, moreover, to "lie like truth," and to such an extent as to almost deceive the initiated. Celluloid films particularly lend themselves to this end. As we have shown in recent articles, it is perfectly easy to combine different negatives into one so that the junctions are quite imperceptible. It is a very simple thing with films to produce a group of two or more persons who were not or ever had been in each other's company. The time will no doubt come when, if photographs are submitted in court, experts will have to be called to testify to their authenticity or otherwise.

ONE of the Society papers, in an article on the portraits of celebrities shown in the shop windows, makes the following remark:—"Miss Shortskirts shows in her picture quite as much—if anything, perhaps a little *more*—of her figure and her legs as she does on the stage; and she is wise. The stage groans under the thumb of a Lord Chamberlain; the photographic art knows no such controlling influence." In the opinion of many people this is perhaps to be regretted. However, the publishers of portraits of celebrities know very well that portraits of ballet girls in scanty clothing are far more saleable stock than are those of bishops "'tis true, and pity 'tis 'tis true."

ON THINGS IN GENERAL.

A WELL-KNOWN writer has informed us of the danger of "prophesying unless we know," and his wisdom is doubly proved by the sequel of an innocent remark of mine at the beginning of my notes of a month ago. "There would appear to have been no personal friction at the Convention meeting," I wrote, inferentially suggesting such friction would be altogether foreign to the Chester Convention. But how woefully have I been deceived! The management and the findings have roused as bitter hostility as is to be found in an average religious or artistic polemic. One can often get amusement, tinged it may be with sadness, and sometimes instruction, while the disputants are losing their temper. In the heat of argument a man's feelings have been known so to get the better of him as to paralyse his power of correct quoting, but the line has always to be drawn at distinct untruthfulness. I am sorry to find that, in two instances, one of each pair of disputants has trampled the truth underfoot. I do not believe there is amongst eminent photographers a man more generally liked than Mr. Warnerke, and when, through over-eagerness and championship of what he looks upon as a just cause, he allows himself to say that which is not true, it is a little remarkable that afterwards he has not withdrawn his statement with a graceful apology. The chief faults Mr. Warnerke finds with the remarks in the report are founded on figments; photographers were not insulted, as he states. The ignorance of our complicated British system of weights and measures, shown by a clever experimentalist like Mr. Warnerke himself, is sufficient proof of the sagacity of the Committee in not going further than they did with their recommendations as to the metric system—a much more inconvenient one than the British for domestic purposes—being one that the mass of the "inhabitants of Germany, the Balkan peninsula, and other countries of the Continent," were conversant with three months after introduction. I am in no position to enter into their mental capacity, but this I do say: Mr. Warnerke would be very unwise to attempt to prove that they all made general use of it either within three months or three times three years after its introduction.

If Mr. Warnerke is blameable for over-harshness, what can be said of Mr. Emerson's very remarkable observations regarding Mr. Newman? I have had shown to me an article by him attacking the latter in a fashion which it is gratifying to think is rarely seen nowadays in English literature. This lucubration also starts with an untrue assertion, which perhaps was necessary as a kind of internal spur which the pen could resent. This Mr. Emerson appears to desire not to be confused with the owner of a similar sounding name, the memory of which is grateful in the ears of men with literary tastes. We are to understand this is young Mr. Emerson. I am not going to undertake any arguments to or for the style of work this "young Emerson" affects; I desire to raise a protest. Photography, not to say literature, is degraded by the style of writing adopted by Mr. Newman's critic. The following paragraph I quote *verbatim*, and it is in spirit repeated frequently—"I look upon Mr. Newman as a third-rate decorative painter of advanced years." *De gustibus non est disputandum* we are told; hence when I quote another sentence "I would rather serve in Hell with Velasquez and Whistler, and the painter of common things, than reign in Heaven with Raphael, Fuseli, and Newman" it is not to question the taste but the balance of mind of a writer whose bitterest taunt is founded in opposition at any rate to the teaching of one modern—Mr. Ruskin. However, let it go: if Mr. Emerson's sense of art be in any way gauged by his sense of propriety in literature, is fate is nowise uncertain. It will be very entertaining to read the testimonials he half promises to publish. Will they be equal to those of "Beecham's Pills, or "Pears' Soap?" I did hear that at the Convention it was said Mr. Newman was connected with the *Athenæum*: I presume that Mr. Emerson will not publish with the rest of the testimonials all that the art critics of that journal have written about him.

Turning from this unpleasant exhibition one cannot but remark in how different a manner the correspondence between Mr. Pringle and Dr. Lindsay Johnson has been managed; hard knocks are exchanged, but in proper language, rather suggestive perhaps of two men with foils, uncertain of each other's powers. If the Zeiss objectives eventually prove to be constructed with one of the components or fluor spar lens (by-the-by, for some time "fluorite" was the name given, and every one wondered what fluorite was), I don't think the makers can be accused of anything but "cuteness," for no one would have accused them of false representations if the ordinary optical glasses of commerce were used in connexion with the Jena glass. Why, therefore, are we, on ethical grounds, to blame them, when an equally well-known substance—difficult, it is true, to procure coneless—is used, its value for lenses having been by no means unknown for long time past? I do, however, look with very grave suspicion upon that

wonderful lens which the best workers here could not photo-micrograph with, but which, when sent to the Continent and back, was capable of good photography. That is not my experience with lenses—that travelling improves them. Nor is the suggested experience of Mr. Debenham with weak negatives, as given at the technical meeting the other day. I know, and so, I feel sure, does Mr. Debenham, that prints in the sun with ordinary, or, rather, thin negatives, will not bear comparison with prints from the same done in the shade, yet he appears to hold a contrary view. Is this an elaborate joke again?

FREE LANCE.

SHUTTERS, EXPOSURE, AND DEFINITION.

INNUMERABLE as are the types and forms of exposure shutters, it is very certain that we have not yet attained perfection, or anything like it: indeed, it appears as if a large section of amateurs who practise "instantaneous" work are content with anything that bears the name of shutter if it only looks rather complicated.

That there are many really good forms of shutter in the market no one can deny, but I think most practical men will agree that the best are, as a rule, the simplest, and, as a matter of fact, for ordinary "quick" work—street scenes and the like—no very great degree of rapidity is necessary, and the simpler the mechanism the better. For scientific purposes and for some classes of subjects out of the common run it may be necessary or desirable to go into hundredths and even thousandths of a second, and then no doubt the highest skill of the mechanician is no doubt required: but what the every-day worker chiefly wants is a shutter that will give him a moderately short exposure with the very largest amount of light possible.

I will not say that the question of the proportion of light actually utilised by the different forms of shutter has been neglected, for some years ago a good deal of attention was devoted to the subject, but latterly, since shutters became so painfully numerous, their discussion has been almost tabooed, and many of the more modern amateurs look to nothing beyond speed, imagining that every exposure of, say, a tenth of a second, gives the same amount of light to the plate. I need not point out the fallacy of this idea, for any one with but a brief experience in photography must be aware that the same shutter will vary greatly in this respect, according to the position in which it is used with regard to the lens.

I think there can be little doubt that there was more commonsense, if less mechanical ingenuity, displayed in the shutters of ten or eleven years since than in many of the more modern ones. If any one will look back at the ALMANAC of 1880, and study the different shutters there described, I think he will be of my opinion, for just previous to that period the want of a good shutter had been experienced, and the subject was being investigated, with the result that many good and simple ideas were published, the principles of some of which were subsequently dressed up with various mechanical improvements to fit them for the Patent Office.

One of the simplest and best of the principles involved in some of these old shutters is that of making the exposure by means of two plates or discs crossing one another; the advantage of this is, that with practically the same motive force the exposure can be made much more rapid than when a single plate or disc is used; or, if the same duration of time be adhered to, a vastly greater quantity of light can be utilised, since by doubling the length of the two apertures the full opening of the lens is at work for a much larger proportion of the total exposure. But this only refers to those forms in which it is possible to so enlarge the openings in the moving discs, for if the apertures, whether circular or square, be, as in many cases, practically no larger than the full opening of the lens, the latter is working at its highest power for but an infinitesimal fraction of the total exposure, and the only gain is in shortening the duration of the action with a corresponding loss of light.

The difference between the quantity of light admitted by a single and a double disc shutter, giving an equal *length* of exposure, may be graphically illustrated by supposing the first to be represented by a diamond-shaped figure, the longer diagonal of which gives the length of exposure and the shorter the volume of light. Commencing with the exposure at one end of the longer diagonal the volume of light admitted increases until the full aperture is reached at the widest part of the diamond, and then it immediately begins to decrease in precisely reverse fashion. If we give the diamond the dimensions of four inches and two on its two diagonals we shall find that its superficial area is four square inches. Now substitute a double disc shutter working with the same motive force, i.e., each disc travelling in opposite directions to one another at the same speed as the single one. In this case the maximum exposure will be reached in half the time, and the figure given when the exposure is complete will be a square, whose diagonal is two inches and its side $\sqrt{2}$; its superficial area is, therefore, just half of the previous figure.

But now, if we take a double-disc shutter with the apertures doubled in length, which will make the exposure equal in duration to the first or single disc, we find an entirely different figure. Commencing at the apex as before, the maximum width or exposure is reached in the same time or distance as in the previous case: then the boundary lines proceed in a parallel direction for double the distance, and finally converge in a reverse figure to the opening. The shape is, in fact, something like a rather stubby "tip-cat," and if we measure the superficial contents we find they are six square inches; in other words, half as much more as the single disc and three times as much as the double disc, with square or circular apertures.

As I have shown, there is a decided advantage in using the double shutter with square apertures where rapidity of action is required regardless of loss of light, but another advantage is claimed by some for certain forms of the double action shutter. The above calculations refer to square apertures passing one another in the direction of one of their sides, in which case the exposure commences at once across the full breadth of the opening. But there is another type in which the apertures cross in the direction of their diagonals, the exposure then commencing and finishing in a point at the centre. For such shutters a finer degree of definition, other things being equal, is claimed on the ground that they act as diaphragms during the greater part of the exposure. This claim, I shall endeavour to show, is based on an entire fallacy.

But, first, as regards the relative amount of light admitted as compared with a single aperture of the same dimensions. I have not ventured to attempt to calculate this accurately, but obviously the loss must be very much greater than in the case of the apertures travelling in the direction of the sides. For instance, in the latter case, when the shutter has performed one-eighth of its opening, precisely one-eighth of the area is at work, but in the other case, when the shutter is one-eighth open, only one-sixty-fourth of the real power of the lens is operating, and when it is half open it has only attained one-quarter the value of the full aperture. There must then be an immense loss of light as compared with the other instruments already mentioned: still, if there be a gain in definition it is something.

But, unfortunately, those who make this claim overlook the fact that during the periods when the shutter is acting as a stop and the lens is defining at its best, the light is so extremely feeble that its action is overwhelmingly smothered by what enters when the lens is working at its worst. Thus, for instance, take a shutter whose full aperture is one inch; each fractional part of a second that that aperture is at work spoiling definition as much light enters as during sixty-four times that period would reach the plate through the opening of one-eighth of an inch, or four times as much as during the same time would pass through the half-open shutter.

It would be a difficult as well as a tedious and laborious job to thoroughly work out this matter to the end, but I will venture to give a little calculation I have made which will help to throw some light on what I mean. It is based on the supposition—a reasonable one, I think—that equal volumes of light passing through stops of different area would give the same definition as the medium stop between them, the extra definition secured by the smaller being then exactly neutralised by the larger. I adopt this plan merely to simplify the calculations, confining myself to the working of the lens at its best and its worst, and ignoring the intermediate and constantly altering sizes of opening.

Let us suppose, with a total exposure of one-tenth of a second, that the total light reaching the plate is equally divided between (*a*) the full aperture of one inch and (*b*) the aperture of one-eighth of an

inch. The relative exposures will have to be with (*a*) one-sixty-fifth of one-tenth of a second, and with (*b*) sixty-four-sixty-fifths of one-tenth of a second; or for (*a*) ·00154, and for (*b*) ·09846. If we now take the half-inch aperture or stop midway between (*a*) and (*b*) and calculate the time it would require to perform the same work under similar conditions, we shall find that it would take four times (*a's*) exposure *plus* one-sixteenth (*b's*), or a total of practically ·0125, or one-eightieth of a second. Thus, assuming that I am correct in my belief that the half-inch stop would give equal definition to that obtained by the joint use of the two others, I would do it in one-eighth of the time.

But with these centre-opening shutters, though it is impossible without having a shutter much larger than the lens to prolong the exposure with full aperture, it is possible to stop down the lens and so work for a considerable portion of the period with a moderate-sized diaphragm, and so escape the loss of definition resulting from the preponderating influence of the larger openings. This can be done, too, with far less prolongation of the exposure than might be imagined. Let us divide an exposure into eight equal periods, the periods representing the exposure successively with apertures increasing by eighths from one-eighth to an inch. The amount of light passing through the one-eighth aperture during its period we will call the unit of light, the number of units passing during the succeeding periods will then be 4, 9, 16, &c., and the total of the exposure 204.

Next, let us insert a half-inch diaphragm and repeat the exposure with the shutter, dividing it into periods as before. Now we have five periods of exposure with the half-inch stop, equal to 5 × 16 units, or 80 together, with 1, 4, and 9 units from the remaining three periods, or a total of 94 as against 204 without the stop. This represents forty-six per cent. of light, or in other words, with the stop we should have to give a little more than twice the exposure.

But now for the question of definition. Let us call the three smallest apertures "good," the half inch "medium," and the four largest "bad" definition. I will spare the readers the details of the calculation, but the following are the proportions in which the light acts on the different grades of definition. Without stop: Good definition, 6·86 per cent.; medium, 7·84 per cent.; bad, 85·3 per cent.; total, 100. With stop: Good definition, 15 per cent.; medium, 85 per cent.; bad, *nil;* total, 100. Surely the difference in quality of definition these figures promise should make up for loss of light!

I fancy that any one interested in instantaneous work who will take the trouble to go in for a few calculations and experiments of this kind will find it worth his while. The centre-opening shutter is, I think, the worst "light-waster" we have, and as for its advantages in the matter of definition they are purely imaginary. What we really want is the ideal shutter Mr. W. E. Debenham recommended years ago in the form of a revolving disc, so cut away as to leave just sufficient material to cover the lens. A revolution of this shutter leaves the lens exposed the greater part of the time, instead of, as is too often the case, closed except for the brief instant a small aperture passes it. Shutters of the "double flap" kind, when properly arranged, pass a very high percentage of light, and may be extremely simple in construction. It is in this direction, rather than that of intricacy of mechanism, we have to search.

W. B. Bolton.

THE ART OF RETOUCHING.

Chapter XV.—Method No. II.

A method which finds considerable favour with many of our English retouchers consists of filling in or spotting, as it were, all the leading imperfections and general defects almost completely; that is to say, the pencil is worked very carefully all over the face, filling up all the transparent spots or specks, lines, and other markings, until no trace of them is left. This done, the inequalities of light and shade, also the modelling of the various features and muscles of the face, are harmonised by a system of more or less straight lines running in a downward direction. In this treatment, as often as not, the lines must necessarily run *across* the muscles and lines of the face. Although, as I said, many really good retouchers adopt this method, and some undoubtedly good results are gained by it, I do not at all think it an advisable one to adopt as a model upon which to form a special style or method for one's own particular use.

As the reader will observe, there are some points, though few, in this method which may be considered slightly analogous to the method described in the preceding chapter. It will be easy, on examination, to see how very slight, however, is this resemblance when I say that it is only to be found in the treatment of the nose and the frontal depression.

In this method, although the lines all take a downward direction, they are very seldom parallel, or, to be more correct, perhaps I should say equidistant. Now this must necessarily detract from the firmness of touch as well as the general quality of the work when finished. I have known retouchers, who were more than ordinarily skilful in the execution of this method of working, who made these lines so very fine that they have, under some circumstances, imparted the appearance of having been *dotted*. Indeed, when extremely successful, and on a negative which lends itself somewhat to this method of working, results may be produced which might easily pass as having been accomplished by a system of *stippling*. This, however, occurs but seldom, as few negatives will offer favourable opportunities for success; besides, the effect will be by no means so good as that produced by the bolder and more artistic treatment of the lines, and need not, therefore, demand our further attention.

It will be found advantageous, when striving for a style of one's own, to reflect well on all the various methods of working—good, bad, and indifferent—but care must be taken not to model it upon any system but the best. The knowledge of an inferior method need not make a student fall into the errors of its ways, but, on the contrary, serve as a warning to keep away from them. It may seem strange that I should lay down the theory that a really good and well-defined method should not be adopted by the student, and, in fact, become the general treatment for all retouchers. This, however, will easily be understood when I say that *sentiment* (if I may be allowed the expression) is an all-important factor; indeed, I may say an absolute necessity in the production of truly artistic and successful work. It is this very *feeling* or *sentiment* in the retoucher's art that makes it absolutely necessary for each artist to adopt his own particular method, that *system* which will produce in *his* mind the most harmonious and graceful results. There is, in my mind, relatively as much sentiment and appreciation required in a retoucher's treatment of a head in a negative as there is in an artist's colouring of a picture. *All* artists will not sketch in and colour a portrait according to hard-and-fast lines, but rather be guided by their *feelings* as to the most favourable manner of treating their subjects. It is this same *feeling* that must guide the retoucher, although in a less degree, and in a much humbler work of art.

It is the possession of these artistic feelings that will show to advantage as a retoucher perfects his style of work, and according to the degree they are possessed and taken advantage of, so will the excellence of his work be valued. It is *feeling* alone that will preserve *intellect* in a head, while *taste*, so called, may prove sufficient to produce a passable work. It is needless to say which would take the palm in the scale of excellence.

In America all the various methods and styles seem to have their fair share of supporters. As a rule, however, the leading retouchers work rather more in a scumbling style, being bound by no very fixed rules as to the making of a stroke. Wherever taste suggests, or an imperfection requires it, there he places his touch. This is most naturally a very convenient manner of working, and when the retoucher is thoroughly experienced he can carry it to a very high degree of perfection. But, mark you, one must be truly proficient to succeed in it. Of course, in this treatment it is not usual to pay any very particular attention to the direction taken by the lines of the skin or muscles; at the same time, the work will be found to take a more systematic form than that which might be described as simply *scumbling*. The nearest I can get to a description of the touch is by calling it a *saw-tooth* one. If examined with a powerful magnifying glass the shape or character of the markings will be found to closely resemble the "business side" of a saw. The touches are generally made very fine, and produce a very charming effect of stipple when printed. The student can easily see what I mean by carefully examining a few of the American portraits sent over to this country.

Sarony & Mora, of New York, have sent us very many beautiful examples of retouching, and which are well worth the best attention of the intending retoucher. Of late years retouching has been carried *too far*, and a kind of reaction has been setting in which will, I think, effectually check this most dangerous inclination.

On the Continent of Europe there are many very excellent systems of retouching. Indeed, generally speaking, they are nearer the perfection of this art upon the Continent than they are either in this country or in America. Although widely different methods may be used in the same town, or even the same studio, by the various operators, all seem to get the desired artistic effect to a uniform degree of perfection. To this they each add their own natural artistic *feelings*, which instinctively guide them, each and all, to that point of excellence to which the less cultured or commercial retoucher can never hope to arrive. On the Continent excellence and artistic effect are the qualities retouchers place before themselves, and they ever struggle to attain them—a reasonable time being always allowed for the production of first-class work. *Here* in "Merrie England" I regret to say such is not the case. I have met innumerable cases where the important point was not, "*What* can you do?" but "How *many* can you do in a day?" In other words, here it is a question of results—"Does it pay?" There the sole trouble is, "Is it really good and artistic?"

This will easily account for much of the difference between the work produced here and abroad. There are men here daily producing *ordinary* work who, if placed upon the same footing as their Continental *confrères*, would be found capable of producing results second to none. In this country we are commercial or nothing. As I before hinted, it is more a question of "How many heads has he done to-day?" than "What splendid work this man is producing!" that is likely to decide the importance and general *status* of a retoucher. By all this I do not wish any one to infer that we cannot hold our own, or that all we do is wrong and everything done on the Continent is perfection. On the contrary, we will find on examination that large numbers of Continental negatives are manifestly much *overworked*, and the *likeness* almost, if not absolutely, entirely taken away. I regret to say that even these, as a rule, please the ignorant public (I hope they will forgive me), and so the majority of the photographers continue to send forth such productions. I most sincerely wish the public would be less easily gulled by injudicious flattery, as much better works would be the result in thousands of cases where really bad ones now pass muster.

It seems to be a rather disputed point as to whom the honour of introducing the art of retouching into this country should be awarded. I believe Herr Mohr, of Frankfort-on-the-Maine, however, may fairly be allowed to take the credit. He certainly took the monetary blessings attached to it, if that should prove anything. It is undoubted that a few worked it secretly before his advent, and a very good thing they made out of it. Those who thus practised it guarded their secret as a miser would his gold. They kept it from the rest of the profession, who, in their blissful ignorance, wondered at the excellent results produced by their more fortunate, I won't say more enlightened, rivals.

If I mistake not, Mr. Williams, then of Regent-street, caused not a little sensation in those days by the marvellous results he then produced. For the first time in our history of photography ladies with badly freckled faces got a presentable portrait. The result was everybody flocked to his studio to be taken. And yet how time changes all these things. The best works turned out by Mr. Williams in those days would stand but a poor chance to-day if compared with the best works of any of our leading firms.

In those days the now old-fashioned plates were in general use, and, of course, were not retouched under the same conditions as the negatives of to-day. Then we had to retouch on the collodion film, either before or after varnishing. It was then a disputed point between the various photographers as to which was the better. Colour was the first agent used for retouching, but the pencil proving to be far superior in its working very soon completely altered this state of affairs. It gradually forced colour out of use, until it was altogether abandoned as a medium for retouching. I believe Mr. Williams used colour first for retouching his negatives, although he ultimately adopted the use of the pencil as well. However, he began by using a neutral colour, and sometimes a blue to make up the necessary density required to do away with the defects in his negatives and so produce those results which brought him in vogue.

As I am on this subject I may as well say a few words upon the system of retouching upon the old collodion plates which came into general use shortly after Herr Mohr began to teach it publicly.

The film of the old wet plate, unlike that of its tough, dry successor, was delicate, and would not in its natural state allow of a pencil being worked over it. I do not think it necessary to dwell upon its treatment with *colour*, as it can have very little, if any, bearing upon retouching as now practised. To impart to this delicate film the necessary power of resistance, as well as to give it a *tooth* in order to take the plumbago of the pencil, a medium had to be employed. This refers to working on the film before varnishing; *after*, the varnish itself constituted a satisfactory base, and gave a very good tooth. If you wanted, therefore, to retouch a negative *before* it was varnished, the most common method was to dip each plate in a weak solution of gum, which, when dry, would not only impart a firmness to the film, but also a tooth which greatly facilitated our work. Great care had always to be taken not to breath on the film, as it was exceedingly sensitive to moisture, and the least suspicion of moisture would tend to soften the film, and, as a result, the pencil touching it would be sure to cut through it. Assuming that the plate be all right for working, the negative had to be treated in the same manner as has been laid down for the retouching of a dry plate. It is needless to say that it was a matter of impossibility to work upon these old-time plates with the same boldness and firmness of touch as may be used with impunity upon the films in general use to-day.

The pencils in general use were those of the softer grades, and the touch was light. Naturally these negatives when varnished would admit of being worked upon with much harder pencils and commensurate boldness and firmness of touch. On the gummed film a light touch was all that was necessary, for the tooth on these old-fashioned negatives gave touch as freely as would drawing paper. Sometimes, if the least moisture happened to have been absorbed by the film, the negative would come to grief in the varnishing. Indeed, this fact gave rise to the habit in this country (where we have a little *moisture* at times—even in summer) of generally working *after* varnishing instead of before. During my stay in Paris I never saw a negative retouched *after* varnishing, but here I have had to retouch more than ninety-nine out of every hundred on the varnished film. We used to get a fine surface for working upon on the varnish by applying a medium made up of eighty grains of gum dissolved in one ounce of benzole. When thoroughly dissolved and filtered, this solution had to be applied to the parts needing treatment with a piece of cotton wool. It dried quickly, and by rubbing it gently with the ball of the finger a perfect surface for working upon was procured. If the work did not, for some reason or another, prove satisfactory, it could be removed by the application of a little benzole, and the work begun over again.

Another medium, to be used similarly, was composed of spirits of turpentine, three ounces; and cuttle-fish powder, one ounce. Another, turpentine, one ounce; gum dammar, ten grains; and Canada balsam, five grains. Still another was made by dissolving ten grains of clear resin in one ounce of benzole; allow to settle for a day or two before using.

I worked without *any* medium for years, however, on Hubbard's varnish with the greatest ease and success. It is not necessary, however, to worry much over these matters now, as they all belong to the "long, long ago," and are not likely ever to be needed in the future. Still, they must all have a certain interest for an intending retoucher.

REDMOND BARRETT.

ON THE PROPER ESTIMATION OF LIGHT FOR PHOTOGRAPHIC PURPOSES.

I.

UNDOUBTEDLY one of the factors of primary importance to a student of photography is a proper knowledge and right estimation of the nature of the light at his command for the different kinds of subjects he is called upon to photograph, and he who aspires to take any rank among professionals or amateurs of high standing must study the important bearing that the employment of a suitable light has upon

the success of his operations. In this, not only must some consideration be given to the quantity of light, but also to the quality of light at command, and study to employ such a light as is best suited for the particular class of work it is desired to accomplish.

There is an old saying that "the better the light the better the picture." In one sense this is quite true, but it implies that an operator ought to know and be able to discern what is the best light to employ. A very little consideration of this subject will suffice to show that a light which is best suited for some particular subject, say such as a landscape, would by no means be the best light to employ for some other out-of-door subject, such as a group, or other similar object, where the main thing is to avoid too violent contrasts or over-sudden transitions from light to shade. Undoubtedly, for general landscape work it may be taken that, as a rule, good sunshine is a *sine quâ non*, and when a clever operator, or one who has an eye for the artistic side of photography, comes to frame his picture with the materials as nature offers them to his camera, and has good sunshine at his command, he has an immense advantage over what would be the case were he merely compelled to make a bare photograph without its aid. With sunlight at his command, he can so study to work in his balance of light and shade, and also break up monotonous and uninteresting masses of foreground, that would be impossible to achieve otherwise.

Before, however, treating minutely as to what are the best kinds of light to employ for the numerous kinds of subjects that have to be photographed, it would be well for the student of our art science to give some little thought and consideration to the different "qualities" of light. But very few beginners will have gone far in the practice of photography without having learned from some text-book or other source that the ray of light which exercises the greatest amount of energy, or, in other words, possesses the greatest actinic force on a bromide of silver dry plate, is the blue ray, therefore the presence or absence in varying degrees of such in the light at an operator's command comes to be a very important factor in estimating the proper exposure to be given to a subject.

It will take but little discrimination on the part of a beginner to discern between intense sunlight, with a milky blue sky, and that of bright sunshine, with fleecy clouds sailing rapidly overhead; but a beginner must not fall into the error of supposing that all kinds of sunshine have the same actinic power, and is the most intense light an operator can have at command. Again, some little discrimination is needed to be able to judge between a sky overcast with grey clouds and one in which the clouds are of a lighter or more transparent character. Neither will it be difficult for a casual observer to understand that sunlight, when reduced to diffused light by the intervention of some friendly or unfriendly cloud, according to the class of work at the time, loses much of its power, although, in point of fact, the quality of such diffused light, or the actinic power of such, is but little reduced in its action on a bromide of silver dry plate.

At times it may happen that objects have to be photographed with light emanating from a light blue sky, and upon which sunlight does not fall; when such is the case, it will be found that, even should the eye fail to notice any difference in the brilliancy of the appearance of the object from what would be the case were a diffused light illuminating the same and the work being done with such, and all else being equal, a marked difference in the results would be found, for the actinic power of the blue ray in the former case is much greater than would be found in the case of the diffused light, although to all appearance the eye failed to observe any marked difference in their brilliancy of illumination.

Having noticed the difference in the actinic value of light from a light blue sky, as opposed to that of a diffused light, a student would do well next to turn his attention to, and give some little thought upon, the difference which exists between an object lit by a yellow sunlight as against the same object illuminated with the actinic rays from a blue sky only.

In my practice I have often been puzzled to account for a seeming want of energy when exposing bromide plates to some kinds of sunlight, and I feel that now there is such a rage for hand cameras, and a natural longing for bright, sunny days to use them in, that much misconception is likely to exist on the part of a large number of those who have formed the idea that all that is required for the production of a good negative is sunlight in some shape or form. To such I say there is sunlight and sunlight, and the sooner they learn to discriminate between a light containing a large proportion of actinic rays from a light weak in respect of same, the sooner they will learn to keep their plates or powder dry, and only go on firing off shot after shot on days really suitable for such work.

Meantime, from what I have said it will be seen how necessary it is that a beginner in photography should have a proper knowledge of the difference which exists in the actinic power of the ever-changing light at his command. In my opinion this is the fundamental basis of the whole structure upon which all later operations must of a necessity be built up, and once a student has learned to correctly gauge or estimate, not only the quantity of light, but the quality as well, which he has at his command, he will have done much to smooth down future failures, for he will most certainly have mastered one of the most important, if, indeed, not the most important, factor in connexion with the charming study of photography.

In another article I hope to treat upon the necessity of employing suitable light for different subjects.

T. N. Armstrong.

A TOUR IN ICELAND.*

Next morning we were up betimes, determined to make an early start for once, and a swim in the sea was not to be despised. Before taking leave of our hosts we procured some more champagne, and had a general leave-taking, and when I say we did not leave till 4 p.m. I trust my readers will understand the time was fully taken up with photography. However, at 4 p.m. off we did go, but before long we halted at a farm where Mr. Thordahl proposed we should taste skyr. This being agreed to, a plentiful supply soon appeared; some of us liked it, some did not, and for the benefit of those who want to try it I give the receipt. Boil a quantity of milk, and let it cool until lukewarm, add rennet to sour, then strain off water, and when thick stir up with milk and eat with any amount of sugar. To my mind it is only fit to eat when there is more sugar than skyr, but, of course, tastes differ. One thing I am certain of, and that is, it is not good to ride immediately after partaking of it. However, we had no time to waste, though the day's journey was to be a short one, and away we went, the afternoon's ride being only enlivened by Captain W., who, endeavouring to avoid fording an ugly looking hole, selected his own track, resulting in his pony getting bogged and the gallant Captain being thrown safely to the other side. We ferried the River Thjorsa, and camped for the night at Sandhólaferja Farm at 9.45 p.m., having travelled seventeen miles. This being only a resting place we were early on the march next day, as we had a tough bit of ground to cross in order to reach Hekla, and 11 a.m. saw us in the saddle once more. Our track was for some time along the River Rauviloken, which we forded again and again, until Gudmundsen, apparently getting tired of it, proposed to take a short cut. This, like most short cuts, proved a fraud, for, after meeting with bogs and losing our way, we had to make our way back to the beaten track across several miles of abominable swampy ground. To our amusement our guide Gudmundsen, a veritable champion rider of Icelandic ponies, was thrown on the boggy ground through his pony coming down unexpectedly, but at the same time I am not certain he had any girth to his saddle, for all the harness was of such a rotten description that whenever a strap gave way Gudmunsen had to hand over his own to replace it, and he often rode with much less apparatus on his pony than most riders would like. We got as much riding on this occasion as satisfied every one of us, and when we reached the base of Hekla at 8.30 p.m., a distance of thirty-three miles over most uninviting road, we were all ready for dinner. On this occasion Captain W. distinguished himself, for, after retiring to the nearest farmhouse with sundry tins of provisions, he produced hot soup and meat which was judged perfect; indeed, the Captain turned out to be a skilled cook, and many of his dishes were worthy of an English kitchen with every appliance. At last we were to have a day off to allow for the ascent of Hekla, and for one I was extremely thankful, for the sufferings I had gone through in the saddle had well-nigh finished me.

Hekla was duly ascended next day by the President and two others, while the rest of us spent the day on the plain beneath. Those who climbed were duly rewarded with lovely weather, a magnificent view, and a descent into the crater. The hand camera was taken to the top and views taken of the crater, but the labour in doing so was so great that not many others are likely to repeat the experiment. On the plain beneath I found a splendid bit of wild river running furiously between steep basaltic sides, which had fallen in in many places, and I took the trouble to retrace my steps some three miles to bring the artist, who spent the rest of the day there. While lying half asleep in the tent watching the sunset tints lighting up Hekla with the most gorgeous colours, I began to realise what I had been doing. Here was I, who practically had never ridden in my life before, out in the wilds of a distant land. It almost seemed a dream; it puzzled me to think how I had got to Hekla, and much more so how I was to get home again. Already sore and tired out with exercise almost hateful to me, it was only the love of photography, and the hope of seeing the great Geyser spout, that nerved me to continue without murmuring. While in camp here our next photographic difficulty came about, for to our horror a large rent was found in our changing tent, and had it not been for the President, with needle and thread and a bit of dark-coloured cloth, our photographs would probably have ended there. An icy cold stream afforded us a morning bathe, and these daily washes were of considerable importance after riding through clouds of the

* Continued from page 490.

finest sandy dust all day, which made its way inside cameras, and it yet remains to be seen whether any plates have been spoiled as well.

On the morning of the 12th of July we struck camp at 10.30 a.m, and rode through a regular sandstorm to the River Thjorsa, which we ferried for the second time, and after a pleasant ride reached Hruni at 5.45 p.m. —a distance of twenty five miles. The only feature of the day was the number of ravens which we passed, each one calling at us in angry tones for disturbing its solitude. At Hruni we met three other travellers bound for Hekla. One of these carried a facile hand camera, but after disposing of nine plates the machine had stuck, and had it not been for our luck tent he would have had a bad time of it, as he had not calculated on having no night.

Hruni being only a resting place, we were on the march again next morning at 10 a.m. for the Gull Foss, one of Iceland's finest waterfalls. The fall was reached soon after 2 p.m. and after lunch the cameras came out. Rarely has a more magnificent fall been photographed, and I sadly regretted having only two plates ready; but I was doomed to further disappointment, for after exposing my second shot I discovered it was on the top of the first, so I shall have a poor result compared with the others. We left our artist at work with a guide to take care of him, and rode on to Geyser, which we reached at 6.30, after fording several rivers, one of which was about as much as could be done without a swim. Our baggage, having gone a shorter and direct route, arrived before us, and the tents for once were pitched and ready before we arrived. At last I was satisfied; here was the sight I had come to see, and it was well worth all the trouble we had gone through. By way of luck, we threw several coins into the great Geyser and retired for dinner. Having satisfied the inner man, we went the round of all the boiling springs and geysers, and amused ourselves in plugging up a particular one which took our fancy. The result was not a success, as the geyser merely churned up our sods and showed signs of uneasiness; but suddenly a shout brought us all to the great Geyser, which, after a few seconds of rumbling, shot up a column of water some twenty feet high, and then quieted down for the night. It was not a grand discharge, but it pleased us as much as could be expected, considering that the chances of seeing a big explosion are very small unless a stay of several days is made. We were too excited to sleep, and our tent was a perfect bear-garden till long after midnight waiting for another eruption. Sleep, however, did come, and continued till 7 a.m. when one or two loud reports warned us that Geyser was again uneasy. We were out of bed like a shot, but merely to see the monster overflow for a short time and then calm down again. After breakfast Strokkr was given a fill of soda, which was calculated to take a few hours to work. In the meantime we ranged round the different pools, and did our best to secure the lot. From a photographic point of view, these wonders of nature are anything but easy subjects to reproduce satisfactorily. The great Geyser basin required all the powers of my wide-angle lens to get it in, and for want of a similar lens more than one of the party had to be content with a portion of it. The saucer-shaped pool of hot water is contained in a smooth, circular basin from forty to fifty feet in diameter. This basin is usually full of water, in which case the central tube or shaft, some seventy feet deep, can only be dimly distinguished, but during an explosion the water is thrown out, and after the eruption is over one can venture to the very edge of the shaft. Some idea of the force stored up below may be gathered from the fact that it is calculated that the temperature of the water at the bottom of the shaft is not less than 280° Fahr., considerably above boiling point. Having disposed of the great Geyser, I tried a shot at another hole exactly like Strokkr, where deep down could be heard the same violent boiling which is the characteristic of Strokkr. This hole and Strokkr are really just like wells with rough, rocky sides covered with siliceous deposits of all colours, and while in the middle of securing this view with camera racked in for wide angle, and swing back set to allow for tilting the camera, a loud yell announced the fact that Strokkr was off. I simply tore off the wide-angle lens, racked out the bellows, and working with reckless speed managed to get off a couple of shots at the rush of water. I was too late for it at its highest point, but it was very comforting to think I was in time to get it at all. The eruption of Strokkr is stated by some writers to last for fifteen minutes, but I am confident it did not spout for more than two minutes; for I know pretty well how long it takes me to adjust my camera, and there was not a second to spare in securing two shots. The President meantime fired eight shots with the hand camera, taking views from all round the column of water, which, I should say, rose fully eighty feet at its highest. After the discharge all the water was found to be blown out, and the steam came roaring through the inlet pipes with fearful force.

I see, on referring to the JOURNAL for 1885, that Mr. Macdona describes the cone of Geyser as being composed of lava, which is incorrect, the mound being a sintery deposit like a heap of dry grey leaves piled up about thirty feet above the soil. The mound has been entirely formed through the deposit of siliceous sinter from the overflowing waters, which are strongly impregnated with silica or flint, insoluble in water at ordinary temperatures, but acted upon by the great heat under the earth. Mr. Faraday states that the solution of silica is promoted by the presence of soda, and this alkali is contained in the rock in the neighbourhood of Geyser. When the hot siliceous water is cooled by exposure to the air, the silica is deposited, being no longer able to remain in solution, not only on account of the cooling of the water, but also because a decomposition of the compound of silica and soda takes place, owing to evaporation and the action of the carbonic acid in the air. The silica is thus deposited as a solid crust, which hardens into a rock called siliceous sinter. Generally speaking, the mound looks like a giant oyster shell, being of the same brownish colour. The falling off in the number of eruptions is supposed to be owing to the continual deposit, which causes the tube to grow higher and so contain a greater depth of water. As the pressure of water increases a higher temperature is necessary to reach the boiling point, and in time we may expect the pressure of water will be great enough to counterbalance the pressure of steam beneath, and then Geyser will become a simple boiling pool.

We did hear at Reykjavik as to what Geyser would fetch if put on the market, and it is not improbable that it will be bought up before long as a speculation and boarded in as a show, to see which one must pay extra.

The fairy-like grottoes, by name "Blesi," tempted us sorely, but being full of boiling water to the brim, we were puzzled to think how to get a picture of them. To the eye, looking down into them, every stone could be clearly distinguished through the intensely blue water, and we had to content ourselves with this, though I dare say some smart man will do what we could not. Blesi is generally used for cooking in, and many a dinner it must have cooked before our turn came, though why it should be selected I cannot think, for the water is below boiling point, and, consequently, second rate for tea and coffee.

Last of all I must mention the "little Geyser," a sort of plaything, which shoots up about ten feet high. About midnight I tried to plug it for a display on my own account, but came off second best, as, not relishing the dose of soda, it shot a quantity of boiling water over my legs, much to my discomfort. The pill worked all the same, and next morning we saw him in his attempt to rival his more noble brethren.

Lovely weather favoured us, and after collecting an empty pickle bottle full of different chemical deposits which abound in the locality, we packed up and prepared to make tracks for Thingvalla.

BROWN SLICK.

(To be concluded.)

THE PHOTOGRAPHIC IMAGE.*

THE oxyhaloid theory was first suggested by Robert Hunt† for the chloride; it was taken up by Sahler, and has recently been revived by Dr. W. R. Hodgkinson. It has been thought that this theory is disposed of by the fact that the chloride darkens under liquids, such as hydrocarbons, which are free from oxygen. I have been repeating some of these experiments with various liquids, using every possible precaution to exclude oxygen and moisture; dry silver chloride, heated to incipient fusion, has been sealed up in tubes of dry benzene, petroleum, and carbon tetrachloride, and exposed since March. [Tubes shown.] In all cases the chloride has darkened. The salt darkens, moreover, in a Crookesian vacuum.‡ By these experiments the oxychloride theory may be scotched, but it is not yet killed; the question now presents itself, whether the composition of the photo-salt may not vary according to the medium in which it is generated. Analogy sanctions the supposition that when the haloid darkens under water or other oxygen-containing liquid, or even in contact with moist or dry air, that an oxyhaloride may be formed, and enter into the composition of the photo-salt. The analogy is supplied by the corresponding salt of copper, viz., cuprous chloride, which darkens rapidly on exposure. [Design printed on flat cell filled with cuprous chloride by exposure to electric light.] Wöhler conjectured that the darkened product was an oxychloride, and this view receives a certain amount of indirect support from these tubes [shown], in which dry cuprous chloride has been sealed up in benzene and carbon tetrachloride since March; and although exposed in a southern window during the whole of that time, the salt is as white as when first prepared. Some cuprous chloride sealed up in water and exposed for the same time is now almost black. [Shown.]

When silver is precipitated by reduction in a finely divided state in the presence of the haloid, and the product treated with acids, the excess of silver is removed and coloured products are left which are somewhat analogous to the photo-salts proper. These coloured haloids are also termed by Carey Lea photo-salts, because they present many analogies with the coloured products of photo-chemical change. Whether they are identical in composition it is not yet possible to decide, as we have no complete analyses. The first observations in this direction were published more than thirty years ago in a report by a British Association Committee,§

* Continued from page 493.

† *Researches on Light*, second edition, 1854, p. 80.

‡ Some dry silver chloride which Mr. Crookes has been good enough to seal up for me in a high vacuum darkens on exposure quite as rapidly as the dry salt in air. It soon regains its original colour when kept in the dark. It behaves, in fact, just as the chloride is known to behave when sealed up in chlorine, although its colour is of course much more intense after exposure than is the case with the chloride in chlorine. The tube in which the chloride had been sealed up in benzene gave off a considerable quantity of hydrogen chloride on breaking the point in June.

§ These results were arrived at in three ways. In one case hydrogen was passed through silver citrate suspended in hot water, and the product extracted with citric acid. "The result of treating the residue with chlorhydric acid, and then dissolving the silver by dilute nitric acid, was a rose-tinted chloride of silver." In another experiment the dry citrate was heated in a stream of hydrogen at 212° Fahr., and the product, which was partly soluble in water, gave a brown residue, which furnished "a very pale red body on being transformed by chlorhydric and nitric acids." In another experiment silver arsenite was formed, this being treated with caustic soda, and the black precipitate then treated successively with chlorhydric and nitric acids:

in which the red and chocolate-coloured chlorides are distinctly described. Carey Lea has since contributed largely to our knowledge of these coloured haloids, and has at least made it appear highly probable that they are related to the products formed by the action of light. [Red photo-chloride and purple photo-bromide and iodide shown.]

The photographic image is impressed on a modern film in an inappreciable fraction of a second, whereas the photo-salt requires an appreciable time for its production. The image is invisible simply because of the extremely minute quantity of haloid decomposed. In the present state of knowledge it cannot be asserted that the material composing this image is identical in composition with the photo-salt, for we know the composition of neither the one nor the other. But they are analogous in so far as they are both the result of photo-chemical decomposition, and there is a great probability that they are closely related, if not identical, chemically. It may turn out that there are various kinds of invisible images, according to the vehicle or halogen absorbent—in other words, according to the sensitiser with which the silver haloid is associated. The invisible image is revealed by the action of the developer, into the function of which I do not propose to enter. It will suffice to say that the final result of the developing solution is to magnify the deposit of photo-salt by accumulating metallic silver thereon by accretion or reduction. Owing to the circumstance that the image is impressed with such remarkable rapidity, and that it is invisible when formed, it has been maintained, and is still held by many, that the first action of light on the film is molecular or physical, and not chemical. The arguments in favour of the chemical theory appear to me to be tolerably conclusive, and I will venture to submit a few of them.

The action of reagents upon the photographic film is quite similar to the action of the same reagents upon the silver haloids when exposed to the point of visible colouration. Reducing agents and halogen absorbents increase the sensitiveness of the film; oxidising and halogenising agents destroy its sensitiveness. It is difficult to see on the physical theory why it should not be possible to impress an image on a film, say, of pure silver bromide, as readily as on a film of the same haloid embedded in gelatine. Every one knows that this cannot be done. I have myself been surprised at the extreme insensitiveness of films of pure bromide prepared by exposing films of silver deposited on glass to the action of bromine vapour. On the chemical theory we know that gelatine is a splendid sensitiser—*i.e.*, bromine absorbent. There is another proof which has been in our hands for nearly thirty years, but I do not think it has been viewed in this light before. It has been shown by Carey Lea, Eder, and especially by Abney—who has investigated the matter most thoroughly—that a shearing stress applied mechanically to a sensitive film leaves an impression which can be developed in just the same way as though it had been produced by the action of light. [Pressure marks on Eastman bromide paper developed by ferrous oxalate.] Now, that result cannot be produced on a surface of the pure haloid, some halogen absorbent, such as gelatine, must be associated with the haloid. We are concerned here with a chemical change of that class so ably investigated by Professor Spring, of Liége, who has shown that by mere mechanical pressure it is possible to bring about chemical reaction between mixtures of finely divided solids.* Then, again, mild reducing agents, too feeble to reduce the silver haloids directly to the metallic state, such as alkaline hypophosphites, glucose or lactose, and alkali, &c., form invisible images which can be developed in precisely the same way as the photographic image. All this looks like chemical change, and not physical modification pure and simple.

I have in this discourse stoically resisted the tempting opportunities for pictorial display which the subject affords. My aim has been to summarise the position in which we find ourselves with respect to the invisible image after fifty years' practice of the art. This image is, I venture to think, the property of the chemist, and by him must the scientific foundation of photography be laid. We may not be able to give the formula of the photo-salt, but if the solution of the problem has hitherto eluded our grasp it is because of the intrinsic difficulties of the investigation. The photographic image brings us face to face, not with an ordinary, but with an extraordinary class of chemical changes due entirely to the peculiar character of the silver salts. The material composing the image is not of that definite nature with which modern chemical methods are in the habit of dealing. The stability of the photo-salt is determined by some kind of combination between the sub-haloid or oxyhaloid, or whatever it may be, and the excess of unaltered haloid which enters into its composition. The formation of the coloured product presents certain analogies with the formation of a saturated solution; the product of photo-chemical decomposition is formed under the influence of light up to a certain percentage of the whole photo-salt, beyond which it cannot be increased—in other words, the silver haloid is saturated by a very minute percentage of its own product of photo-decomposition. The photo-salt belongs to a domain of chemistry—a no man's land—peopled by so-called "molecular compounds," into which the pure chemist ventures but timidly. But these compounds are more and more urging their claims for consideration, and sooner or later they will have to be reckoned with, even if they lack that definiteness which the modern chemist regards as the essential criterion of chemical individuality. The investigation may lead to the recognition of a new order of chemical attraction, or of the old chemical attraction in a different degree. The chemist who discourses here upon this subject at the end of the half century of photography into which we have now entered will no doubt know more about this aspect of chemical affinity; and, if I may invoke the spirit of prophecy in concluding, I should say that a study of the photographic film with its invisible image will have contributed materially to its advancement.

PROFESSOR RAPHAEL MELDOLA, F.R.S.

"Silver is dissolved, and there is left a substance . . . (of) a rich chocolate or maroon, &c." This on analysis was found to contain twenty-four per cent. of chlorine, the normal chloride requiring 24·74, and the sub-chloride 14·08 per cent. The Committee which conducted these experiments consisted of Messrs. Maskelyne, Hadow, Hardwich, and Llewelyn. *B. A. Rep*, 1859, p. 103.

* The connexion between the two phenomena was suggested during a course of lectures delivered by me two years ago (*Chemistry of Photography*, p. 191). I have since learnt that the same conclusion had been arrived at independently by Mr. C. H. Bothamley, of the Yorkshire College, Leeds.

LETTER FROM GERMANY.

DEVELOPMENT OF EOSIDE OF SILVER PLATES.—RED GLASS AND BRIGHT LIGHT FOR DARK ROOMS.

FOR several weeks I have made daily colour-table views on eosine silver plates, to obtain new facts about the fluctuating colouration of daylight. About these interesting results I will report later. At present, I want to point only to a remarkable appearance in the development of eosine silver plates. It is a fact that with these plates the action of chrome yellow is generally stronger than that of ultramarine blue and without yellow glass.

If an eosine silver plate, exposed under a colour-table, is developed, no matter what kind of developer is applied, the blue will first appear on the surface and later on the yellow. If after about a minute's development the plate is now looked at in its transparency, the intensity of the blue is very much stronger than that of the yellow. After prolonged development the matter changes: In the surface view the blue will retain its apparently stronger intensity, but in the transparency one recognises that the yellow has soon surpassed the blue and appears finally more intense (opaque). This proves that the action of the blue is superficial, and that the yellow rays penetrate deeper into the film and act principally in the interior of the same. The practical consequence is, that the development of the colour-sensitive plates must not be interrupted too soon. The developer has to work through the film, even upon the danger to obtaining over-developed or too-intense plates. The latter can easily be reduced in case of necessity, with red prussiate of potassium (5 c.c. of a solution, 1 : 5 to 100 c.c. Fixing soda, 1 : 6–7).

With regard to the developer itself, I was informed by several parties that fresh hydroquinone developer is not suitable for eosine silver plates, and to prove this, plates were sent to me showing fog with fresh developer. Still, I am not of the same opinion. Recently we have worked more than ever eosine silver plates with fresh hydroquinone developer at the Royal Technical High School, because it gave more intense plates than any other developer, and furnished glass-clear negatives. The only care taken was, that to 10 c.c. of fresh hydroquinone developer one drop of bromide potassium solution 1 : 10 had to be added.

In my last letter I wrote to you about red glass for dark rooms. In consequence of several complaints made to me about glasses for lighting the dark room I have investigated the subject somewhat.

Samples of red glass were sent to me, which, although evidently copper-flashed and resembling completely in their outer appearance the red glasses tested and used, proved to be unfit for use by admitting the passage of green light. I received others of such a dark colour that they hardly gave any light. I then inquired at some of the principal dealers in Berlin and found that at present none of them had any red glass in stock suitable for photographic purposes. All the samples shown to me were either too light or too dark.

Now, I will admit that I have already developed with very light glass, yes, even in plain lamp light, and often without the least disadvantage, only I was careful to expose the plate as little as possible to the light. In the shadow of the light it was taken from the holder, flowed with the developer, and only then brought to light for a very short time, when the image was already distinctly visible. In this way even a bad glass will not do much harm. The developer helps a good deal, too. If coloured brown, as in the oxalate developer, the colour itself is already a sufficient protection against white light. But what a practical photographer may risk the beginner should avoid. There are dark-room lamps of dubious condition, with badly closing doors, the glasses not fitting tightly, and admitting the passage of white rays. Some people do not observe this at all, and in their innocence expose still undeveloped plates, and quite dry, to such a lamp, carelessly letting the white rays from the cracks around the glasses act upon the plates for minutes, and afterwards wondering that these stripes make a black mark in the development.

But it is quite different with the doubtful dark-room glasses which are

bought in good faith. What a loss is caused by them is shown by the letter of an amateur, who had applied a combination of green and yellow glass. He writes that fifty plates out of one hundred were foggy; at the same time it is incomprehensible to me how such combinations of green and yellow glass can be recommended. But even white dark-room lights have been recommended. A mixture of cobalt and chloride of nickel solution gives a white or greyish-white liquid, and this, poured into a glass cylinder and placed in front of a window, is said to keep back the chemically effective light. To verify this it is asserted that silvered albumen paper remained white for a week behind such a cylinder. This appears so convincing, and still it proves nothing.

Silvered albumen paper is principally violet sensitive; the violet rays of the white light, true enough, are absorbed by the said solution, this being the reason for the albumen paper remaining white. But it is quite different with the bromide of silver plates. These are principally blue sensitive (highest sensitiveness in the middle between the solar lines G and I), and this very light is allowed to pass by the white cobalt nickel mixture. Such a solution is, therefore, as a substitute for the dark-room glasses not only without value, but will do harm. If the solution is taken very concentrated (3 chloride of nickel + 1 chloride of cobalt in 10 water) it will appear partly dark green yellow; it will then absorb the blue almost entirely, but it will admit the yellow and green-yellow light, and is, therefore, useless for colour-sensitive plates. For ordinary plates it might perhaps be applicable, if not coloured too dark. To make it lighter by dilution is not admissible, because, chemically, blue rays would then pass through. I therefore cannot enough warn against those so-called white lights for dark rooms.

Those who have a spectroscope handy—a pocket spectroscope is sufficient—can easily recognise this fact; but unfortunately only a very few possess such an instrument, and the largest number of practical photographers and amateurs are deprived of this means of testing their glasses. If a thin, copper-flashed ruby glass is held in front of such a spectroscope it will be observed that principally the blue end of the spectrum is extinguished; towards green the opacity is declining. Yellow green passes through to a perceptible degree; but in the yellow a stronger extinction is shown in the shape of an absorption stripe. Copper-flashed ruby glass, of such a thinness that it will admit the passage of gases with widely opened spectroscope, cannot be used for photographic purposes. Two such thin glasses placed together may be used, but the light of course is considerably darkened.

It is better to apply gold glass for the correction of such a thin copper-flashed ruby glass. This pink glass by itself is useless for photographic purposes, because it admits green, yellow, blue, and violet, and absorbs only the green light.

But if such a gold glass is put together with a thin copper-flashed ruby glass, the former will absorb all the green light which found passage through the thin copper-flashed ruby glass. This combination will then admit only the passage of red and orange light, and appears much lighter than two copper-flashed ruby glasses placed together. A good red dark-room light should be so light that at a foot distance from the glass ordinary-sized type can be read. The use of daylight I do not advise, because of the danger of too much intensity, and many red glasses suitable for lamp light are entirely useless for daylight.

As the red glasses ordinarily found in the market change their quality very often, and as of even one and the same sheet one side may be good and the other useless, my son, E. Vogel, has tried to produce artificial red glasses for the dark room by colouring gelatine with some suitable colouring matter and pouring the same upon glass. Such glasses have proven to be excellently fitted for the purpose, and gave double the light of copper-flashed ruby glasses.

It has only to be discovered yet how long this colouring matter will keep.

Dr. H. W. Vogel.

(*To be concluded.*)

Foreign Notes and News.

In his monthly communications from the Vienna research laboratory, Professor Eder gives an interesting account of some experiments he conducted for the purpose of ascertaining the duration of the flash produced by different flash lamps. The apparatus he employed consists of a large wheel, which is caused to revolve by hand in such a way as to make regularly one revolution per second. The wheel is provided with two small, silvered hemispheres, one at the centre and one on the circumference. The whole is fastened in the camera, the sensitive plate inserted and the flash produced. The image of the centre hemisphere of course comes out as a small point, while that of the one on the circumference appears as a curved streak. From the length of this streak the duration of the flash may of course be calculated. Professor Eder points out that the same contrivance may be employed for determining the velocity of instantaneous shutters. The results go to show that the duration of the flash produced by flash powders (chlorate of potash) is much the shorter, amounting in some cases to only one-eightieth of a second, and never exceeding one-twentieth; while the flash produced by the combustion of pure magnesium in different lamps varied from one-thirteenth to one-fourth of a second.

It appears that photography has not been particularly well represented at the Vienna exhibition of "Forestry and Agriculture," both of which are subjects in illustration of which photography might obviously be largely employed. Exceptions' are, however, furnished by the exhibits of the Prague "Kuntanstalt," Dr. Eckert of which firm exhibits a collection of forty-eight landscapes taken principally from the geological point of view, their scientific character exciting very general recognition. Of considerable value also were the views of Steiermark and Eisenery by Dr. Herman Heid. While of most interest to the agriculturist were probably the studies of Herr Josef Jahudka consisting of photographs of special breeds of horses and cattle.

An exhibition was also opened on Sunday last in Gras of the natural produce, manufactures, and characteristic features of the province of Styria. Among other objects of interest composing the exhibition are a number of heliogravures from the studio of Herr Jacob Bleehinger, the artistic finish of which has excited considerable admiration.

It appears from the *Vossische Zeitung* that a new method of obtaining oxygen from the air has been recently invented by Dr. G. Kassner, of Breslau. It consists of pouring water upon a mixture of peroxide of barium and ferricyanide of potash, whereupon oxygen is given off in a state of great purity.

To the *Bulletin Belge* M. L. van Neck contributes what appears to be a very good receipt for toning albumen paper. Two parts of carbonate of magnesia are added to 1000 parts of silver bath, and the whole is well shaken before use. The white powder must be left at the bottom and ought not to be transferred to the filter. If the bath become red in summer it should be heated with carbonate of magnesia, whereupon it rapidly becomes colourless again. The bath need not contain more than eight to ten per cent. silver nitrate. Twelve cubic centimetres of a twelve per cent. silver nitrate solution should be added for every sheet of paper silvered.

For toning with gold M. van Neck recommends preliminary washing with spring or river water, but never with rain water. The gold bath itself is composed as follows:—

A.

Crystallised acetate of soda	45 parts.
Borax	8 "
Water	2000 "

B.

Brown chloride of gold	1 part.
Distilled water	50 parts.

An hour before use, the two solutions are mixed together, shaken, and left to stand in ordinary daylight. This bath acts quickly and gives very good results. It must not, however, be used at a lower temperature than 20° C.

The following is given by the *Bulletin de la Société Française* as a reliable osmium bath for albumen prints:—

Osmium ammonium chloride	1·5 grammes.
Osmiate of potash	0·1 gramme.
Acetic acid	15 c.c.
Water	1 litre.

Our Editorial Table.

The Convention Group.

By G. Watmough Webster, Chester.

It is said that so highly is the honour esteemed of being taken in the Convention Group as to prove an incentive for some becoming members for the sole pleasure of attending that one meeting, in order to form an integral element in the group of scientists and be handed down to posterity in such companionship. This probably accounts for the non-recognition of some by most of the *habitués* of the other meetings.

In the large group before us Mr. Webster has succeeded so well that each one of the numerous party present is a portrait, and one that is sharp and full of detail. The group is posed on the wide flight of steps leading up to one of the entrances to Eaton Hall. Who that

witnesses the repose and placidity apparent on the faces of the Convention members would imagine that the rain was descending in torrents at the time the grouping and exposure were being effected? Yet was such the case, although there is nothing in the picture to suggest this fact. The print is made on albumenised silver paper, and there is a fine rich transparence in its brownish purple tones.

Mr. Webster supplies this historical picture at the small price of half-a-crown.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 11,778.—"Improvements in Photometers, specially Designed for Use with Automatic or Coin-freed Photographing Machines." L. Nievsky.—*Dated July* 28, 1890.

No. 11,797.—"Improved Method of, and Appliances for, Enabling Photographic Negatives to be Developed in Full Daylight." A. Génel.—*Dated July* 28, 1890.

No. 11,858.—"Improvements in Apparatus for Measuring Short Intervals of Time, especially Applicable for Timing the Exposure of Sensitive Surfaces Used in Photography." W. E. Gibb.—*Dated July* 29, 1890.

No. 11,891.—"Improvements in Means or Apparatus for Separating and Manipulating Sheets or Cards, more especially Applicable to the Separation and Manipulation of Sensitised Sheets or Films in Photographic Cameras." J. T. Clarke.—*Dated July* 29, 1890.

No. 11,945.—"Improvements relating to the Manufacture of Flexible Films for Photographic and other Purposes, and to Apparatus for Use in such Manufacture." B. J. Edwards.—*Dated July* 30, 1890.

No. 11,959.—"Improvements in Photography." G. Davies.—*Dated July* 31, 1890.

No. 11,986.—"An Improvement in the Application of Photography to Textile Fabrics." F. T. Knott.—*Dated July* 31, 1890.

No. 12,014.—"Improvements in Apparatus Applicable for Use in Photography." T. B. Sloper.—*Dated July* 31, 1890.

No. 12,137.—"An Improved Rapid Rectilinear Photographic Lens, and Method of Applying Same." G. Prescott and J. H. Stewart.—*Dated August* 2, 1890.

PATENTS COMPLETED.

Improvements in Photographic Cameras and Shutters for use in connexion therewith.

No. 11,416. Benjamin Joseph Edwards, The Grove, Hackney, Middlesex.—*July* 12, 1890.

It relates to improvements in the shutters used for exposing the sensitive plates or films, and in the appliances for changeing them, also in the holders or sheaths used for carrying such plates or films. My objects are, first, to facilitate the regulation of the time of exposure so that the same instrument may be successfully used for extremely rapid or for prolonged exposures, and that better protection may be afforded from the light previous to exposure.

Second, to combine in one operation the setting of the roller-blind shutter and the removal of the plate after exposure.

Third, to provide a means for holding flexible sensitive films, so that they may be curved to form the arc of a circle of any required radius, thus bringing the side of the picture, which is formed on the hollow side, more into focus of the rays from the lens, so obtaining better definition than is possible with films used in the ordinary way.

In carrying out the first part of my invention I combine the shutter known as the "roller-blind shutter," which was described and shown by me in 1882, and which has since been extensively used for what are known as instantaneous exposures, with an ordinary pivoted or flap shutter, in such a manner that both may be used in combination, or the flap shutter may be employed separately. The mechanism which I employ for working the shutter or shutters may be hand, pneumatic, hydrostatic, or other convenient style, and is so arranged that when the flap is lifted, a catch which holds the roller (the spring of which has been previously wound up), shall be released and the shutter allowed to descend; when the pivoted shutter is to be used alone for time exposures, the roller shutter is set so that it shall be open, and is fixed in that position by a clamp catch or other convenient arrangement. I do not confine myself to any particular position for the roller shutter, which may be in front of or behind the lens, but I prefer to place it immediatly in front of the sensitive plate. The use of the two shutters in combination forms an additional protection to the plates previous to exposure, the flap covering the lens while the roller shutter is set and until it is brought into use.

In carrying out the second part of my invention, I combine with the roller-blind shutter, used separately or in combination with the flap shutter, an arrangement for exposing a succession of plates by removing the plate which has been exposed, thereby leaving the next plate in position for immediate use; this I do by securing, in a suitable position on the flexible blind, one or more projections or hooks, which fall with the shutter when the plate is exposed and engage with the plate, or its frame, or carrier: thus when the roller shutter is again set or wound up, the plate is drawn or raised with it. In adapting my camera, which may be of the type known as the "Detective," to suit this part of my invention, I divide it into two compartments longitudinally, each of which will hold a number of plates, each plate being fitted into a sheath or carrier, of paper, wood, metal, or other suitable material, and these I place one behind the other and keep in position by means of a spring or other contrivance in one of the compartments (preferably the lower one), after having wound up or set the shutter. On releasing the shutter the plate is exposed, and the hooks or projections engage with it, ready to draw or lift it into the second compartment when the blind is again set, the operation being repeated until all the plates are used and removed to the second chamber, when they are taken out and a new set placed in the first.

In carrying out the third part of my invention I do away with the flat surface now used as a support for the flexible film or sensitive paper, and I make the holder, or sheath, or support, curved to the required radius, or I leave a sufficient space at the back of the flexible film to allow of its being bent to the required curve, and held in such position by pressure at the edges; when continuous bands or separate pieces of sensitive paper or films are employed, they may be placed or drawn round a curved plate of glass and thus held to the required radius, the photograph being taken through the glass.

The other parts of the camera may be of any convenient form or type such as are at present in use.

The claims are:—1. The combination of the flap shutter with the spring roller-blind shutter for use in connexion with photographic cameras, substantially as shown and described. 2. In the combined shutter, as claimed in claim No. 1, the clamping or fixing of the roller-blind shutter, open so that the flap shutter alone can be used for time exposures, substantially as described. 3. The sheaths for the sensitive plates for use in photographic cameras, substantially of the form and for the purposes shown and described. 4. The removeable interchangeable boxes for holding sensitive plates or films before and after exposure. 5. The sheaths and boxes in combination with the roller-blind shutter, substantially as shown and for the purposes described. 6. The combined flap and roller shutter in combination with the sheaths and interchangeable and removeable boxes. 7. In the interchangeable and removeable boxes the light-tight lids or covers arranged to work automatically or by hand, substantially as described. 8. The interchangeable and removeable light-tight cases for containing the sensitive flexible film, provided with a light-tight slit through which the film is drawn. 9. The rollers on which the sensitive flexible film is wound, arranged to be actuated from the outside without removal from the case, substantially as described. 10. The combination of the interchangeable light-tight cases with the rollers on which the film is wound, substantially as shown and for the purposes described. 11. The combination of the two cases containing the rollers with the roller-blind shutter. 12. The combination of the two cases containing the rollers with the combined roller-blind and flap shutters, substantially as shown and described. 13. In a photographic apparatus the curved guides or bent glass for holding the flexible film at the required radius, substantially as described.

Improvements in Photographic Cameras.

No. 7010. Benjamin Joseph Barnard Mills, 23, Southampton-buildings, Middlesex.—*July* 12, 1890.

The invention is particularly applicable to portable photographic apparatus, and has for its object to present successively and at will behind the lens a certain number of plates previously enclosed in the apparatus, and to shut them up one by one as they have been used in the bottom of the camera, from whence they are withdrawn only in the dark room.

This result is obtained by a very simple apparatus worked from the exterior. The accompanying drawing shows clearly the application of the system.

Its nature can be ascertained to some extent from the following claim, viz., An arrangement of camera in which a number of plates contained in frames furnished with trunnions are suspended one behind the other in front of the lens, and are pushed by a spring, the first frame, and in succession the following ones, being capable of removal by a notched disc operated from the exterior, and then of swinging on to the bottom of the camera by turning on their lower trunnions, substantially as herein shown and described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 11.....	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 12.....	Derby	Society's Rooms, Derwent-bldings.
,, 12.....	Manchester Amateur	Manchester Athenæum.
,, 12.....	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 13.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 14.....	Birkenhead	Hamilton Rooms, Birkenhead.
,, 14.....	Manchester Photo. Society	36, George-street.
,, 14.....	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

July 31,—Mr. J. J. Briginshaw in the chair.

Prints from negatives taken at the last outing of the Association, by Mr. J. W. W. Brown, of the Croydon Society, were received, with a letter asking for papers by members of the London and Provincial Photographic Association for reading at Croydon.

Mr. Otto Schölzig, in continuation of the last week's discussion on *Printing through Coloured Media*, said that green and dark yellow were the only colours of any use to obtain good tones. He had been attracted to this matter by observing that on printing from a negative half of which was badly stained, that half had yielded a print having beautiful blue-black tones which could not be got on the print from the other half of the negative. The next thing he did was to expose a negative under orange paper, and he got tones such as he had never obtained before. He considered also that prints were much more permanent when printed in this way. If an ordinary untoned print was left all night in the fixing bath it dissolved away, but by printing under orange glass a deposit was obtained that would not dissolve in nitric acid.

Mr. A. Cowan inquired whether Mr. Schölzig was speaking of plain or albumen paper.

Mr. Schölzig replied that he referred to both kinds. He had used a strong solution of nitric acid—one part of acid in twenty of solution.

Some members did not consider that strong as a solvent for silver, whatever it might be as regarded the albumen surface.

Mr. Schölzig continued: The slips which he showed last week proved, he

thought, that orange was much better than ruby for dark-room illumination, as the paper under the ruby glass lost greatly through so much more than under the orange, and he could not see that it made much difference whether the sensitive compound was chloride of silver, or bromide of silver, or platinum and iron salts.

Mr. W. E. DURNHAM dissented from the last proposition. Orange might be, and indeed, he considered was, better than ruby for dark-room illumination, but he could not accept the other upon almost any organic compounds of silver as proof of similar effect upon bromide or subbromide of bromide and iodide. They were not equally sensitive to the same part of the spectrum.

The CHAIRMAN enquired whether Mr. Sedgwick had any specimens from the same negative printed with and without the coloured glass, to show the difference.

Mr. SEDGWICK had had two, but they had been sent away, and he could not produce them now. There was another matter to which he wished to refer. He stated that if a print was simply passed through water and then toned it toned readily to a beautiful black, but if thoroughly washed only a poor brown image was got in the same time. He showed two prints on matt surface paper to illustrate this observation. The good deposit of gold upon the slightly washed print would resist greater persuasion upon it; indeed, he thought the washing-out so complete that it would resist chemical agents that would destroy a slow print.

Mr. DURNHAM said that Mr. W. K. Burton had stated that if a print was thoroughly washed before toning, the gold would not be deposited in the blue tones, which in turn gave a fully toned appearance to a silver print, but particularly in shade of a warmer colour than the silver might be almost entirely covered by gold without the finish appearance of over-toning setting in. According to this view, the slight washing recommended by Mr. Sedgwick as leading to permanence would have precisely the contrary effect. Then as to the effect of green glass in printing, he had last week shown four prints on the same piece of paper with different glasses used to screen, and had then found that the orange, which was the slowest in printing, had yielded the purest print of the whole. He now showed two prints on the same paper, and it would be seen that the one made under deep green glass was of the same pure quality as the one under orange glass, whilst the other print from the same negative was much weaker, and a dull brown compared with a pure warm grey.

Mr. J. S. FRASER showed a set of prints made from a thin negative in various tones of printing, varying from two and a half minutes to nearly seven hours, and noted a regular improvement and increase of brilliancy as the printing was slower.

Mr. DURNHAM said the effect shown by Mr. Teape, which he (Mr. Debenham) had not met with, might possibly be due to different conditions of the paper used. Mr. Teape, he understood, had used commercial sensitised paper, whereas he had sensitised the paper himself. In the former case there was probably an great excess of free nitrate of silver. It appeared to him that experiments in printing by silver printing in the same sense it existed was needful for the fact that chloride was theoretical in printing as any one would find in the search of a freshly printed piece of paper, and that the liberated chlorine might be supposed to exercise a retarding or impoverishing influence upon the formation of a fresh deposit by the light. When printing was slow, the chlorine would have time to get away in the progress of the operation, but with very quick printing the work would be going on in an atmosphere of chlorine. When there was plenty of free nitrate of silver in the paper for the chlorine to act upon, its prejudicial effect upon the formation of the image might be prevented or considered, but with a paper sensitised in free nitrate the reverse might be the case. Take chemical reasons, he suggested, would not only account for the differences in the results obtained by himself and Mr. Teape, but was a fault quite sufficient that the proportions in the proportionate effect of light passing through the different densities of a negative varied with different rates of printing.

Mr. SEDGWICK thought that this explanation met the case; he had seen chlorine rising from a sheet of paper when exposed to light under a sheet of glass merely resting on it.

Mr. H. M. HASTINGS showed prints illustrating the effect of a short preliminary exposure to light sufficient enough to tint the sensitised albumen paper. The effect was most strikingly evident when the paper was subsequently exposed under a red glass. In this case the part previously exposed showed a distinct warm tint printed under the red glass, whilst nothing could be seen on that part which had received no preliminary exposure.

Mr. HASTINGS enquired whether any one could suggest a neutral support for albumen and other emulsions of silver [illegible] ordinary paper contained starch or gelatine matter, and pure filter paper would not hold together during the [illegible].

Mr. [illegible] was elected a member of the Association.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

[illegible]—Mr. PERCY LANGE presided. There was a numerous attendance of members.

The following were elected members:—Messrs. Herbert F. Cox, Arthur Wilkinson, Robert J. Mallaband, Jno. A. M. Lowry, C. E. Jones, and Edward Long Jones.

Mr. C. E. BROOKS reported on the excursion to Bolton Abbey, and gave some interesting information respecting the district. Being made on the Thursday of the Liverpool Cotton Exchange Club, U.S.A.

A vote of thanks, the proposition of the Vice-President, Mr. W. Tomkinson, was accorded to Mr. C. E. Brooks for his services.

Mr. A. [illegible] exhibited a number of photographs that he had secured at Bolton Abbey. Messrs. Tomkinson, Pilkington, and the Hon. Secretary (Mr. F. M. Sandford), many of the interior of Bolton Hall, taken at the Chester Photographic Convention, and the latter particularly proved the whole [illegible] of Mr. Brooks and Hall also secured during the Convention week. Mr. Edwards' Manchester photograph of the Convention group was also handed round.

The PRESIDENT expressed the great pleasure it gave him to once more meeting the members of the Association after his trip to Iceland. He had undergone as extraordinary an experience as any man could undergo, and had passed through much hardship and fatigue. He thought he had accomplished a feat no man had done before in managing to climb up 5200 feet and photograph the crater of Hecla. Thus Liverpool had distinguished itself again.

Mr. J. W. WADE, Vice-President of the Manchester Amateur Photographic Society, read a paper on *Landscape Photography*, illustrated by rapid sketches in charcoal.

From the applause with which Mr. Wade's efforts were received, it was apparent the Association had lectured to one of the most valuable and useful lectures ever given before its members.

The PRESIDENT announced the excursions for the month of August, namely, to Rufford Hall on Saturday, the 9th (half day), and to Haddon Hall on Wednesday, the 20th (whole day).

WEST LONDON PHOTOGRAPHIC SOCIETY.

JULY 25th.—Mr. Charles Bilton (President) in the chair.

Dr. St. Clair Baston, and Messrs. Lynn, Ward, Holmes, and Kendall were elected members.

The question of the advisability of removing the *locale* of the Society from Addison Hall to the Lecture Hall, Broadway, Hammersmith, was considered, Messrs. Bilton, Whiting, Blackmore Miller, and the Secretary taking part in the discussion. In the result a motion in favour of the suggested change was moved and carried.

The remainder of the evening was occupied in exhibiting and criticising work done at the summer excursions.

It was announced that the next outdoor excursion would take place on August 9, members to meet at Greenford Green Post at half-past three. On August 23 the members meet at Hayward's Heath, [illegible] Brent. On September 25 an indoor meeting will be held at the Broadway Lecture Hall, Hammersmith.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

"DISCURSIVE NOTES ON LENSES."

To the EDITOR.

SIR,—Judging from some statements in your article on the above subject, "there seems prevalent much what" "I" "may very mildly term lack of information concerning" "optical" "matters relating to photographic lenses of a former period and the inception of some of the present day."

As an historian, you should, doubtless, be able to speak offhand with greater accuracy than I could, for your experience dates further back; but in matters of history I have my remedy in searching for corroboration in published matter where I may deem that you are inaccurate. With regard to whatever I may say on optical subjects with which you may disagree, you have your remedy in proving and giving absolute scientific reasons to show that I am mistaken when my statements are backed by proof.

With regard to the slight historical matter (which is of little moment) I have made a search, and find in your contemporary, the *Photographic News* of 1866, page 33, a corroboration of what I stated as to the origin of the wide-angle rectilinear lens from my own father's words; I find, too, in my letter to the *American Photographer*, that history has repeated itself, in that my late father there pointed out the same error into which you had fallen in your rough demonstration in connexion with the periscopic lens.

Now as to the optical question. Any unprejudiced person reading Mr. Taylor's letter to Mr. Walker, of the Eastman Company, could but form one opinion, namely, that he there claimed the periscopic lens of Steinheil to be achromatic. It appears, however, that many years ago you yourself found that *it was not, but*—and it is a big "but"—you still say: "Mr Dallmeyer's leading mistake is in thinking that a demonstration or rough explanation of a *possible*" (the italics are yours) "means of achromatising two single lenses, given in THE BRITISH JOURNAL OF PHOTOGRAPHY of 1865, applies to Steinheil's periscopic lens of that period," &c. Where I am particularly surprised is that you should emphasise "*possible*." I contend, and can give you a mathematical demonstration, that it is impossible that the lens as constructed by Steinheil or roughly sketched by you can be achromatic. You proceed then to bring in Zentmayer's invention—one that certainly guarantees a *nearer* approach to the attainment of achromaticity than that of Steinheil, but *not perfectly*.

Now for proof. The absolute condition for parallel rays that must obtain in order that two single lenses of the same kind of glass should achromatise one another is, that they should be separated by an interval of one-half the sum of their combined focal lengths; Steinheil's periscopic, therefore, could not be achromatic as it did not fulfil these conditions. That it should be achromatic the separation must be that of the focus of either of the components, and hence no image could be formed. In Zentmayer's lens the focal length of the exterior element was longer than that of the posterior, but in Zentmayer's lens, although approximating to achromaticity more nearly than that of Steinheil, the condition was not absolute in that the separation between the lenses was not sufficiently great. The proof above given is the result of the work of Sir George Airy, and is worked out on absolutely strict mathematical principles,

and was first brought to bear on the achromatism of eye-pieces. As I before pointed out, the Huygenian eye-piece is achromatic because the glasses are separated by an interval equal to half the sum of their added foci. The Ramsden eye-piece, on the other hand, is *not* achromatic, and the reason is that both lenses have the same focus, but are separated by an interval *less* than the focus of either in order that the image may be formed outside the lens with simultaneous micrometrical readings.

I have never seen a Zentmayer lens, but you have described them. As a matter of fact, from your figures there would not be sufficient separation between the lenses to attain perfect achromaticity; but, as far as my memory serves me, Zentmayer suggested what I may term a scientific "dodge" of ensuring his lenses to work to both visual and chemical focus by taking the visual focus with a larger stop than the lens itself permitted for working to sharp focus; the smaller stop was inserted afterwards, and the result was that the plane of the chemical focus fell in the identical one with the temporary visual focus made with the larger stop. This must have been the means employed in using the lens that was so favourably commented upon by the skilled scientists to whom you refer.

Your first quotation from the late Mr. R. J. Fowler reads very plausibly to a general reader, but whatever the work referred to was, it *cannot refute the principles* deduced by Sir George Airy from his analytical treatises contributed to the Royal Society in 1827, and a year or two later, on eye-pieces. These must apply in the constructions referred to, and cannot be gainsaid by any number of quotations.

I am quite at sea as to the meaning or value of your second quotation from the late Mr. Fowler, where, in speaking of Steinheil's lens, it says:—"Simultaneous pictures were taken of the same landscape from the same point of view with the periscopic and the triplet lenses" (N.B.—Triple achromatic, I presume) "of nearly equal foci," and that the "image produced by the former is not only sharper at the edge, but is *nearly double the size* of that of the triplet." If lenses have equal foci, what does it mean that one image can be double the size of that given by another lens of identical focus? If it means that it included *double the subject*, the optical construction would warrant this *without a practical trial;* but even here the comparison does not quote the comparative intensities, &c.

I refer to your authorities and quotations as you seem to support the position you take up by them. The real question at issue is one of strict optical and mathematical principles, and any careful reader of my letter to the *Amateur Photographer* can see this; it was not purposely controversial but explanatory, and I repeat again that Steinheil himself would not have claimed his periscopic to be achromatic, and my reason was that I hold a high opinion of Steinheil as a mathematician.—I am, yours, &c., THOMAS R. DALLMEYER.

25, *Newman-street, Oxford-street, W., August* 4, 1890.

[In accounting for the achromatising or, more correctly, the practical achromatic effect given by the Zentmayer lens, Mr. Dallmeyer has long ago been anticipated. We, too, had reasoned in like manner, and on October 12, 1866, we wrote—speaking of the influence of the reduction of the aperture of single lenses in lengthening the focus—"The same principle applies to non-achromatic photographic lenses. If a sufficiently small stop be employed, the sharpness of the finished picture will, to the unaided eye, appear to equal that obtained on the ground glass; but when a large aperture is employed the difference between the focus of the blue and yellow—or chemical and visual—rays will be about one-thirtieth of the focal length. . . . . When a larger stop must be used for obtaining the focus than that similiarly employed for the exposure, the two foci under these altered circumstances will not prove of the same length." And Mr. W. E. Debenham had, at the same period, twenty-four years ago, written that "for all lenses having spherical aberration (and all wide-angle lenses at present in use possess that quality, necessitating the employment of an aperture more or less contracted) the focus is longer when a small stop is used than the approximate or quasi-focus produced with a larger aperture; and if in any lens the spherical aberration exceed the chromatic, it will be possible so to arrange the sizes of the stops as to have a visual focus, when a large opening is used of the same length as the chemical focus with the smaller stop." But as if to anticipate or meet the explanation made by ourselves and Mr. Debenham so very long ago, and now introduced by Mr. Dallmeyer (but not on Zentmayer's authority) in the above letter, Mr. Carey Lea had written on this very point as follows:—"This is not the case. This would not be achromatisation, but a substitute for it. With Zentmayer's lens this focussing with one stop and taking the picture with another is not a necessity but a convenience; the picture may be focussed carefully by the small stop, and the negative taken by it. . . . . A negative taken yesterday with one of Zentmayer's lenses makes me affirm positively that the chemical and visual foci do effectively coincide. The speculations, therefore, of those who have affirmed that such a thing was impossible amount to nothing. The one point which interested me most is that which I have verified, viz., that a pair of uncorrected lenses can have the actinic and visual foci to coincide." And Dr. Coleman Sellars, too, had written that repeated tests had been made with the largest and smallest opening, with the result that it had not been possible to discover any want of correction; adding that "an able amateur, noted for his care in experiments, tested the lens, using polished plate glass and a compound microscope, and *then made negatives on the plane of the visual focus. They were sharp;* while negatives made by moving the plate both back and front of the plane of visual focus were out of focus just as much as they seemed to be visually."

The "corroboration" as to the origin of the wide-angle lens of the late Mr. J. H. Dallmeyer, cited by Mr. T. R. D., turns out, as we expected, to be no corroboration at all. In the remarks referred to, which were not in the form of a paper, but consisted of a few "remarks," introducing the exhibition of a number of views taken by Mr. D.'s landscape lens (afterwards expanded for publication in our contemporary), he stated that while the single-view lens included a sufficiently wide angle for landscapes, and the triple lens for architectural work, he *hoped* to bring before them (the South London Photographic Society) a combination which would include as large an angle as the Steinheil lens, but the hoped-for combination had nothing whatever to do with the wide-angle doublet, but with a triple combination formed of three *single non-achromatic* lenses, the centre one (a flint concave) being intended to achromatise the other two single crowns, and he applied for a patent for this lens within a few weeks (Feb. 8, 1866) after expressing the hope above referred to; and it was not till after the construction of the Zentmayer lens, with its long-focus front and shorter-focus back lens, had been published in our pages and elsewhere, and a specimen of the same examined in our office and in his own *atelier*, that he applied for the patent for his wide-angle rectilinear (on Sept. 27, 1866). Mr. Dallmeyer had evidently had some faith in the employment of objectives composed of singles lenses, for on June 18 of the same year, 1866, he had applied for another patent for a combination consisting of "three *simple* or *uncorrected* lenses" to form a triple combination, the first and third of which were of crown or plate glass and both positive, while the intermediate lens was of flint glass and negative. This, doubtless, would give an achromatic combination; but Mr. Dallmeyer probably foresaw that trouble might arise in the holding of the patent, and that a better combination would result from achromatising the Zentmayer lens; at any rate, he allowed both of these patents to drop without completing them and adopted the Zentmayer form instead—in so doing acting a wise and prudent part, for the Zentmayer combination pure and simple cannot for a moment bear comparison as an "all-round" useful lens with the same form of lens when achromatised. In conclusion, whatever may have been the precise degree of assimilation of chemical to visual foci obtained by the Steinheil and Zentmayer lenses, there can be no doubt whatever that the sharpness of the pictures produced by them was of a very good order of excellence; indeed, the high reputation of the two opticians is a sufficient guarantee for that, and no optician of the present period need be ashamed of, "borrowing a little of their thunder."—ED.]

RETOUCHING AND RESITTING.

To the EDITOR.

SIR,—I hope you will forgive me for again trespassing upon your valuable space in order to answer a letter appearing in last week's JOURNAL by your correspondent, "F. B." I beg to draw his attention to a slight error into which he has fallen, although I thought my last letter moderately clear. He seems to have come to the conclusion that *my* letter was "a curious specimen of an answer to the questions relating to negative retouching." If such were the intention of my letter I would be very happy to agree with him. But nothing was further from my mind when writing it than to offer an opinion as to the merits or demerits of retouching. It might not appear graceful of me as a retoucher to try and force my own opinion in this regard.

In his letter of last week he seems, also, disposed to shift the point at issue between us. He quotes "A Photographic Artist" (who wrote in a former letter, and with whom, on this point, I completely agree), "This over-retouching has become a perfect nuisance," and seeks to make believe that my letter had reference to this statement. Unfortunately, however, the above quotation of "A Photographic Artist" does not at all appear in the letter of "F. B.," which has caused this seeming "storm in a teacup," but to which I hope I will be considered justified in taking exception.

The real point at issue, as far as I am personally concerned, is whether or not a thorough *art education* is an absolute *necessity* before becoming a retoucher. My name was mentioned in connexion with a certain paragraph from one of my articles in the JOURNAL embodying my opinion that it was *not* (and to which opinion, as expressed by me, I still stand), and a more or less mild suggestion that I was in error. All I wished by my letter was simply to put myself right before the Editor and many readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, some of whom seem to have kindly favoured me by a reading. This, I think, requires a certain stretch of even a lively imagination to be construed as "fury," whereas it will

be seen on *calm* consideration to be only business. Believe me, Mr. Editor, although the hairs, I regret to say, are getting thin on the spot which Sambo declares is "the place where the wool ought to grow," the present trouble has not arisen through any inability, upon my part, to "keep my hair on." If my name had not been mentioned and connected with the suggestion that I had given an erroneous theory to the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY you would not have been troubled by any communication from—Yours, &c.,

50, *Kellett-road, Brixton Hill, S.W.* REDMOND BARRETT.

FRENCH CORRESPONDENCE.

(*From our own Correspondent.*)

Liberty to take Photographs in the Streets of Paris—Medals and Diplomas of the last Paris Exhibition—Photographs in Natural Colours a wonderful invention if true—Lectures to be made in a Public Museum on the valuable objects therein contained—August Meeting of the Photographic Society of France—A Novel Dark Slide—Panoramic Views of Marseilles, &c.—Lantern of Emaux de Limoges—A New Book by Gauthier-Villars on Photographing Prisoners.

A GREAT victory has been obtained by "La Syndicat général de la Photographie," they have at last succeeded in obtaining the sanction of "M. le Préfet de Police" to allow photographs of the public buildings to be taken without hindrance. This news will be received with pleasure by all. Tourists can now set up their cameras in the streets without fear of seizure, and amateurs no longer need be kept on the *qui vive* watching the movements of the "Sergents de Ville" in order to get a shot now and then with a well-disguised hand camera. Liberty for the camera is now the order of the day, and I do not think that the dispensators of this liberty will have to regret their decision. Many amateurs to my knowledge have been deterred from spending their holidays in France on account of the prohibition, and have carried their cameras and their money to more hospitable lands. I have received hundreds of letters requesting information and advice. At last the prohibition was carried to such an extent that photographers paying rent and taxes could not obtain permission to set up their cameras in the streets, at the same time foreigners could do so if they could obtain a letter of solicitation from their respective ambassadors. All these grievances are now at an end, and the French railways and the hotel keepers will be the gainers.

Most of the exhibitors at the last International Exhibition of Paris have been disappointed at not having yet received their diplomas. Complaints having been sent in, M. Jules Ferdre, "Ministre du Commerce et de Plénipotentiaire," wrote to M. Berger, soliciting him to begin as soon as possible the distribution of the medals and diplomas obtained. The Directeur-General in his answer explained that in spite of all his efforts, and the activity of those under his orders, the distribution could not take place before the 15th of August. "Moreover," said he, "I desire to draw the attention of the Government to the fact that the rewards granted after the Exhibition of 1878 were not distributed before July, 1879. These diplomas were printed by a process of heliography from a design by Baudry. The diplomas of 1880 will be taken from an engraved plate, which plate has already taken seven months to complete. A special paper is being manufactured, which could not be obtained before the administration had accepted the engraved plate. It must not be forgotten," continued M. Berger, "that the printing off of these diplomas will take a considerable time—no two of them being alike—the honours and the name being different in each." We can now surmise from this answer that the diploma will be a work of art, which will repay the exhibitor for the strain put upon his patience.

A hobby rises up now and then in the photographic profession, and very often the results obtained are not worthy of the energies and brains which have been spent. On the other hand, supposed impossibilities have been overcome. At the present moment the rage, if it may be so called, is to obtain natural colours; every one is bringing a stone to erect the edifice, but it is a question of time to know if the foundations be on a rock or in the sand. Many content themselves by going over the ground won by Becquerel and Poitevin. The ferro-type of a coloured paper or a subject in stained glass is obtained, and the only apparent failure of the operator gives vent by his exclaiming, "Would that I could discover a means of fixing without destroying the colours!" Others, more bold, leave this beaten track, and we hear day by day of some discovery wonderful to the uninitiated, but, like the egg of Columbus, simple indeed when once made public. I have just heard from a most distinguished amateur, a member of photographic societies, a gentleman in whose judgment and veracity I have every reason to have the most absolute confidence. Excuse this preamble, but what is coming is so strange and wonderful that this round-about way may be excused. I begin again. I have just heard of a secret process which will revolutionize photography. This gentleman gave me his word that a friend, one of his acquaintances, had discovered a process of printing by which he obtained the natural colours. I showed my scepticism, and this is what he told me had taken place. I was, said he, as great an unbeliever as yourself, and would not give credence to the pretended discovery of my acquaintance, a man such as I know him to be an ignorant photographer, but I must confess he is a very good chemist, added he. He proposed to make the preliminary experiments in my presence, and in my own laboratory. The next morning he came to my residence and asked me to lend him the negative of a portrait. I passed him one of a lady the likeness of whose dress I remembered very well. Naturally, said he, I did not confide this to the inventor, neither did he ask me to expose me to do so, neither the other way, repeated my friend. He passed the negative to an ordinary printing frame, and upon it he laid a piece of prepared paper; after about a hundred exposures to light, the image was printed through various colourations. The final result was a fairly coloured print, in which there was, wonderful to say, the same hues and tints, with all the shades, exactly as the lady was dressed and looked when my friend took her portrait. I cannot describe it in any other manner, said he, than by saying it appeared as if the complete counterfeit of the lady as reflected by her mirror. I hear that the inventor is about forming a company, therefore we shall hear more anon, hoping it will not prove another kind of South-sea bubble.

The French Government have decided that, during certain hours of the day, promenade lectures shall be given in the "Musée des Arts decoratifs." The different professors will describe the valuable contents of the said museum. I need not comment on this decision; these lectures will obtain a legitimate success, and it is to be hoped that this school for learning may be imitated.

The Photographic Society of France held their monthly meeting on Friday evening last, M. Davanne in the chair. A letter was read, that of a Scotch gentleman, expressing his thanks to the Society for the use of their dark room during his stay in Paris.

M. Martin, one of our best photographic cabinet makers, exhibited a very novel automatic camera. In appearance it resembled a book or a neat dressing case. A turn of the handle separated the two covers held together by the bellows; two brass hooks maintained the separation as well as the rigidity. It must be noticed that the bellows is placed differently than in other cameras. The apparatus being thus opened, the lens and its rapid shutter is in view. The proper position having been obtained by means of the finder, the dark slide is introduced and the exposure is made. It is on this dark slide that the greater ingenuity of the inventor has been displayed. It holds two plates. On being inserted into the camera at a certain place it meets with a steel point, which sets free a spring, the flap or door of the dark slide flies open and remains so until the slide is drawn out of the camera, which closes it again. Simplicity is the order of the day here. No shutters to draw out, therefore no chance of letting in rays of light. The dark slides are very light, they being diminished in thickness, therefore in weight. M. Martin was highly complimented.

Messrs. Beru, Hanseer, & Co., presented an instantaneous shutter made in France after an American model.

M. le Commandant Moessard exhibited two different models of his panoramic camera, one a very small one and the other large enough to make proofs over one yard in length. Several proofs were sent round representing Marseilles and Villefranche. These were very much admired.

Messrs. Marillier et Robelet exhibited a new process, by which M. Schirm was enabled to imitate by photography those world-famed enamels known as *Des Emaux de Limoges* effectively. These gentlemen are enabled to form an image in relievo, white opal on a dark ground, and *vice versâ*. Some very fine specimens were shown; but as the process will not allow of firing, therefore it is a bad imitation, and can, according to my appreciation, easily be obtained by a carbon transfer. Nevertheless, it gives a very pretty appearance and makes a good effect.

M. Mebeux gave a very long and tedious description of the yellow stain. Nothing new could be gleaned; it appeared he recommended the employment of a great quantity of developer as a cure. The Society then separated until next November.

N.B.—Just received a new publication from Messrs. Gauthier-Villars et fils, entitled *La Photographie Judiciaire*, by Alphonse Bertillon, Chef du service d'identification de la Préfecture du police de Paris.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Sewey boat and posing chair with four backs in exchange for good indoor accessories. —[illegible], EDGAR STOWE, Bedford.

Will exchange magic lantern by Horne & Thornthwaite, three-inch condensers, for half-plate camera and lens.—Address, T. M. CUTHBERTSON, Chemist, Lostwithiel.

Changing and developing tent, mahogany top and bottom, cloth sides, 24×16×2 closed, very light and handsome; wanted, cabinet lens.—Address, PHOTO, 42, Sensible-road, Eastbourne.

Wanted, wholeplate or 10×8 wide angle rectilinear lens in exchange for whole-plate Lerebours portrait lens in good condition.—Address, T. COUPE, 40, Bank-top, Blackburn, Lancashire.

Will exchange fifty-four inch bicycle, Singer's Challenge, double ball bearings, hollow forks, cane backstays, Hancock's patent tyres, for wholeplate camera and tripod and three or four double backs.—Address, H. C. T., 3, Summers-terrace, Glenthorn-road, New Southgate, N.

Will exchange a military four-inch prismatic surveying compass by Elliot Brothers, London (used, but in good condition), and a protractor (brass circle six and a half inches diameter) by G. Falconer, of London and Hongkong, for a Ross or Dallmeyer C.-D.-V. lens.—Address, H. O. BROWN, 38, Schul-strasse, Oberlösanitz pres de Dresden, Saxony.

Wanted, a good graphoscope with stereoscope, or the equivalent, in exchange for any or all of the following:—Wilson's *Quarter Century in Photography*, Wilson's reproductions of Burnet's *Essays on Art* (both in new condition), a Harrison's globe lens (about eight inches in focal length), six Tylar's metal double backs (quarter-plate size).—Address, H. C. J., 7, Tadema-road, Chelsea, S.W.

MANCHESTER AMATEUR PHOTOGRAPHIC SOCIETY.—The next meeting will be held on Tuesday, August 12, when Dr. C. O. Weber, Ph.D., F.S.C.J., &c., will read a paper on the so-called *Non-Actinic Solutions*; and Mr. G. Wheeler will read a short paper and demonstrate his method of producing "clouds" in bromide prints. The attention of members is called to the following rambles:—Dolin Valley, Saturday, August 2; train, half past one, Central, to Ashley; leader, Mr. J. Drinkwater, Station-road, Altrincham. Bolton Abbey, Wednesday, August 13; train, twenty minutes past nine a.m., Victoria, No. 7; leader, Mr. E. O. Gilmore, 18, Cooper-street, City. Alderley, &c., Saturday, August 23; train, half past one, London-road (L. and N. W.); leader, Mr. Seed, 324, Upper Brook-street, Charlton-on-Medlock. Lymm, Saturday, September 6; train, eight minutes past one p.m., Oxford-road Station; leader, Mr. Wilcock, 325, Moss-lane East.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

E. S. Baker, Birmingham.—*Ten photographs of Sergeant Bates, Queen's Prizeman*, 1890.

Silvester Parry, Chester.—*Seven photographs of Pant Asaph Monastery, North Wales, entitled:* 1. "*The Calvary*;" 2. "*Monks haymaking*;" 3. "*The Monastery*;" 4. "*Entrance to Calvary*;" 5. "*Pant Asaph Church from churchyard*;" 6. "*Pant Asaph Church from field*:" 7. "*Thomas Porter's grave.*"

LANCASTER & SON, and GRIFFIN & CO.—Received.

NOVICE.—Try some of the numerous formulæ that have been been published in the ALMANACS.

A. TATE (Belfast).—Received. We shall probably have something to say on the subject next week.

GEO. EASTMAN (Rochester, N.Y.).—Thanks for friendly services. The "Shipman" catalogue has not, however, yet been received.

A. X.—Both samples of nitrate of silver appear to us to be good. We shall make trial of them by the polariscope and report again.

QUERIST.—Pyrogallic acid is a poison, but we cannot say the smallest quantity that would prove a fatal dose. Neither do we remember a case of poisoning by it.

R. C.—Celluloid films must not be dried by the aid of alcohol. The effect you got is quite what might have been expected, considering that alcohol is a solvent of celluloid.

W. J.—Yours is about as bad a case of fading as we have ever heard of in so brief a period. Some one is, of course, to blame, but who we cannot hazard an opinion without knowing more particulars.

J. E. O.—Obtain a treatise on the positive collodion process. The manipulations are the same with this difference, that the one is taken on glass while the ferrotype is produced on a blackened iron plate.

S. BULLEN.—If you read the article last week on the use of celluloid films in group photography, you may see your way out of the difficulty. Employ the rectilinear in preference to the portrait lens—it will cover better.

S. E. WILTON.—Such an apparatus as yours has very little commercial value nowadays, as it is quite out of date. The dark-tent camera and stand, baths, &c., if sent to an auction sale, would probably not realise a couple of pounds.

G.—It is impossible from your description to afford you any idea of the capabilities or value of the lens. The better way would be to send it for examination per Parcel Post, enclosing therewith an addressed "tag," when we would return it same day as received.

HERTS.—We fear the negatives, however good they may be, will not sell for much. Views of country lanes are very pretty, and often artistic, but publishers prefer pictures of well-known places of general interest. With them it is quite a commercial question—what sells best.

C. MILLER.—The picture is very grotesque, though it is quite what might have been expected from drying a gelatine negative in the sun at this season of the year. The heat is so great that it caused the gelatine to run. However, you may have some fun out of the negatives if the sitters do not object.

A. HOWELL.—As you say, all such bombast and twaddle is sure to "end in smoke," just as in the present instance. Sellers fix their price, and always will; the public purchase or not as they choose. Your letter is very clever, but no good would result from its insertion. You may possibly note that the tone has altered considerably during the last week or two.

ORTHO.—As a rule chromo-lithographs are not so difficult to copy as oil paintings, on account of the surface being more even and less glossy. A great advantage will accrue from the use of achromatised plates if used with the yellow screen. The formula quoted for the preparation of the plates is one of the best that can be used. The commercial preparation, we hear, is also excellent, though we cannot speak from personal experience of its use.

PIRACY.—The thing is very vexing but you have no remedy. The copyright is not legally vested in you, although you registered the picture and it was taken by your paid *employé*. You must do as hundreds of others have to do, put up with the annoyance. The majority of the illustrated periodicals are very unscrupulous in such matters. We hope some day to see one of them made to suffer, as they may possibly pirate a legally copyright photograph.

WM. ADCOCK.—To carry out the same plan as described in our article, your plan is inefficient. Firstly, if the whole forty feet be glazed your blinds should be long enough to at least cover all the glass. You would thus need forty feet plus six or eight feet for "slack." When you speak of the glass being "quite obscured," we do not know if you mean "frosted" or rendered opaque. Secondly, you will lose much command of illumination if you leave the middle portion of the glass unscreened.

RESIDUE asks: "1. Will a paraffin cask thoroughly cleaned and washed out answer for holding silver residues?—2. Are the hypo residues from silver prints worth saving?—3. Ditto hypo residues from gelatine plates?—4. What is the procedure for making a photograph copyright?"—In reply: 1. Yes.—2 and 3. Most certainly. We saw, within the last few days, a lump of pure silver weighing forty-eight ounces that was recovered from the two months' hypo wastes of a London establishment.—4. Our publishers undertake the copyrighting of photographs at 1*s.* 6*d.* each; but you can do it yourself by getting a form from Stationers' Hall. It will probably cost you more this way than the other.

A. F. H. writes: "I sent four negatives to a well-known firm for one carbon print from each on paper; I asked to have them at their earliest, and they kept me three weeks; this I thought ridiculous for only one print per negative. One of the negatives in question is a pretty subject, and just suited for opal pictures for publication; the negative had only printed two silver prints before sending it, but now it has the appearance of at least fifty copies having been printed from it. It is strange the other three negatives, being only ordinary, do not appear the same. If my customer got to know that such was the case I should get into hot water. Now, Mr. Editor, I should feel obliged if you would advise me in the matter."—What advice can we give? Three weeks is certainly a long time to get a single print from each of four negatives. Write to the firm for an explanation. Your note insinuates that an improper use has been made of one of the negatives, but this no respectable firm would do.

W. A. R. writes: "Your advice is requested, in your 'Answers to Correspondents,' on the following:—At this season of the year we are continually requested to photograph cricket groups and garden parties where it is quite impossible to get a bit of shade to arrange a group in; what can be done in a case of this sort, as it is useless to take a negative in the bright sunlight? If done so, is there any way of softening the shadows to prevent them spoiling the picture? Is a wide-angle rectigraph lens a rapid or slow one, as I have one I cannot get good results with, although I vary the exposure very much?"—In reply: It is seldom indeed that some shady place cannot be found wherein to pose the group; where, however, this is not the case it must perforce be taken in the sun. In this case a full exposure should be given and the development conducted so as to obtain all the details before density is acquired. All wide-angle lenses are necessarily slow ones as compared with those of the "rapid" type.

MAJOR B.—1. Not having, so far as we know, seen what is termed the "Ideal" hand camera, we must be excused from answering your queries respecting it. Although we are unacquainted with it yet, we have no doubt, from the reputation of its agent, that it will do all that he claims for it.—2. As regards the Swinden & Earp hand camera, we have satisfied ourselves by that best of all methods, practical trial, that it does its work in a most satisfactory manner. We took many excellent negatives, both "time" and "snap shots," by it during the Chester Convention.—3. The other one concerning which you inquire, the "Facile," has also proved in our hands a most delightful companion on a journey. Ours, which was made by Mr. F. Miall, the inventor and patentee, has served us well under all conceivable circumstances. This was the camera with which we took our Channel Island views.—4. Call by all means when you are in this quarter. We shall be glad to see you.

GELATINO-BROMIDE writes: "I have been used to making my enlargements with an oil lamp. My negatives being dense require very long exposures, some as much as six hours, in which case I lock up my room and return when the time is up, to find increasing heat has drawn the flame until the chimney smoked, the lamp went out, and my dark room and furnishings were covered half an inch thick with soot, and an atmosphere so thick with picric acid you might cut it with a pick. The only remedy within the reach of an amateur seems to be gas. Would you kindly advise me as to the best form of light for that purpose?"—No wonder a lamp goes wrong when left for six hours to itself! If common gas is to be employed under these circumstances let there be two flat-flame burners, such as the fish-tail; let one be immediately behind the other, and separated from it by an inch, their flat sides being towards the condenser; then place as close to the front one as convenient a plate of thin metal, having in it a hole barely as large as a shilling, so as to cut away from the condenser all but the best part of the flame. But why not try enlarging by daylight?

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, August 13, *Extemporising Apparatus;* August 20, *Actinometers and Photometers.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, August 14, Further adjourned discussion (third evening) on *Printing through Coloured Media.*

IN a letter from Mr. S. T. Chang, at present in Godalming, he informs us that at the Southern Counties Cyclists' Camp, at Burbridge Park, the Holborn Camera Club have provided for themselves a dark-room tent and lamp to facilitate their photographic operations.

THE LANTERN SOCIETY.—This Society has obtained the use of the rooms belonging to the Royal Medical and Chirurgical Society, at 20, Hanover-square, and, through the courtesy of their Committee, at a very moderate rental. These rooms are centrally situated, and are frequented by several scientific societies, amongst whom are the Royal Microscopical and Quekett Club. Meetings will be held, for the purpose of reading papers and exhibiting lantern slides, on the second and fourth Mondays in each month from October to April inclusive, at half-past eight p.m. Several applications for membership having been received from ladies, the Council desire it to be known that they are eligible for election.

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PANORAMAS BY THE ORDINARY CAMERA.

The receipt of a fine panoramic view of the widely extending Conway Castle, taken during the Convention week by Mr. A. Tate, of Belfast, prompts us to say something concerning suitable methods of obtaining panoramic pictures by ordinary cameras and lenses which, although faulty in principle, yet are agreeable as a whole.

Where the principle is faulty is this: A panorama ought to be taken in panoramic perspective in which the axis of the lens is directed to each part of the scene in succession, and each part of the plate is successively brought opposite the axis of the lens. Plane perspective, on the other hand, is that in which the image is projected on a flat plate, as when a plate of this form is held up between the eye and the scene and a tracing is made upon it without moving the position of the eye. This latter is the class of picture that is produced by a wide-angle lens on a flat plate.

Both kinds of perspective are faulty when carried to an extreme, unless the picture be examined from a point a distance from it assimilating to that of the focus of the lens, this point being opposite to the centre of the picture in the case of the perspective being plane, while if it be panoramic the eye must be opposite each part being looked at. In the former the picture, in all but its centre, must be viewed diagonally; in the latter it must be examined directly, for whether the surface on which the image is received be curved in cylindrical fashion or flat, the result is the same when the picture is mounted.

To do justice to many extended views they must, as we have said formerly and elsewhere, be taken in a series of successive negatives, one to begin where the other leaves off, and these must then be joined so as to form a panorama.

It is not only possible, but it is not by any means difficult, to print a negative upon one end of a long strip of sensitised paper, and then superimpose the end of a second negative upon the terminus of the print from the former one, provided a portion of the first negative is also produced in the second one by way of guide. Having registered these portions, the printing of the second may be proceeded with in the certainty of the two prints forming one harmonious whole, provided due skill has been displayed in preventing the junction from being lighter or darker than the rest of the picture. This method demands the employment of a rectilinear or non-distorting lens.

But by far the better and most satisfactory way to proceed is not to join the series of views together on one sheet of paper as suggested (for a skilled artist would at once discover that the picture, as a whole, was a conglomerate of plane and panoramic perspectives), but, having carefully levelled the stand and taken a series of views by rotating the camera, one view commencing a little before where the other leaves off, make a print from each negative thus produced. It matters not whether the lens be a single landscape or one that is rectilinear; that is, if there be no architectural subjects near the margins. In trimming the prints, remove as much of the foreground as possible, and allow a very small portion of the marginal view common to both to remain. Then, in mounting, take care to allow a small space—an eighth of an inch is sufficient—to intervene between each picture. The illusion is perfect. The spectator does not allow his mind to realise that he is looking upon a series of individual pictures; and his mind, refusing to accept them as such, prefers to realise them as a whole. The slight space intervening between them is not sufficient to break the continuity of the scenery, but it is amply so to prevent the discovery of slight inaccuracies in junction, which, if the prints were placed close together, would inevitably be detected.

GRAIN OR WET NEGATIVES FOR PROCESS WORK.

The first necessity in many of the processes of photo-mechanical printing is a means by which the natural half tone of the negative may be broken up into some sort of grain in the positive print, and this is frequently effected by the use of a film negative interposed between the printing surfaces, or it may be between negative and lens in the process of reproduction. The chief essentials in such grain negatives, beyond a sufficient degree of fineness for the particular purpose or process, are absolute uniformity and perfect clearness of the transparent portions, together with a sufficient degree of density.

With the first of these conditions we have not at present to deal; the particular form of the grain is comparatively an unimportant matter, provided it is uniform, and may consist of a series of minute circular dots, a network of crossed lines, or, indeed, of any fine pattern that will conveniently serve the purpose. The best of such negatives are made by reduction in the camera upon collodion films, and it is our intention in the present article to give brief directions which may prove useful to a rapidly growing class of experimenters in photo-mechanical work.

We must assume that a choice has been made of the material from which the grain negative is to be made, and that, whatever it may be, a camera reduction is to be made. This will be found to give the most satisfactory result, as, though wire gauze, for instance, is obtainable as fine as 120 holes to the linear inch—as fine as is ever needed—a far more even as well as a cleaner grain is produced by photographing down a coarser material. Such gauze is obtainable in brass or copper of almost any degree of fineness to that just mentioned at most of the

dealers in philosophical apparatus, and the coarser sizes are also made in iron. They vary very considerably in quality and uniformity, and a careful selection should therefore be made. A series of fine lines ruled upon paper may be utilised, but such are more difficult to obtain of the desirable regularity, and the final result is scarcely equal to that given by wire gauze.

In photographing the latter, it should be strained evenly in a wooden frame, which must be fixed in such a position that an even and not too powerful light passes through it to the lens. On no account should direct sunlight or direct daylight of any kind be employed; reflected sunshine is too powerful, and the best result is obtained by a subdued diffused light reflected from a *matt*, white surface. These conditions are secured by arranging the screen at an angle of 45° with a smooth wall or other surface of sufficient extent, properly coloured and lighted; and in order to secure the greatest possible uniformity in lighting, it is desirable that the reflecting surface should be considerably larger than the screen to be photographed.

As regards the comparative dimensions of the original and the reproduction, these must, of course, depend upon the material available, and the fineness of grain required in the negative. From eighty to a hundred lines to the inch will generally be found fine enough, and a clearer and sharper result will be obtained by reducing from a mesh three or four times as coarse than from finer material. Another point that requires to be taken into consideration, too, in the matter of reduction is the relative proportions between the thickness of the wire composing the gauze and the apertures. Very considerable differences can be produced in the character of the grain by paying attention to this matter, but it must always be borne in mind that the greater the number of reductions beyond three or four the larger will be the surface required, and, consequently, the greater the difficulty of securing mechanical perfection and uniformity of illumination.

The process of reproduction is almost of necessity confined to collodion, either wet or dry. With gelatine films, however perfect for general work, it is practically impossible to combine the necessary conditions of clearness and vigour as well as sharpness required; this arises as much from mechanical as from chemical reasons, while it may be urged in addition against the use of gelatine that the operation of stripping the negative from its glass support is a far more difficult one than with collodion.

The latter may be used either wet or dry, and each form will, no doubt, find its supporters. Wet collodion will, perhaps, be invariably employed by professional photographers and others who may be familiar with its use, but dry collodion or emulsion plates will be perhaps more convenient to the average amateur. A dry, bromised collodion film, too, has an advantage over wet collodion in that it is amenable to alkaline development, the benefit of which will be alluded to further on.

We will describe the wet process first. The glass employed should be patent plate in order to secure as perfect a surface as possible, and it must be most scrupulously cleaned and polished, a final treatment of powdered talc being given in order to ensure the easy stripping of the film negative. The collodion should be as structureless as possible, as any tendency to "crapiness" will, by the introduction of a separate grain, tend to mar the result aimed at. It should not be too heavily iodised, should contain a fair proportion of bromide, about 1 : 3, and should not be too new. When old enough to have acquired a pale sherry tint the condition will be satisfactory. The bath is best of the strength of thirty-five grains to the ounce, thoroughly iodised, sunned, and finally rendered decidedly acid with nitric acid. The conditions, in fact, must be such as to secure the greatest possible clearness, but without any tendency to over-density of image, which is usually accompanied by an inclination to "filling-up" of the fine lines.

The delicate part of the process, of course, lies in the exposure and development, which must be so suited to one another that the requisite depth of deposit is secured at one operation, and without any forcing, which only helps to fill up or veil the lines. There is far less difficulty in this respect when working *through* a screen of gauze or other material than when operating upon a series of lines ruled on paper. In the latter case, even the black lines reflect a portion of light, and this, added to the natural tendency to spreading of the action, helps materially towards the undesirable filling up of the lines. When gauze is employed, by shutting off the light between the camera and the screen, which should always be done, the dark lines of the material are absolutely black, and the chances of filling-up are confined to the developer; that is, provided the illumination be not too powerful, in which case the lines will be filled up by irradiation or "blurring." Actual experiment alone can fix the proper time of exposure.

With regard to development, the majority of operators will, no doubt, prefer the iron process, and there is really no reason to depart from it. In the production of line negatives for photo-mechanical work, where extreme density is required, many operators prefer to use pyrogallic acid, but for the purpose we have at present to deal with, where excessive density of image is objectionable rather than otherwise, iron will answer every purpose, and in any case will give an image better adapted to intensification after fixing than when pyro is used. The solution should be of the ordinary strength of fifteen grains of ferrous sulphate to the ounce, with rather more than the normal proportion of acetic acid, say twenty minims of glacial, and sufficient alcohol to make the solution flow easily on the plate.

The beginner in this class of work, even though he be an "old hand" at photography, will probably be surprised and somewhat disgusted with his first efforts, and hastily proceed to blame the bath and developer for all sorts of imaginary faults; but let him remember before he applies the developer that the picture or image he is about to bring out is a perfectly even grain of such fineness as to be almost, if not quite, resolvable by the unaided eye in the comparatively dim light of the developing room. Before, therefore, he throws the plate on one side as hopelessly "fogged," let him examine it with a magnifier, when the grain will be apparent. A little experience, combined with a comparison of the colour of the body of the plate with the corners or edges protected by the dark slide will enable the development to be judged with a fair amount of certainty, the magnifier being at hand in case of necessity.

Wash well after development, and fix with cyanide of potassium before the plate has access to daylight; wash well again, and if on examination the image be not dense enough, it may be intensified slightly by means of pyro or iron and silver. Or perhaps a preferable method as being less likely to fill up the lines will be to use bichloride of mercury, followed, after careful washing, with weak ammonia or a saturated solution of sodium sulphite. This not being a *developer*, but only an intensifier, cannot fill up the clear lines of the negative if these are without deposit to start with and the film has been well washed. The amount of washing necessary is, however, far less than with gelatine plates.

The negative so produced from a screen of wire gauze or similar material will consist of a network of continuous *transparent* lines or a series of rows of opaque dots. If the positive grain is to consist of continuous cross lines this is what is required; if, on the other hand, the picture is to be composed of minute dots, a reverse must be made from the original by contact printing on a dry collodion plate, the same conditions being observed throughout development. Or in case a reversed negative be required the preferable plan will be that which we have yet to describe.

In this case a dry collodion plate is used, or at least a collodion plate prepared in the same manner as a dry plate, namely, freed from all excess of silver nitrate so as to be developable by means of alkaline pyro. With this condition the plate may of course, if preferred, be used wet, but it is necessary to employ a simply bromised collodion, or at any rate one containing only a very minute trace of iodide. The reason for this is found in the fact that iodide of silver is not readily reduced by the ordinary alkaline developer, and as this method is based upon the removal of the image first formed by the developer, it is obviously necessary, in order to obtain a series of transparent dots, that the proportion of iodide should be extremely small.

The plate may be prepared by sensitising a plain bromised collodion film in a silver bath of the strength of sixty or, preferably, eighty grains to the ounce, and washing until every trace of free silver has been removed. A far more convenient plan will, however, be to employ a bromide emulsion in collodion. The exposure is made with precisely similar precautions to those already described, and the development effected by means of pyro and ammonia. The action of ammonia is more thorough and searching than either of the fixed carbonates, for which reason it is recommended. The action of the developer is continued until, under the magnifying glass, the grain is clearly and strongly visible at the back of the plate; in fact, the object is to reduce the whole of the silver bromide on those portions of the plate representing the dots. It is not easy to judge precisely when this has occurred, but a little experience will teach how far the development may be carried to secure this result without over-doing it by reducing the unexposed portions, which would result in loss of vigour in the final image. If the action is incomplete the second development will veil the image, a more serious evil than the other.

Development complete, the plate is thoroughly washed and placed in a dish with a sixty-grain solution of the double sulphate of iron and potassium, or iron alum as it is called. A solution of *ferric* sulphate may be used, but the first-named is more reliable and keeps better. This dissolves the metallic silver forming the image and leaves a negative in which the lines representing the original gauze consist of silver bromide, and the "dots," or holes, of clear glass, the absolute clearness of the latter depending, as has been said, upon the thorough action of the developer. The plate is again well washed, and after a brief exposure to light again treated with alkaline pyro to darken the silver bromide, when an image of absolute clearness and great density is obtained.

The advantage of this method is, that there is not the slightest tendency to fill up the transparent lines of the final negative. These, if the development has been carried far enough, have absolutely no silver to be acted upon by the second developer, and consequently remain perfectly transparent, under which circumstances the development may be continued for any length of time without injury. This process produces the finest combination of vigour with clearness, and enables *quick printing* grain negatives to be made, which are at the same time perfectly opaque in the lines.

The conversion of the negative into a film will form the subject for a separate article.

Willesden paper, which our readers are familiar with from its value in extemporising washing trays, for covering roofs, and, indeed, for building studios it may be said, promises to enter into still closer relationship with photography. Mr. J. Williams, of the Willesden Paper Works, has taken out a patent for a paper intended for the use of photographers, which, on the face of it, promises to be of very great value. The method by which the ordinary papers from this place are made is well known, and consists in partially dissolving the surface of ordinary paper by cuprammonium hydro-oxide solution, as the patent describes it, and then pressing two or more sheets in contact, or allowing single sheets to dry, the partially dissolved surface forming a sort of skin difficulty pervious to water. The same principle is adopted in the new preparation. Suitable paper is floated upon a bath of the chemical, and this converts the surface into a structureless film of cellulose, which is also combined with the copper, &c., of the liquid. Exposing the paper thus treated to as little contact with air as possible, it is passed over hot rollers to expel moisture and ammonia. But it still contains copper, and this is got rid of by successive weak baths of sulphuric acid. After washing and drying, the paper has a permanent glaze like albumenised paper, and is capable of withstanding the action of water, steam, weak acids, alkalies, and ordinary solvents. Until more is practically known about this new material it is impossible to speak definitely of its qualities; but for albumenised paper printing, and, it might be thought, for platinum, experimenters may find elements of great value in this new patent.

Mr. E. Stanford, of Charing Cross, has just issued a little book on *Weather Forecasting for the British Islands by means of a Barometer, the Direction and Force of Winds, and Cirrus Clouds.* The author is Captain H. Toynbee, F.R.A.S., &c., late Marine Superintendent of the Meteorological Office, and he gives a clear idea of what can be done towards forecasting the weather in these islands.

The great usefulness of "paraffin" or "mineral oil lamps" in photographic practice should not blind users to the fact that many accidents have occurred, and may again occur, in their employment under apparently safe conditions. A recently published report by Colonel Majendie is calculated to make a careful person pause before starting the use of this form of illumination. Particulars have been collected of the details of twenty-nine lamp accidents, and it is stated that in eleven cases the lamps exploded spontaneously while burning normally; hence the fault cannot be always traced to carelessness, to moving the lamp, attempting to replenish it while burning, or to extinguish it in some improper manner. The report states that the oil in one-half of the cases had a higher flashing point by about 10° and upwards above what was legally necessary, and in some of these instances the explosion was actually of a more than ordinarily violent character. It is not intended that these remarks should discourage the employment of this cheap and beautiful illuminant, so superior to gas in every respect, in quality of light and the odourless character of the products of its combustion, and the report indicates the best way of avoiding the dangers referred to. The lamp reservoirs should be of metal, and a suitable extinguishing apparatus should be provided to enable the light to be put out without resorting to the common but exceedingly dangerous practice of blowing down the chimney. Further, "all channels of communication between the burner and the oil holder should be protected with wire gauze of twenty-eight meshes to the inch." Lamps in which the oil is supplied to the burner on the "bird-fountain" system are considered free from danger if the tube through which the oil passes remains sealed by the liquid. The wicks should be soft, and not too tightly plaited, should be rendered quite dry before being put into the lamps, and should be only just long enough to

reach the bottom of the reservoirs. They should be so wide as just to fill the wick holder without squeezing. The reservoir should be quite full before lighting the lamp, and all charred wick and dirt should be removed. The oil should be stored in vessels closely stoppered.

This may be looked upon as a long list of precautions, but most of them are already practised by those in the habit of using "paraffin" or "petroleum lamps," and we would most earnestly draw to them the attention of those using mineral oil as the illuminating agent in optical lantern work, where conditions favouring explosives are so often present, and when, if accident did happen, its consequences would most probably be of an unusually disastrous character.

The Ealing Photographic Society is now formed, and under very favourable auspices. It bodes well for the new Society that it is under the management of a small number of officers—a president, four vice-presidents, a council of four, with an honorary secretary and treasurer—eleven all told. Small committees always work better than large ones; the business is got through quicker, and generally much more satisfactorily. Promoters of new photographic societies will do well to follow the example of the Ealing one. In forming new societies there is just now a growing tendency towards making—like the late Artemus Ward's proposed army—all the members officers.

QUICK AND SLOW PRINTING, AND THE USE OF COLOURED MEDIUMS.

It has often been stated that a thin negative will yield a print of much more vigorous character when printed in a slow light than when printed quickly. I think I have even known some go so far as to say that intensifying is unnecessary, the only thing required being to print the negative in very subdued light to get the vigour that would otherwise be obtained by intensifying. The reason commonly put forth in connexion with an assertion of this kind is that a strong light will penetrate the deposit forming the image, whereas a weak light will not do so, or at all events not in the same proportion to its action through the more transparent portions of the film. It has always seemed to me that a proposition of this kind, involving a change in the operative ratio of units of light when they are relatively abundant or scanty, would require much stronger evidence than any that I have ever seen brought forward.

Although the statement as to the different effect of a short exposure to a strong light from a long exposure to weak one has generally been made with reference to direct printing upon albumenised paper, it has also been sometimes applied to other photographic processes. It has been stated, for instance, that with a thin negative, when used for enlargement in the lantern, more intensity will be obtained in the resulting print by using a weak illuminant, such as oil, instead of the limelight or the electric arc, or by using a yellowish screen with the negative in the lantern.

Concerning camera exposures, a proposition of the contrary kind has sometimes been put forward, to the effect that it is not desirable to use a small diaphragm, as by so doing the image becomes comparatively weak, flat, and poor. Another proposition of somewhat similar character, as involving difference of ratio, has been enunciated; viz., that the relation of exposure required with slow and rapid portrait lenses in the studio is not the same in the summer as in the winter months. With regard to the supposed weak image induced by a small diaphragm, I may say that I have not found it to occur even when the exposure has been very prolonged in a dull light, and I remember some examples that were shown at a photographic meeting by Mr. A. Cowan wherein, with very great variations of the diaphragm and proportionate exposures, the density and brightness of the images produced were as nearly as could be estimated identical. As to the use of a bright light in the lantern being the cause of a weak image I have not found it to be so, even when using the electric arc.

To return, however, to the subject of the effect of quick and slow printing with albumen paper, I have not, with paper that I sensitise myself, been able to find any difference. I have now before me a piece of paper which was folded and printed thus:—One portion was exposed under a rather thin negative for three and a half minutes to a bright light—not continuous sunshine, which was not then available, but to partial sun. Another portion of the same paper was exposed under the same negative in a position so shady that it took two days to print. A third portion was then exposed to a bright light for about the same time as the first, and the paper was toned and fixed without the prints being separated. They are so much alike that I do not think any one could say which had been printed in the strong and which in the weak light.

I have, however, seen prints, and I have produced some myself, showing a certain difference between quick and slow printing, but in these cases the paper has been ready-sensitised paper of commercial manufacture. Does this difference, then, prove that the relative opacities of a negative vary in their ratios according as the light is weak or strong? I think not; if this were the case, how could it be accounted for that the difference was not found when using home-prepared paper? The explanation that I suggest is a chemical one, and though it is possible that it may not be the correct one, and that another may be found, I think if such prove to be the case, it will turn out to be a chemical one also; the chemical conditions of the sensitive surface being different, whilst the ratio of light with the same negative must be the same to both papers, whether both are printed upon quickly or slowly.

The difference in the action of the papers was this:—Whilst with the home paper the prints from the thin negative were fairly bright and undistinguishable whether printed quickly or slowly, with the ready-sensitised paper a print of quality equal to those on the home paper could only be obtained by slow printing. The print made quickly with this paper was weak. I suggest that the chlorine given out whilst printing acts unfavourably to powerful reduction upon the sensitive surface with which it is in immediate contact, and that when the printing is effected quickly the chlorine has not time to get away or diffuse itself as it can during a prolonged exposure. Why this action does not occur with the home-prepared paper may be accounted for by the abundant free nitrate of silver at hand to absorb it.

The use of coloured glass—green, yellow, pale red, &c.—for covering the negative during printing has been recommended on various grounds; one, perhaps the most common, is that it slows the printing, and thereby confers the richness which slow printing is assumed to give. Another reason, and one which is certainly supported by facts, has been given for using green glass, and that is, that the silver is reduced of a greyer or blacker colour, and the toning is much more quickly effected. The first proposition, that greater vigour results, I have found with the home-sensitised paper to be just the reverse of the fact. Using green glass that necessitated exposures of from twelve to twenty times what would be required without it, I have found that the image is of much greyer colour, and decidedly less vigorous. Whilst, therefore, with a thin negative the use of green glass was injurious, with one that was just a little too marked in contrast a better print could be obtained with than without it. The objection to its use here is that with a negative of excessive contrast the time of printing is not short, even without the intervention of the coloured screen. However, when the best obtainable quality of print is required from a dense negative it may be useful. Ready-sensitised paper seems to be more easily affected in facility of toning by the green glass than the home paper, and not so easily affected in the matter of producing a less vigorous image, and therefore it may with such paper be a valuable adjunct. Chemical reasons may perhaps be found in the different sensitiveness to different colour rays of the sensitive substances present in the papers.

Printing through orange glass gave much the same effect as green, whilst on the other hand with a very deep blue glass the print was rather warmer in tone than with the negative uncovered.

W. E. Debenham.

ON THE PROPER ESTIMATION OF LIGHT FOR PHOTOGRAPHIC PURPOSES.—II.

In my previous article I referred to the necessity of a student in photography giving some consideration to the nature of the light at his command, so as to be able to discriminate between a light con-

taining a larger degree of actinic power from such as is weak in this important essential. Having referred to this important point in the practice of photography, I now pass on to the consideration of the best class of light to use for various kinds of subjects. In considering this portion of the subject it will be well to divide the subjects into two classes, viz., outdoor and indoor exposures. I propose to deal with the former class of subjects first.

Of all outdoor subjects, perhaps the first to claim attention is landscape work, and here there is no denying the fact that if an operator be desirous of securing the best results he must of necessity study well the subject beforehand. I am quite aware that with many the practice prevails of just going for a day's outing with the camera, it may be with the intention of taking some particular view decided upon beforehand, and having for a few days previously made up their mind to photograph this particular view on a certain day, off they go, irrespective of the nature of the light or the proper time of day to take the particular view decided upon. Chance may so cause it to happen that now and again circumstances transpire to enable good results to follow such a happy-go-lucky style of procedure, but of this I am certain, it is not the way to secure success in the main, and no professional landscape photographer who has to earn his bread and cheese would think of going about the work in such a manner. No! in landscape work there can be no success without downright hard study and untiring patience. Each particular view must be well considered beforehand, and the exact time of day selected when the light suits best, having due regard to shadows, reflections, &c., and patience must be exercised so as to only take the view when the near foliage is absolutely still; in many other respects, such as the time best suited for reflections and shadows, a previous study of the particular view to be taken will amply repay the trouble and time expended.

There is no doubt that sunshine for general landscape work is of the first importance, and a beginner should endeavour to get into a practice of self-denial, and bide his time for exposures on such subjects, and not go on exposing plate after plate on poorly lighted views, that can at best only turn out failures, and which lead most probably to disappointment.

Another class of outdoor subjects in which sunshine is of the first importance is architecture. Here also it is almost imperative that some thought should be given to the subject beforehand, and such time elected for exposure as will cause the structure to be lit to the best advantage. As a rule, it will be found that stonework or similar subjects are best illuminated with such a side light as just gives the necessary roughness to grain of the stone or interstices of the building, and at the same time helps in a marked degree to give so many nice little shadows from prominent points in the building. Let any one try the effect of photographing, say, an old rubble dyke with a *side light* that just gives beautiful relief of high lights and shadows between the stones, and then try the experiment of taking the same view with bright sunshine streaming from the direct front, and he will need but little more to convince himself of the great difference in effect produced by the former way of lighting. In the one case he will succeed in getting a brilliant picture full of relief, while with the latter it is ten to one it will be flat and entirely wanting in roundness and relief.

In photographing subjects which have inscriptions or other carved masonry upon them, an operator must spare no pains by studying beforehand the exact time of day the sun will suit best for the work. This is a most important point in architectural photography, and should never be omitted.

Another important class of outdoor work may be roughly included under the title of instantaneous work, and here it will be at once obvious that the very nature of such of necessity implies the using of the greatest amount of actinic light it is possible to command. The great diversity of subjects which comes under the title of instantaneous work nowadays, when hand cameras are as plentiful as blackberries, has led to a practice of indiscriminately firing off plate after plate upon whatever little thing strikes the user just at the moment, without any regard to the question of the sunlight at command, or whether this or that little picture would not be much better had the light been from some other direction. I am as well aware as any one of the infatuation a hand camera has for many workers, but I am equally well aware that not sixty per cent. of the plates exposed ever yield printable negatives. It may be too sweeping an assertion to make, but somehow I cannot refrain from expressing it as my opinion that hand cameras are what some would term scientific toys, and only in the hands of very few, such as Mr. John Morrison, jun., who, perhaps, has done far and away the best work of this kind of any one, do anything like steady work with such. I have often thought why so many failures arise with hand-camera work; and, first of all, I attribute the main cause to exposing the plates at all times and seasons without a proper regard to the amount of light at command at the time. Some years ago, in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY, I took occasion to mention, when writing on instantaneous work, that lenses of the rapid symmetrical type, working at *f*-8, were not sufficiently rapid for such subjects as street scenes with heavy shadows, and since then one firm of opticians in particular have done more than any one else to popularise hand-camera work by bringing out short-focus lenses of an angular aperture equal to *f*-8. Doubtless this has had much to do with the marvellous popularity of one form of hand camera in particular which is now on the market, for the original lenses which worked with a smaller angular aperture have been discarded for the more rapid class. With good sunlight, and some practice beforehand, very excellent results can be secured with these little cameras, but I would urge upon those who are the happy possessors of such the necessity of bearing in mind that the very same factors come into play with small cameras as with larger ones, and that one of these factors undoubtedly is that proper judgment be exercised, not only to the quantity, but also to the quality of the light at command; and further, of equal importance is the necessity of only selecting subjects as are lit by a light coming from a suitable direction.

In marine work also there is a wide difference in results obtained by a judicious selection of time of day and direction of light. To those who have not thought of it, I say just try the effect of exposing a plate on a broad expanse of sea and sky under the full blaze of a noontide sun, and against this compare the difference obtained with a similar view taken with a low sunlight in early morning or late afternoon. In the former case, if the exposure be made with the sun in any way behind the camera, there will be but little difference between the sky and water, and the beauty of any ripples or motion will be entirely lost; but with a side light early morning or late afternoon exposures will yield pictures in which the motion of the waves or water are beautifully depicted.

In summer time early morning sunlight is far and away the best light to employ for many classes of outdoor subjects. Let those who have never thought of it just look for themselves at a landscape lit up with a bright sunlight early in June, say about 6.30 a.m. Let them take particular note of the shadows as they appear then as compared with other shadows later on in the day; there will be an apparent transparency in the former case that is quite absent in the latter. Some of the best results are undoubtedly got when the shadows are long and the light low.

With early morning light we obtain also effect pictures, such as some term moonlight studies. The conditions for such are often met with on a bright May or June morning, when, after a brisk shower of rain, the sun comes peeping out behind some silver-lined clouds, flooding the surface of the sea with a sparkling shower of diamonds, and as each little ripple of the water reflects the rays of sunlight, so appears the glistening diamond-like effect. Of course, to obtain these effects the camera must work up against the light, i.e., almost in the eye of the sun, but it is an easy matter to shield the lens from its direct rays.

A morning sunlight is a landscapist's best light, and he who is desirous of obtaining many charming results cannot discard it, for it very frequently happens that there is quietness and stillness at such times that are not to be met with later in the day.

In my next I hope to refer to a few other outdoor items.

T. N. ARMSTRONG.

THE SCIENTIFIC METHOD.

THERE are few of us who have not in some way or another profited by a perusal of the presidential address delivered before the last meeting of the Photographic Convention of the United Kingdom. Probably no one directly concerned in the progress or practice of photography will fail to discover something therein which does not appeal to his attention and command his interest, while to the very large class who were compelled, like disconsolate Paris, to sigh afar off for the happiness of being present at the Chester meeting, Mr. Bothamley's comprehensive address offers itself as a solatium of no inconsiderable efficacy. The presidential address at the Convention is, in fact, a kind of annual stock-taking, which tells us how we stand in regard to photographic progress, and if photographers and photography derive relatively as much benefit therefrom as a house of business does from the performance of a similar duty, this will not be the least of the Convention's claims to approbation and success.

Mr. Bothamley, however, is not content merely to wield scissors and paste brush in the usual mode of the cheap summarists; his own mind confronts us in nearly every other sentence, and we have lucid

comments upon the various improvements, modifications, and novelties which he notices that are as instructive as they are brief. Again, upon what we may consider the burning question of the hour, which is comprised in the department of artistic photography, we obtain some clearly expressed views which naturalistics, naturalists, and realists have no doubt profitably pondered, although they may have failed to discern anything of a severely contentious nature in them; while the President reserves some very trenchant paragraphs for the field with which he himself is so closely and honourably identified—namely, the chemistry of photography.

Mr. Bothamley partly explains the fact that most of the problems awaiting solution at the last (London) meeting still remain unsolved by the allegation that the number of competent investigators [of the real nature of the latent image, &c.] throughout the world may almost be counted on the fingers. The names of these gentlemen, together with the particular theories with which they are identified, will, of course, instantly occur to the intelligent reader, who, looking at the hopeless differences which prevail among them concerning the change which silver compounds undergo when exposed to light, might, with some reason, urge that we are not in want of any more investigators of this kind, but rather of a few who can demonstrate their competency by solving the problems before them. For if, after very many years of experiment on the part of Mr. Bothamley's favoured few, we are still, in that gentleman's words, almost entirely ignorant of the reactions which underlie some of our most important processes, the scientific method is clearly just as much at fault as the haphazard system which he condemns. Nothing plus nothing always equals nothing, so that the experimenters of a certain kind whom Mr. Bothamley so caustically handles are not more deserving of contempt than his few competent investigators, since the efforts of both classes have not, on his admission, diminished our ignorance in regard to the problems awaiting solution.

But it is on lower ground than that of the application of science to photography that the presidential severity of criticism seems to me open to the greatest demur, namely, in the "less difficult questions of *technique* and processes, in which we have made no great advances . . . from want of acquaintance with the scientific method," of course, that scientific method which, applied to the unsolved problems before referred to, still leaves us in total darkness. It is to the scientific method that we must undoubtedly look for our future progress, says Mr. Bothamley. Possibly; but why? Do we owe so much to the scientific method in the past that we must not dare to hope to get on without it in the future? I humbly answer, No, and will try to make good my scepticism.

Photographic *technique* and processes are, without doubt, under many obligations to the men of science; but science—or rather the scientific method—can by no means claim the monopoly of what has been done in the advancement of photography: experiment "of a certain kind;" common-sense; the mysterious instinct to try this, that, or the other modification; sheer, downright groping in the dark, yea, even pure accident, have all had a share in helping us forward, collectively as large as, if not larger than, that of the scientific method. We cannot, of course, expect the schoolmen with their blue ribbons of science and other alphabetical decorations to be over-eager to admit that either the indefinable quality of the human brain which is called natural genius, or the equally rare quality of dogged application, have benefited photographic *technique* and processes as much as the showy efforts of the Burlington House dry-as-dusts, any more than we can get a doctor to praise the virtues of a quack medicine which has relieved a patient whom he himself was powerless to help; but in both cases the facts remain, and cannot be denied.

By what peculiar modification of the scientific method was it discovered that mercury vapour would develop the invisible image in silver iodide, and were the photographic uses of gallic acid revealed by systematic research, or did a chemical cupboard in the one case, and a lady's glove in the other, have any share in the proceedings? To what extent has emulsion photography benefited by the scientific method? Between September 8, 1871, the date of Dr. Maddox's gelatine formula, and 1878, an ardent band of experimentalists, who were certainly not deeply imbued with the scientific method, were hard at work, and we to-day are reaping the fruits of their labours. One has only to study that formula, and to realise that *aqua regia* was used; that the superfluous salts were not removed, and that the finished mixture contained free silver and free nitric acid; that the exposures under negatives varied from half a minute to a minute and a half; that the developed image was useless without intensification, to understand how wide was the field in which they worked—entirely without scientific assistance. Was it the scientific method that led Mr. Charles Bennett to the happy thought of prolonging digestion to increase sensitiveness? Furthermore, turning our faces in a different direction, do we not owe the practicability of the beautiful platinotype processes to the least scientific of the experimentalists with the platinum salts?

The scientific method is defined as being usually absent from photographic experiments; the foregoing instances prove that this is not always a loss. But the scientific method in the hands of scientific people occasionally leads to strange results. Mr. Bothamley singles out Mr. Chapman Jones' intensification experiments for commendation; but is the scientific method responsible for that gentleman's subsequent discoveries (see page 487) that "the best stain remover is simple water," and that "a stain able to resist simple water will also be unaffected by clearing solutions," or are these discoveries what the Editor drily calls "extraordinary," and a wrathful colleague stigmatises as "unmitigated nonsense?"

The President further declares that Messrs. Hurter and Driffield's recently published paper is worthy of careful study in connexion with the question of development; but is the scientific method responsible for leading those gentlemen to a series of conclusions on that subject which, to put it mildly, are as distinctly opposed to the accumulated practical experiences of many years' working as they well could be? Can Mr. Bothamley parallel these two products of the scientific method among those experimenters of a certain kind whom he ridicules?

In recent years, at any rate, the scientific method has had less to do with advances in photographic *technique* and processes than untrained experiment. Science has aided photography before, and may do so again; but just as in the past it has not done everything for us, so we may safely infer that it will not unlock all the secrets of the future. If Mr. Carey Lea, Captain Abney, and Professor Meldola settled between them to-morrow what the precise products of the action of light on silver salts really were, possibly one out of every hundred in the photographic community would be highly edified, while the other ninety-nine would look for some practical application of the discovery, and if none came of it, would cease to feel any interest in the matter; but let one of Mr. Bothamley's "so-called photographic experimenters" give us an infallible remedy for under-exposure, and the ninety-nine would be extremely grateful and materially benefited.

It is because I believe that there is, and has been for some time, a growing disposition among outside men of science to pat photography on the back in order to make capital out of it, while they coldly ignore what has been done for photographic *technique* and processes by innumerable workers who, as they do not fall under Mr. Bothamley's restricted definition of competency, must necessarily be classed among those at whom he sends his arrows, that I have ventured respectfully to point out that, however excellent a quality the scientific method may be, (1) it has not done everything for us; (2) may not be so fruitful of results in the future as is supposed; and (3) is, probably, responsible for conclusions quite as absurd as any that could emanate or have emanated from unscientific experimenters. I do not seek to be taken as in the slightest degree under-estimating the value of the scientific method in advancing or perfecting photographic *technique* or processes, but I challenge the assumption that it is indispensable. Science may do and has done a great deal for photography, but photography has done vastly more for science. THOMAS BEDDING.

SUN SPOTS AND PREDICTIONS.

ATTEMPTS are continually being made to connect terrestrial weather and storms with the motions and positions of the moon, the planets, and the sun. It has been fairly well shown that at the time of full moon there is a tendency in some parts of the world toward a diminution of clouds. One computation has shown a slightly greater rainfall during new moon on the Atlantic coast, but precisely the contrary on the Pacific coast. There has also been a very slight evidence of the increase of thunderstorms at the new moon. The influence of the planets must be absolutely inappreciable. When we consider the sun, however, we see at once the intimate connexion between his radiant energy and all activities upon the earth. The growth and well-being of every living thing are absolutely dependent upon the sun's light and heat. It is believed by many that the sun's heat is the only agent to be considered in seeking for an explanation of our storms and all our weather changes. It is undoubtedly true that some form of solar energy is concerned in our storms, but it would be quite hazardous to say that electric influences from the sun are not far more potent for producing storms than even its heat. As the sun's heat is the most prominent energy recognised by our senses, every attempt has been put forth to determine whether this is constant as regards our climate, or whether there are fluctuations at long intervals. It is plain that these changes, if they exist, cannot be appreciable to our thermometers for centuries. The difficulty of measuring the intensity of solar rays by direct observation has been practically insuperable; and we may say that the total amount of heat which we receive is so great, as com-

pared with its fluctuation from the greatest to the least, that we cannot hope for any definite solution of that question for years to come.

Coincidences.—In seeking any relation between the sun's light, heat, rotation, or appearances, and terrestrial phenomena, it is unsafe to trust to mere coincidences; but some connexion of cause and effect should be established. For example, on August 3, 1872, while Professor C. A. Young was examining the solar prominences with a telescope, he saw a most violent outburst upon the sun, and noted the exact instant when it occurred. Afterwards he found that his assistant at that very moment had observed a violent agitation of his magnetic needle; and an examination of the records at Kew, England, revealed exactly the same disturbance of the needle there. This may safely be regarded as more than a mere coincidence, and proves, in connexion with other observations of a like nature, the intimate relation between solar disturbance and terrestrial magnetism.

It is well known that the sun is periodically spotted; that is, once in about eleven years spots gradually appear, and increase near the sun's equator. A remarkable fact about these spots is that their motion very near the sun's equator appears to be faster than in higher latitudes. They revolve or come in sight in a little over twenty-five days in the former position, and in about twenty-seven days in the latter. This single fact should lead a great many of those who believe that our tornadoes are produced just as the spots appear by rotation, or about twenty-six days apart, to doubt the sufficiency of the explanation, because any such periodicity would be entirely broken up from the variable rotation period of the spots. The cause of these spots has not been well established, but it is probable that they are the result of increased electric activity on the sun. The attempt to connect this eleven-year period with our weather has proved intensely fascinating, and volumes of researches have been published. Such comparisons have proved, in the main, very illusory. While an apparent connexion would be found in a few periods, yet, as the number of observations increased, the supposed connexion was disproved. A single illustration will suffice. The attempt has been made repeatedly to connect the sun-spot period with fluctuations in temperature. In the nature of the case, it is impossible, perhaps, to prove whether the spots show the sun to be hotter or cooler during their existence. The fluctuations of temperature on the earth certainly do not show a preponderance either way, when compared with the appearance of sun spots. This does not necessarily prove, however, that the spots do not influence our temperature, or that they do not show increased heat in the sun, for this increased heat would tend to produce clouds from a greater evaporation, and these in turn would prevent the sun's rays reaching the earth, and this would result in a cooling rather than a heating, which would mask the spot influence.

Tornado Photographs.—One of the most recent developments in tornado studies has been a strong desire to photograph this extraordinary appearance. It is very unfortunate that this desire has become so strong that unscrupulous persons have resorted to photographing sketches of tornadoes and selling them for the real article. It is also unfortunate that all these alleged photographs have been made at distances of from ten to twenty miles. It is a great *desideratum* that we have many photographs taken at much closer quarters, and this is not so impossible as might at first sight appear. It would be useless for any one to attempt a photograph on the south side of a tornado within a thousand or fifteen hundred feet; but on the north side we have repeated authentic observations of persons who stood within one hundred and fifty feet, and did not feel any violent wind. It is much to be hoped that a photographer will catch, by his instantaneous flash, one of these monsters as it passes just south of his position. It will require more than the usual amount of bravery to do this however, as is very plain.

Alleged Photograph.—While nearly all these photographs show quite plainly their origin, yet there is a single exception in a picture representing an alleged tornado near Jamestown, Dak., on June 6th, 1887, recently published in a prominent magazine. There is no doubt that this is a genuine photograph. There exist most serious difficulties in regarding it a tornado-cloud, however. The picture shows a dense mass of cloud extending from the trees at the earth up to the uniform veil of cloud above, with clear sky on either side. This mass has a thickening on the right-hand side, and this is supposed to be the tornado. The appearance is exactly that of a cloud-burst, as has been often witnessed, and not at all of a tornado. The dimensions of the camera and the distance of the cloud give the height between two and three miles. The distance of the cloud was variously estimated from eighteen to twenty miles. There was no destruction, and no one saw it, at the spot where the tornado was supposed to be. The only way it could be located was by following two lines of sight of persons from ten to fifteen miles away until they crossed. Drawings of a sand-whirl not far from the alleged tornado showed a funnel-cloud, and nothing at all like this indefinite mass in the picture. The evidence is quite conclusive that on this day there were in this region several appearances simulating cloud-bursts, tornadoes, and sand-whirls. It is very probable that this photograph was that of a cloud-burst within two or three miles of Jamestown. It is highly improbable that either a cloud-burst or a tornado ever had a height exceeding two or three thousand feet. A photograph of a funnel-cloud showing details, and especially two or three photographs taken as the cloud comes up and passes by, would be of the highest interest, and invaluable at this stage of our studies.

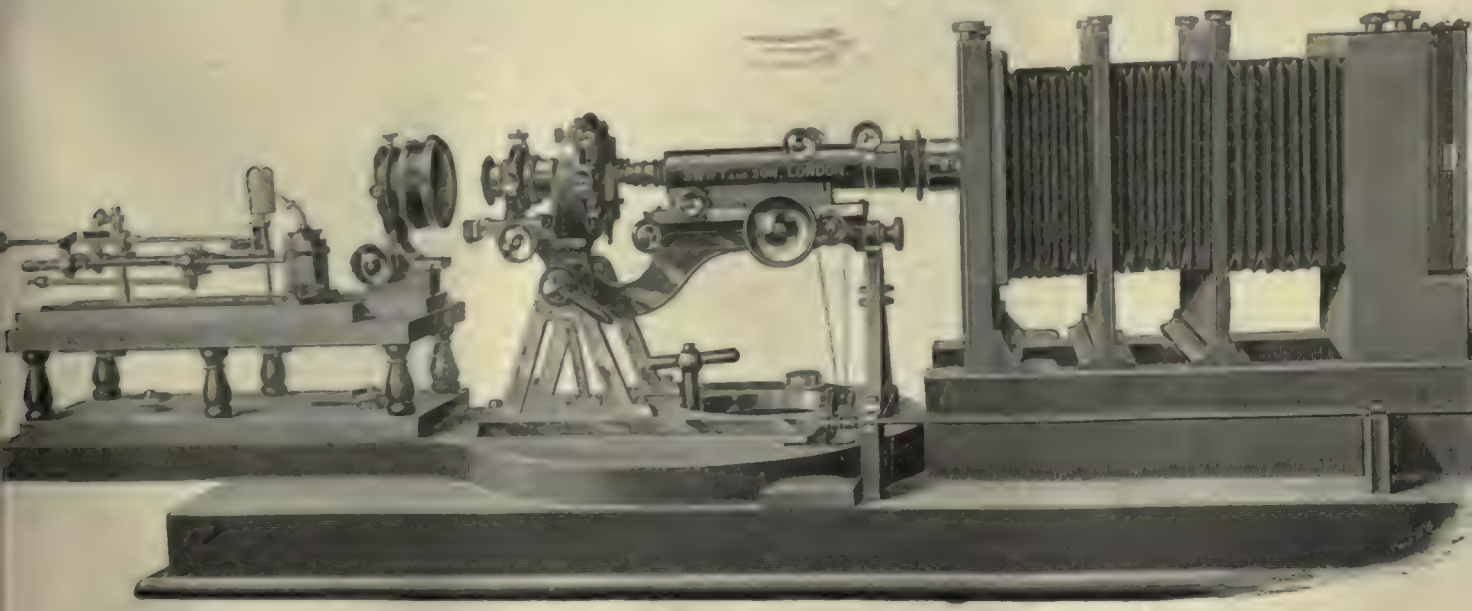
H. A. Hazen.

—*Science.*

PHOTO-MICROGRAPHIC APPARATUS.

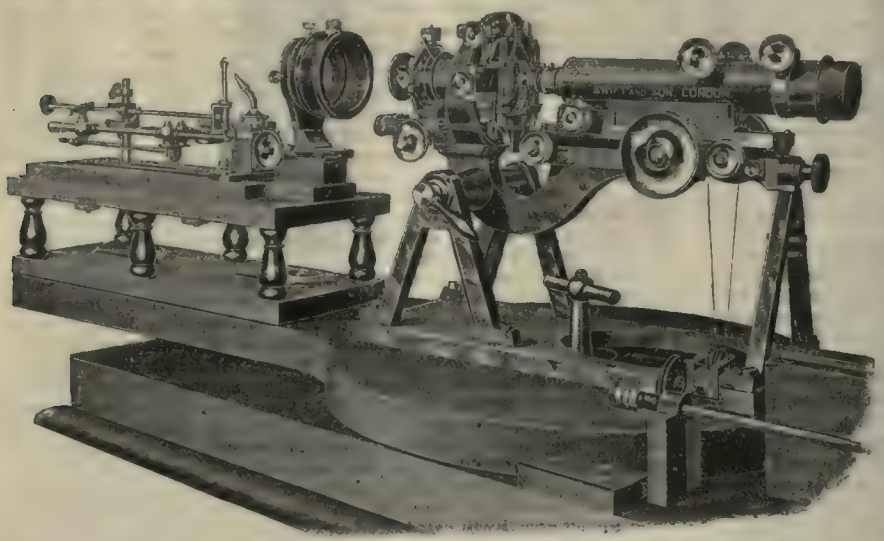
In the exhibition room of the Photographic Convention at Chester a good deal of attention was attracted by a truly fine piece of apparatus designed for the purpose of making photo-micrographs of the highest order. This was the same apparatus of which we gave an account in our issue for June 20 as having been designed by Mr. Andrew Pringle and constructed by Messrs. Swift & Son.

We are now in a position to illustrate what was there said, by giving



two views of the apparatus engraved from photographs. Both views are sufficiently complete in themselves to require no further explanation than

that which we have already given, and to which we now refer those interested in the rapidly spreading application of photography to the microscope. In the large block the instrument is shown side on, with



the camera *in situ*. The smaller block is a perspective, or three-quarter view, showing details of construction not seen in the other. This instrument is made by order of the Privy Council Office, for use at the Royal Veterinary College for photographing micro-organisms.

A TOUR IN ICELAND.*

We had intended to stay at Geyser over a whole day, but as the great Geyser had erupted all that it was likely to do for some days, there was no advantage in prolonging our stay, so at noon on the 14th July we packed up and prepared for the longest march on the tour. Our road skirted mountain after mountain, and numerous small rivers had to be forded, until we came to the Bruara river, where a halt was made for lunch. The particular spot where we halted was one which we easily recognised from pictures and photographs in books on Iceland. Here the river is broad and shallow, but a curious rift occurs in the centre of the river, some twenty feet wide, into which most of the water converges. A small wooden bridge spans the hole, and the effect is extremely novel. Some books describe this rift as an awful chasm, into which the foaming waters fall with a noise like thunder, but I take exception to such statements, for the hole is not more than twenty feet wide, average, and about twelve feet deep, forming a waterfall of a V shape. Naturally enough the view had to be once again recorded, and cameras were unpacked.

After a short smoke we were again in the saddle, and made the best of our way to the half-way point, where we proposed to rest at a farm. Coffee and skyr were almost immediately ready for us, and as we were to wait here till the baggage arrived, together with our change ponies, we had time to take it easy. Close to the farm was one of the most curious sights we had yet seen, for apparently for no reason whatever, at a distance of only three feet from an icy cold lake, a whole regiment of boiling springs were found all in a row. One could hardly imagine why the cold water of the lake did not percolate into the hot springs. Again, the water in the lake was excellent, while the springs were saturated with sulphurous gas. One of these springs boiled with such violence that we fully expected it to spout at any moment like a geyser.

At length our baggage and ponies arrived and we continued our journey, which before long changed in character, for we seemed now to be in the midst of earthquake cracks, and sure enough they were. The mountains near Thingvalla were about the wildest we had seen, and the curious caves which exist there caused another break in the march. They were, however, too insignificant to photograph, although we had a flash lamp with us in case of necessity. A further stiff ride at length brought us in view of Thingvalla, and the mere sight of our destination was a relief to most of us, for we were getting tired, not so much from the day's ride as the effect of so many days' steady riding over rough ground. How I got to Thingvalla I scarcely know. I have a vague recollection of going down a very steep track at a rapid trot, until a shout from behind informed us that the President's pony had come down together with the rider. The doctor, after a lengthy examination, prescribed a little whiskey, and as no damage was done we continued our wild career. We did get to Thingvalla parsonage that night I know, for trout and eggs for dinner kept me awake for a good five minutes, but it was no use, bang went my head on the dinner-table, and I was fast asleep. I found myself in bed in the parsonage next morning instead of the tent, and not only myself but two others of our party had also accepted the offer of a bed, being too done up to wait for the tent. We dined at midnight, and the tents did not arrive till 2 a.m., so the rest of us were fairly late in turning in after a journey of a good forty-three miles.

Next morning I felt as if nothing but a day off would enable me to get back to Reykjavik, and being well up to time we could have taken two days' rest had we desired to do so. Breakfast put us all into a good humour, and a lovely sunny day promised well for the camera men.

Lighting our pipes we made a start for the Almanna Gja, which being translated is "All-man's Rift," the formation of which appears to have been as if all the ground to one side of a straight line across the plain had sunk about eighty feet, leaving a perpendicular wall. An earthquake must have taken place at the same time, for on the low side of the wall the rocks have been thrown away from the wall with such force as to form a comparatively low wall, thus producing a sort of railway cutting, for indeed, except in places, the ground between the high and the low wall is remarkably smooth. A river which in former days ran placidly over the plain, now has to leap into the rift with a drop of nearly 100 feet, and after running a short distance through the cutting again finds an exit through a split in the lower wall. In walking through the cutting one could not help feeling afraid lest some of the apparently loose and overhanging rocks should fall and make an end of the adventurous photographer. These rocks do fall occasionally, and woe betide any one who happens to be underneath; but frost is the usual cause of such falls, and visitors are rarely there in winter.

Having finished our plates on the Almanna Gja, a return to the dark tent was necessary before visiting the hill where the Althingi or Parliament used to sit. Here we found a strip of ground some half mile in length, about thirty or fifty feet wide, cut off from the plain by two long earthquake cracks of unknown depth. It was here that an Icelandic murderer is said to have jumped one of these cracks and so escaped his pursuers. Now if this man did jump where we were told he did, he must have been a marvel at long jumping, but I believe the guides are not particular which spot they declare to be the place, but select one which they think will please their party most. We voted Thingvalla the prettiest place we had seen, and were it not that a sudden heavy shower of rain caught the President and myself unprepared and drenched us, I should have enjoyed it more than any other. Our tents pitched in the churchyard, and a room in the parsonage for meals, were as comfortable as we could want, and a merry time we had in our last camp. First, there were groups to be photographed, ponies and their riders, guides and &c.; then surplus stores of solid and liquid form had to be consumed as far as was consistent with decency. Though in no way bearing on the subject of photography, I should mention that Captain W., who had brought a fishing-rod all the way, left us for a couple of days sport at the River Sóg, and when next we saw him in Reykjavik he had bagged twenty-nine fine trout averaging about five to six pounds. The fishing in this river is well known to be excellent, but the flies are so bad that only the keenest sportsman will face them.

The 16th of July saw us in Reykjavik once again. We did that last run of thirty-five miles about as fast as most travellers ever go. There was little to see on the way, and beyond a halt for lunch it was nothing more than a race.

Once again we reached the "Hotel Iceland," and good-bye to pony riding for some time to come. I made straight for the kitchen, and solemnly burned my whip, lest it should remind me of the sufferings I had gone through in the saddle. Nevertheless, I shall always remember the ride with pleasure now it is over, and it would not take much inducement to get me to repeat the tour.

One thing I am certain about, and that is the route we took was the right one. At first we planned to go exactly the reverse way round, but in that case Krisuvik would have never had the charm of novelty after Geyser, while the grandeur of Geyser over Krisuvik came just when it could be appreciated. A spare day at Reykjavik was spent in buying a few curiosities, which I was pleased to find by no means numerous; and though other writers have stated that they were constantly pestered by sellers of old silver and every description of rubbish, our party was spared to such an extent that we positively had to ask for what we wanted. We spent the 17th July in completing our photographs around Reykjavik and visiting the museum, and the following day embarked on the Danish mail steamer *Romny* for Granton, *vid* the Faroe and Westmann Islands. Fine weather favoured us, and once again we saw the myriads of sea birds at the Westmanns. Our steamer was a great contrast to the *Magnetic*, for everything was clean to a degree, and the captain as pleasant a man as ever we met. Our visit to the Faroes promised to be interesting, as we were to call at four ports there, namely, Vestmanhavn, Klaksvig, Thorshaven, and Trangisvaag, but the weather was so bad that only one or two photo-

* Concluded from page 505.

graphs were attempted under great difficulty, for wind and rain had it all their own way. I had specially reserved half-a-dozen plates out of my original small stock of four dozen, and never had a chance of using them. The chief feature of the Faroe Islands is the construction of the mountains and the great similarity about the place to the Fiords of Norway. Over the construction of the mountains we had much argument and speculation to explain the curious lines of bare rock (as if water-worn) which ran horizontally along every range of hills at varying distances apart. My contention was that the land had been upheaved at different periods, each at which is marked by a sea line on the mountains: but a native of the islands said this was not so, though he could not explain them himself. Should this catch the eye of any one well up on the subject, I should be much obliged for further information. Generally, there appeared to be four distinct belts of water-worn rock running throughout the whole islands.

Leaving the Faroes we made for Granton, and by some stroke of luck escaped a violent gale which the pilot at Granton told us had been raging outside all the day before. Landing at Granton Docks is miserable work, there being positively no arrangements whatever for removing passengers' luggage, and it was only with difficulty that we secured three shaky apologies for luggage trucks, which we had to watch with care, for about every twenty yards something fell off. Owing to one of our party somewhat foolishly attempting to take a rise out of the Custom house officer we were very near having to open even plate boxes (in a dark room, of course). This searcher simply went for us, and poor Dr. R. could not escape with his bulky whole-plate box, which was evidently supposed to be too large. Out came the camera, then with some feeble show of pride the officer pulled out the focussing cloth, and even examined the dark slides with suspicion. Lenses, &c., were scattered on the deck of the steamer, and the whole proceeding simply disgraceful in a country supposed to be civilised; but perhaps I ought not to grumble, for I continually waited till the searcher had satisfied his wrath, and got my packages passed without opening more than a hand-bag. Another hour saw us scattered once more to our various homes, and it is pleasant to record that we all parted with each other as good friends as when we first made each other's acquaintance. No eight men ever travelled together on better terms with each other from beginning to end, and I only hope my next expedition may be as great a success.

Having finished with the sketch of the tour, I will proceed to more details about the photographic portion of the expedition. As before stated, some means must be had of changing plates in daylight, as there is no night in the summer months. We had with us one of Perkins & Rayment's umbrella tents of the larger size. The tent was in every way satisfactory, but a little inconvenience was experienced by us all in manipulating the cord to tighten the cloth round the neck, and we considered elastic ought to be substituted. I referred to a rent in the left sleeve of the tent done on the way to Hekla, and to its repair with a piece of brown cloth. We treated the accident lightly at the time, but development has revealed the fact that the brown cloth was not safe, for plates changed at Hekla have all been fogged. I am sorry to say, also, that the President has a very large proportion of his plates fogged from beginning to end of the tour. These were all extra-rapid plates, and it is an open question whether the light in the tent is to blame or not. The rent in the sleeve explains fog at Hekla, but how about plates changed previously? My plates are all perfectly clean, except those changed at Hekla, and I hear the same report from the other photographers of the party. The reason why plates changed later than Hekla are not fogged is owing to the fact that we invariably set up the ruby tent inside one of our dwelling tents, but at Hekla, owing to circumstances, we were obliged to use the tent out of doors. Now I don't say for a moment that the tent itself was at fault, but our patch of brown cloth, which under a canvas tent let no light through, was simply useless outside. In case the manufacturers think I am not pleased with their tent, I plainly state that if I was starting again for Iceland I should select their umbrella tent for choice.

Plates versus Films.—We all fought shy of the latter, and preferred risk of breakage to uncertainty of result. Dr. R. carried eight dozen whole-plates in Sands & Hunter's packing boxes, and had no breakage, scratches, or other troubles. The President packed exposed plates face to face in bundles of four, with a gummed binder round them to prevent movement. This system has also worked satisfactorily.

My own plates were not treated so carefully at all, as after binding a few together I got tired of the job, and trusting to the careful arrangement of paper packing which Messrs. Wratten & Wainwright adopt, I repacked exposed plates face to face as sent out. Like the others, I have no breakages or mishaps of any kind, and any one going to Iceland need not be afraid of taking glass plates if attended to with reasonable care. Our head guide carried a Kodak sent by a gentleman in England to be exposed on objects of interest, and I hear the results are excellent, which shows after all the advantage of films over glass.

The battery for photography stood as follows:—

Mr. L.—Whole-plate camera by Meagher. Six double backs. Eight dozen Ilford ordinary plates.

Mr. M.—Half-plate camera by Sharp & Hitchmough. Six double backs. Four dozen Ilford Ordinary and one dozen Mawson & Swan's Instantaneous plates.

Mr. G.—Half-plate camera. Watson's Acme. Three double backs. Four dozen Wratten's Instantaneous plates.

Mr. L.—5 × 4 hand camera by Sharp & Hitchmough. Eight double backs. Eighteen dozen Ilford Ordinary, ten dozen Mawson's Instantaneous plates.

Guide.—5 × 4 Kodak. Spool with twenty-eight exposures.

Concerning the cameras and their suitability for such a tour, the whole-plate, though a splendid piece of apparatus, was too heavy to move about, and the owner expressed his opinion that he would have preferred a half-plate. Both the half-plate cameras were as suitable for the tour as any one could wish, but on comparing the two, the difference in size and weight of the "Acme" over the other showed its convenience when it came to packing up in the saddle boxes, and all round I honestly think it could not be beaten for such an expedition. The hand camera had a great pull over tripods, and is undoubtedly the machine to travel with. With better luck the President should have had a truly magnificent collection of views.

Plates.—Out of eight dozen, Dr. R. used six dozen, of which a few were duplicates. Mr. M. let off all his five dozen, and could have done with another couple of dozen. Mr. G. used three and a half dozen out of four dozen, and had he had six double backs he would have repented of bringing so few plates. Three double backs are not enough, as he found on more than one occasion. Mr. L. used about 250 plates out of his twenty-eight dozen, some of which were duplicates; he had an ample supply of plates and never grudged a plate for anything.

Exposures were rapid. Mostly with shutters. The light was very actinic, as shown by development, the chief complaint being over-exposure. Any one visiting Iceland in June or July should not be afraid of under-exposure provided the weather is fine.

Tripod Stands.—This is the worst part of a photographer's outfit. Out of the four we had with us only two would go into the pack boxes, and the others were a constant source of trouble, binding them together with cords and attaching them to the iron framework on the pack saddle, where the chafage is so great as to wear a considerable piece of the stand away in a single day's journey. For the benefit of those who go after us, I say that the legs should fold up within twenty-three inches in length, and then they will go into an Icelandic pack box and the owner will not pass through the daily trouble two of us had in fixing their stands on pony back.

I think I have now come to the end of my tale, and have only to add that in addition to a most delightful tour, I have a collection of prints of boiling sulphur springs and geysers which will be hard to beat, besides a most satisfactory set of general views in the island. BROWN SLICK.

RUBBER TUBING CLIP.

THE want of a secure fastening for connexions of gas supply to jets, dissolvers, &c., in optical lantern work has continually been felt, and although a makeshift was found by using copper or other wire, string, &c., the escape of gas at joints was always a source of trouble.

In the "Grip" clip, which we illustrate above, the difficulties are entirely surmounted, and indiarubber and other tubes or hose can be securely fastened to metal mounts, or glass and earthenware tubes, funnels, &c. They are made in various sizes, but those for lantern and compressed gas work, which are of small size, have been specially made for, and to the suggestion of Mr. J. H. Steward, optician, 406, Strand, by



the patentees. For biunial and triple lanterns, as well as ordinary single lantern purposes, these clips will be found most useful, and in photographic and chemical experiments or operations will be most convenient and handy. It is astonishing when they are accessible how many uses they can be put to as binders, for they are readily attached and detached, and the flat spiral spring makes a positive circle, notwithstanding slight differences in size of connecting tubes.

It will be readily understood that there is hardly any limit to size they can be used for if the starting diameter is properly arranged. There are three or four sizes kept ready commercially, and they are inexpensive

LETTER FROM GERMANY.*

PHOTOGRAPHY IN THE BALLOON.—NEW PHOTOGRAPHIC LENSES.

AN interesting application of photography has now been found in the balloon. The German Society for the Progress of Aeronautical Travelling has built a balloon, through one of its members, Mr. Gross, which, furnished

* Concluded from page 507.

with all the arrangements to note automatically all meteorlogical proceedings in the higher regions, and fastened to an 800 m. long and 7 mm. strong wire of Wolfram steel, ascended lately for the first time from Charlottenburg (near Berlin), and will now be used regularly for scientific observations. The building of this balloon, which on the occasion of its first ascension obtained the name of "Meteor," was connected with a great deal of trouble and much expense, but the latter has been reduced by Messrs. Siemens donating the wire, and Herr Rudolph Hertzog, who gave the necessary silk. The balloon will have instruments for measuring electricity, moisture, heat, and air currents.

The result of the measurements taken in this way is marked by means of an insulated copper wire, which is inside of the cable, on an apparatus fastened to the latter on the ground, and partly it is done in the balloon by an independent photographic apparatus, even at night. At certain periods the photographic camera opens and ignites at the same time an electric light which illuminates the instruments whose notes are to be registered. The balloon ascended the first time in seven minutes to a height of 800 feet, but it took an hour to get down again. With a complete apparatus this will be accomplished in a much shorter time. The trials terminated to the satisfaction of the members of the Society and their guests, among which were some eminent scientists, like Privy Councillor von Helmholtz, Privy Councillor Blenck, Director of the Royal Statistical Bureau, Dr. von Betzold, &c.

Since entirely new optical glasses have been put into the market by the new optical institute at Jena, to the advantage of domestic and foreign opticians, photographic optics have made a great progress, and objective constructions appear of which we had no idea before. Thus the celebrated microscope firm, Carl Zeiss, in Jena, enters with new constructions which differ from all previous instruments, and deserve the highest consideration.

There are two different styles of construction, one a triplet and the other a doublet. The triplet is, in general, a symmetrical construction, and consists of a triple-cemented lens, enclosed by two single lenses. The same is at present in a form which, as a universal objective, might find application.

The proportion of the diameter of the outer lenses—which proportionately are not very distant from each other—to the focal distance of the system, is equal to 1 : 4, 3; that of the largest active opening to the focal distance, 1 : 6, 3; there is, therefore, by this latter opening a large field evenly illuminated, and as this opening might satisfy all requirements in portraiture, the objective would be useful for this purpose. It would also find good application as an outdoor instantaneous objective, on account of the peculiar brilliancy of the picture.

The doublet (anastigmat) is completely unsymmetrical. It affords, by accomplishing all claims to a complete instrument (spherical and chromatic correction in and outside of the axis, evenness, orthoscopy), an almost complete abrogation of the astigmatic defect of oblique rays—obtained by a particular glass—a combination which heretofore has not existed.

The result is that the picture field of our new doublet appears evenly sharp upon the photographic plate in greater extension than the heretofore well-known best constructions (aplanat and antiplanat).

This advantage is particularly observable in such views, when towards the edge of the picture a great depth of delineation is demanded. As aside from this the style has admitted the application of the most colourless new glasses of the glass-technical laboratory here—the baryta flints and the light crown glasses; the doublets are particularly rapid, and by the removal of disturbing reflections and the diaphragm spot, a particular brilliancy of the pictures is peculiar to them.

The anastigmat for instantaneous views consists of five single lenses, namely, a twice-cemented front and a triple-back lens. The largest lens diameter is at the same time the diameter of the largest active bundle of rays, and is, in proportion to the focal distance, like 1 : 6, 3. The picture angle is eighty-five to ninety degrees. The reflection pictures are also very favourable in this objective, so that brilliant negatives can be obtained.

It is specially intended for instantaneous views, and will probably find also good application in the gallery with suitable light. Focal distances of 110, 150, 220, 310, and 440 mm. are now in progress of manufacture. I have tried the latter, and have found confirmed everything that has been said about the lenses. DR. H. W. VOGEL.

—*Anthony's Bulletin.*

PHOTOGRAPHY AND BUSINESS.

IT it a very pleasing and encouraging thing to hear as old and experienced a member of the craft as Mr. Rockwood, of New York, say that he has been in active business for four-and-thirty years, and has never felt sorry at his choice of the art of photography as a calling.

In these days of plentiful, not to say superabundant, photographic literature, we find the two philosophical extremes of the optimists and the pessimists fully represented in our journals and annuals, and we regret to say that there are not wanting those whose views upon photography, particularly in its financial aspects, are directly the reverse of those expressed by Mr. Rockwood.

We are by no means disposed to take part in the discussion whether or no photography is a good means of earning a livelihood. We might as well waste time in inquiring whether it were worth while to raise cattle or vegetables as a means of making a living. We may dismiss this matter by simply saying, that having done our best to support our calling, we have found it to support us in return. If we were asked whether our business life had been free from trials, perplexities, and sometimes bitter discouragements, we should plainly answer no, and then ask our questioner what calling he could recommend that was thus free from all vexations. We can occupy space and time to better advantage here by pausing, as it were, for a little, and looking about us at the present condition of the photographic world, particularly here in America.

The first thing we notice, and greatly do we congratulate our fellow-members of the craft upon it, is the vast increase in the number of applied uses of photography. Aside from the well-worn ruts of portrait making, under the skylight, and ordinary landscape photography, we find new fields of industry in literally every direction we turn to. Interiors—easy, pleasant, and profitable work; portraits and interiors at night, either in public or private, also pleasant and profitable, if not quite so easy. Printing, either by the old or by any of the numerous new methods, profitable and easy. Lantern-slide making, perhaps the most fascinating branch of practical photography, and one that is increasing in importance every day in the year. General business photography, including the photographing of real estate for advertisement, of samples of goods of every possible description for commercial houses, of enormous numbers of small portraits of celebrities for increasing the ready sale of various articles like cigarettes, &c.; photography in conjunction with the microscope, and the incessant calls upon the art made by scientific students and professors of all grades. We merely mention these few of the multitudinous uses of photography, so that if any one should be a little discontented with the art as being narrowing and cramping in its tendencies, he may be set to thinking of the matter, and see that the fault lies in himself, and not in photography; and further, that if one kind of photographic business does not suit him, there are plenty of others for him to select from and pursue.

The question has frequently been raised whether the money-making side of photography was not seriously affected by amateurs and amateurism. Now we have always held to the opinion that the greater the number of amateurs, the greater the benefit to the profession. We know very well of the bitter complaints from certain quarters that the local amateurs take away the business from professional men; but we are glad to see that these complaints grow fewer in number and less loud every year. Besides this, there is one point that these grumblers always lose sight of, namely, that immediately upon an amateur's receiving pay for his work he ceases to be an amateur, and enrolls himself amongst the professional members of the craft. We can indeed recall certain instances in which so-called amateurs had the effrontery to take pay for their work, and print their names and addresses with the title "amateur" on their card mounts, like any regular member of the calling. This might be taken as conclusive proof of the gross ignorance both of the "amateur" and of the public he attempted to cater to, for everybody has always known, or been supposed to know, that an amateur in any science or art is one who follows it for amusement only, and receives no pay for his work. This, at least, is the conventional or commonly accepted sense of the word "amateur," but we are afraid that the more elevated as well as the more literal meaning of the word is too often overlooked entirely. Properly rendered, "amateur" means one who loves (Latin *amo*, I love), and one who thus really loves his art does not disgrace it and himself by such shabby tricks as we have referred to. If he does these mean things, and tries to call himself an amateur, he should be told that his receiving money has effectually banished him from the ranks of true amateurs, and that he is deserving of such treatment as the members of liberal callings visit upon the heads of those scab members who attempt to debase the same. The extent to which photography is indebted to the *real amateur* is a matter so well known that we need hardly mention it.

Out of the large number of amateurs now practising photography, there are many who are already, or who may in time become, of money value to the professional man. Men of business well enough off to make frequent trips to Europe and less known portions of the earth, generally find it all that they can do to make the exposures while *en route*, and will not require much persuasion to leave the routine laborious work of printing

and mounting to the professional photographer. In most cases, if lantern slides or enlargements of any kind be required, the same plan will be pursued, and a very fair profit made. Scientific men of all sorts—physicians, astronomers, and others—are paying more and more attention to photography, but it generally amounts to their making the negatives only, and leaving the printing to the professional man, as well as the developing also sometimes. All of this of course benefits the photographer, and he would be a more than commonly stupid person who would not endeavour to extend and increase any opportunities of the kind that might offer. When we get into the "upper ten" among amateurs, we shall frequently find wealthy would-be æsthetes who prate learnedly about lighting, Rembrandt effects, "Truth in Art," &c., and consider the manual labour of printing from their negatives quite beneath them. We should not at all object to receive profitable work from such people, and in many cases might look forward to regularly instructing them, after a time, in the art of how to make a negative, for let us here remark that, as a general rule, the louder the art talk of an amateur, the more detestable is his work photographically, and often artistically as well.

From our point of view then, which in photographic matters is always that of the optimist, we regard amateurs as valuable to the profession in the strictly business sense.

Efficient assistance in the working of a photographic business is a necessity, and here the question will arise how and what to teach growing lads who have entered our employ with the *bonâ fide* intention of making photography the business of their lives. For our own part, we should prefer the assistance of any ordinary steady person, after a reasonable time of instruction under ourselves, than that of a stranger appearing with highly worded testimonials, and who was obstinately set in his own formulæ and ways of manipulating. A boy starting out to learn the business should be made familiar with the processes step by step, and gradually advanced to such difficult portions as developing and toning, and during this time of instruction we should keep his interest alive by allowing him to assist, now and then, during the posing and lighting: i he manifests any of the ideas which might in time make him a good person to handle sitters, train him for this also, by sending him to art exhibitions, or in default of these, set him on a regular course of art study from first-rate photographs and illustrated books. At the end of a year or eighteen months we should expect a very fair assistant from a young man whom we had thus taught, so far as the mechanical parts of the business are concerned, and one in whose hands a large portion of the business could safely be left in the event of our own absence. In regard to the salary paid, we may call to mind that while the heavier parts of the work are best done by men, the operations of trimming and mounting prints and binding lantern slides is quite as well, if not better, done by women and girls, who would probably consent to work for smaller compensation. Indeed, the neatness of handling required in printing renders it a peculiarly fit employment for women.

Amongst other things that are in favour of the photographer from the business standpoint are the lower insurance rates charged and the lower price of apparatus. If those who quarrel with the insurance rates had been in active business a few years ago when ether and guncotton had to be kept on hand in comparative large quantities—and risks paid accordingly—they would see how vastly things have changed for the better since the introduction of gelatine plates. The lower prices of apparatus, even in spite of the high wages demanded by skilled labour, show that there has been improvement in making the apparatus of a solid, practical character without unnecessary outlay of the skilled labour in excessive finishing, so that the camera (or whatever else it might be) was made to resemble a piece of ornamental *bric-a-brac*.

In concluding, we can truthfully express our feelings as being, on the whole, well satisfied with matters in general, and can thankfully say, in the words of a well-known volume, "Godliness with contentment is great gain."

ELLERSLIE WALLACE.

—*American Journal of Photography.*

A BRIEF SUMMARY OF THE VARIOUS METHODS TRIED FOR THE PRODUCTION OF ALUMINIUM FROM 1886 TO 1890.

THE failures to procure several of the leading commercial articles at a less price, such as the caustic soda of the alkali manufacturers, the synthesis of alcohol for the distiller, the replacement of cane-sugar by saccharine, besides other compounds too numerous to mention, have of late led to the production of several eminent works, in which these experiments are clearly brought to the front, greatly aiding, no doubt, others working in the same direction. Still there are, in each of these works, gaps remaining to be filled, and it is therefore the author's intent to bring before those interested in the production of aluminium at least a few of the more important experiments that have been undertaken both by himself and in conjunction with others, with the hope of obtaining further light upon this metal of the nineteenth century.

In the first instance I will confine myself as closely as possible to the mineral cryolite or its derivatives as the direct source or storehouse for the metal. One of the earliest experiments was the action of amorphous silicon upon that substance, which, although it yielded a negative result, being afterwards readily observed on account of the stability of that substance and its neutral reaction, nevertheless pointed to the direction of some allied substance presenting an acid reaction and less stable, and for it was substituted aluminium fluoride itself. Amorphous silicon thrown into melted fluoride of aluminium when at a high temperature reacts according to the following equation, yielding aluminium and silicon fluoride:—

$$4\,Al\,F_3 + 3\,Si = 4\,Al + 3\,Si\,F_4;$$

but aluminium being once formed and in contact with silicion fluoride at once decomposes it, yielding an alloy of silicon with aluminium containing about seventy per cent. of the former substance.

The second lot of experiments comprise chiefly the injecting of the vapour of ammonia, ammonia oxalate, and the more volatile metals into the melted cryolite.

Experiments with the fluorides in contact with metallic copper, using as a reducing agent the hydrides of antimony, arsenic, sulphur, selenium, &c., have also been tried for the production of Al bronze.

For the production of ferro-aluminium, metallic manganese in presence of iron has been made use of, also ferro-manganese, spiegeleisen, &c.

To manufacture the anhydrous chloride the incineration of a mixture of barium chloride and soda-alum has been made use of, and the introduction of magnesium for the replacement of the aluminium. The phosphides and sulphides have also been largely dealt with. With respect to arsenic the reaction afforded with this substance is more than striking. Absolutely pure aluminium was taken, melted at a red heat, and metallic arsenic thrown on to its surface and impregnated with the same by stirring. A brittle arsenide of aluminium may be formed, but strange to say this compound is completely decomposed again on raising the temperature, even when out of contact with air, insomuch that no arsenic hydride is produced when acted upon by dilute acids.

This reaction was at one time considered to be of value for the separation from alloys containing the same. But quite a different phenomenon is observed in the case of alloys, an arsenical regulus being in every case readily formed. Aluminium in this respect may be compared to the action of metallic copper when in contact with sulphide of that element, and the marked difference observed when foreign impurities present themselves.

Bromides, iodides, and the subjecting of the oxide to all grades of temperatures when in contact with reducible gases have also been thoroughly experimented with. Various methods have been of late patented for the production of aluminium. Among a few of the most famous may be the action of common salt upon clay when in the presence of zinc, and also that of heating to an enormous temperature a mixture of alumina, petroleum, and sulphuric acid, after which is introduced some fabulous metal which is stated reduces the aluminium; but the most curious part of these patents is the present price of aluminium when it can, according to the minds of several, be manufactured so readily. As regards the electroplating of aluminium the same difficulties present themselves. A cyanide of the metal would undoubtedly sound the most feasible, but to procure this compound is as difficult as the preparation of the metal itself. The cyanide, although stated by the various handbooks of chemistry to be unknown, is by no means so; for when a rod of metallic aluminium is connected to the positive pole of a compact battery, a platinum plate furnishing the negative, and the extremities of each are brought into contact with a strong solution of hydrocyanic acid, aluminium cyanide is formed in the solution, which is entirely decomposed below the boiling temperature. Sulphocyanides, ferrocyanides, and all the compounds of aluminium, both organic and inorganic, have in short been thoroughly experimented with.

H. N. WARREN.

—*Chemical News.*

A NEW CO-OPERATIVE COMPANY.

WE have received an announcement and prospectus of a new company, from which we extract the following:—

The British Photographers' Co-operative Stores (Limited), capital, 10,000*l.*, in 4550 ordinary shares of 2*l.* each, and 900 founders' shares at 1*l.* each. The ordinary shares will be entitled (in priority to the founders' shares) to a dividend up to ten per cent. out of the net profits of each year; also to one moiety of the surplus profits (after payment of fifteen per cent. on such surplus profits for directors' remuneration), the founders' shares receiving the other moiety. Each applicant for ordinary shares will have the privilege of subscribing for one founder's share for every ten ordinary shares subscribed for. Special privileges will be allowed to shareholders, who will obtain their materials practically at cost price.

Directors: Dr. James Ferrier-Clarke, Captain Chas. Fairholme, R.N., W. Barrett, and C. R. Bonne (who will join the board as managing director after allotment).

This Company is formed for the purpose of supplying its shareholders and the public generally with photographic stores, materials, and instruments of every description, and to undertake the execution of all work usually done by photographic dealers.

The Company has acquired the sole agency for the United Kingdom and the Colonies, for a period of about ten years to run, of the dry plate known as the "Waterloo," for which there is a rapidly increasing demand, and negotiations are on foot for the agency of a photographic printing process not yet made public in England, which it is believed, from its novelty and cheapness, will be much sought after, and cannot fail to become a source of considerable profit.

For the convenience of shareholders only the Company will undertake, for a fixed commission, to exhibit and offer for sale second-hand apparatus, and a Register will be established for facilitating the sale or exchange of goods in the photographic trade.

Convenient arrangements have been made for dealing quickly and promptly with country and foreign orders, and the Company will, as already mentioned, deal in all the various brands and kinds of photographic supplies, while endeavours will be made to induce country and London dealers to stock the specialities and novelties which the Company will from time to time place on the market.

The directors have agreed that, until the shareholders otherwise vote, they will take no remuneration until ten per cent. has been paid on the ordinary shares out of the net profits of each year, when they will receive for division among themselves fifteen per cent. of the residue of such net profits.

It is estimated that, as the margin of profit on the "Waterloo" plate is large enough to allow of its being profitably pushed through dealers as well as the Company's own immediate customers, it would be reasonable to assume an annual sale of five thousand gross, which, after allowing a liberal discount, would produce a profit in itself sufficient to pay upwards of ten per cent. on the entire capital, whilst it is only one of the many available sources of income.

No promotion money has been or will be paid, the Company's liability for its preliminary expenses of organization and issue being limited to the sum of 100*l*. All such expenses beyond that amount will be defrayed by the Vendor.

The only contract entered into by the Company is one dated 31 July, 1890, and made between Mr. C. R. Bonne, the Vendor, of the one part, and Mr. Henry Kipping, on behalf of the Company, of the other part, whereby Mr. Bonne agrees to transfer to the Company his agency, hereinbefore referred to, for the "Waterloo" dry plate, with the consent of the manufacturers thereof, and his trade connexion, in consideration of the allotment to him or his nominees of five hundred ordinary and four hundred and ninety-five founders' shares, both fully paid up, and to act as Managing Director of the Company for the period of three years (renewable at the option of the Company for a further period of two years) at a remuneration of 300*l*. per annum, with a bonus in every year of 25*l*. for every one per cent. *beyond* twenty per cent. which the ordinary shareholders shall receive as dividend for such year.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,189.—"Improvements in Detective, Hand, and other Cameras." W. Griffiths and J. Pumphrey.—*Dated August* 5, 1890.

No. 12,216.—"An Improved Coin-freed Apparatus for Taking Photographs.' Communicated by A. D. Loman. J. Hart-Davies.—*Dated August* 5, 1890.

No. 12,232.—"Improvements in and relating to Photographic Apparatus." Complete specification. W. E. Schneider.—*Dated August* 5, 1890.

No. 12,320.—"Improvements in Photographic Cameras." F. S. Worsley.—*Dated August* 6, 1890.

No. 12,442.—"Improvements in or relating to Photographic Shutters." Communicated by the Bausch and Lomb Optical Company. W. P. Thompson.—*Dated August* 9, 1890.

SPECIFICATION PUBLISHED.

1889.

No. 14,701.—"Photographic, &c., Negative." Malloch.—Price 4*d*.

PATENTS COMPLETED.

Photographic Cameras.

No. 239. William Snow Rogers, 7, Addison-road, Bedford-park, Chiswick, Middlesex.—*July* 19, 1890.

My invention relates to photographic cameras of the type known as "hand" or "detective" cameras, and particularly to the means for effecting the transfer within the camera of any plate, film, or other sensitised surface from its place within the storage reservoir to its position for exposure, and its removal therefrom, its replacement within the reservoir, and the substitution of another unexposed plate, the operations providing for the exposure of any or all of the plates as desired.

To carry this invention into effect, I employ a light-tight reservoir with vertical parallel grooves to contain the plates, forming a backward extension of the camera. This reservoir can be filled through a door provided for the purpose, or by means of the valve to be described hereunder. I also provide in the camera proper, and immediately in front of the reservoir a single groove to carry the plate whilst it is being exposed, and a spring or springs to keep the plate against the side of the groove or rebate nearest to the lens. Above the space occupied by the exposing groove and the set of storage grooves is an opening provided with a sliding light-tight shutter constructed as follows:—The forward part of the shutter is rigid and slides beneath the camera top, and in light-tight contact with it. The centre part consists of a valve and changing reservoir to be described more fully hereunder, and the back part of the shutter consists of a hinged or flexible portion.

The range of movement of the shutter is such that the valve and changing reservoir can be brought successively over all or over any groove, including the exposing groove, at will, and the hinged or flexible part of the shutter is guided vertically downwards at the back of the storage reservoir by means of a curved groove, as the shutter is moved in that direction.

The valve consists of a cylindrical part slotted through in a plane passing through its axis to allow a passage for the plate, and capable of moving about its axis over an angle of 180° upon a curved seating covered with velvet, or otherwise made impervious to light.

This valve seat also is slotted for the passage of the plate, to correspond with the valve slot when the latter stands vertically.

Forming a continuation of the valve slot is a light-tight reservoir of sufficient size only to contain a single plate in grooves.

The action of the camera is thus: Having placed in the storage reservoir its full complement, or any less number of plates, the sliding shutter is moved along until the valve comes above the first groove; the changing reservoir is then moved so that it stands at right angles to the camera top, by which means the valve is opened, and on turning the camera upside down the first—or any selected—plate falls into the changing reservoir. The sliding shutter is then moved forward to its full limit, when the valve will have come immediately above the exposing groove, and the plate may be made to drop therein by turning the camera right side up. The operation is reversed to return the exposed plate to the reservoir, and the next plate can then be dealt with.

A ratchet, pointer, or other registering device is used to indicate the position of the grooves in the storage reservoir and to register the exposed plates.

The valve may be used as the means of filling the reservoir if so desired, and when not in use the changing reservoir may be folded down flat upon the camera.

Improvements in and relating to Lamps for Enlarging or Copying Photographs and the like.

No. 9058. James Chapman Shenstone, 13, High-street, Colchester, Essex.—*July* 12, 1890.

My invention relates to lamps used for enlarging or copying photographs and the like with the aid of an ordinary photographic camera without the use of a lantern or condenser, the object being to render these lamps more handy in use and efficient in operation.

With these ends in view, my invention consists of a lamp having an oil lamp and a spirit lamp, with magnesium ribbon burner capable of being moved transversely across the lamp to bring the one or the other into a central position, as required for focussing or printing.

The body of the lamp is formed of charcoal iron or other suitable metal, and it is provided at its front with suitable slides adapted to receive a sheet of opaque or ground glass and a negative carrier. A hinged lid is adapted to close down over these slides and make them lightproof. In the back part of the lamp is fitted a carrier adapted to move transversely across the lamp in or on suitable slides. To this carrier are fixed an oil lamp and a spirit lamp. The wick-rising spindle of the oil lamp is of such a length that it projects through a suitable opening in the side of the body of the lamp, and provides a means of moving the lamps. The opening is fitted with a suitable slide, providing for the removal of the carrier and its lamp from the body of the lamp when desired. On the back of the body of the lamp is a magnesium ribbon holder of any approved construction mounted on a plate adapted to slide transversely across the back of the body of the lamp. The ribbon tube passes through a slot in the back of the body of the lamp, and engages with the back of the carrier, thus forming a connexion between the two. It will thus be seen that the oil lamp and the spirit lamp with magnesium ribbon holder all move together. An elongated chimney is provided to allow of the movement of the glass chimney of the lamp, and it is provided with suitable light deflectors. Suitable peepholes fitted with ruby glass are provided in the sides of the body of the lamp.

It will be seen that this lamp is particularly handy in use, as all that is necessary after the focussing has been effected by means of the oil lamp is to pull the carrier over by means of the wick-rising spindle, thereby placing the spirit lamp and magnesium ribbon holder in the central position previously occupied by the oil lamp, ready for operation to effect the printing.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The improved lamp for enlarging or copying photographs and the like, substantially as and for the purpose set forth. 2. In a lamp for enlarging or copying photographs and the like with an ordinary photographic camera without the use of a lantern or condenser, adapting the focussing oil lamp and the printing magnesium ribbon burner to move transversely across the lamp for the purpose of bringing the one or the other into a central position, as and for the purpose set forth.

Improvements in Magic or Optical Lanterns.

No. 12,972. James Henry Steward, 406, Strand, London.—*July* 19, 1890.

Improvements in magic or optical lanterns, consisting, first, of an improved method of adjusting the fronts and lenses (the optical system), and second, improved oxyhydrogen limelight jet for the more perfectly centring, adjusting, and controlling the light.

The fronts are designed to secure more steadiness and greater perfection when focussing and adjusting the lenses. It consists of a racked bar extending from the lantern stage plate or lantern body to a skeleton framework supported on the footboard or base of lantern in front, and connected with it in such a way that it can be moved up or down and sideways, to get the exact adjustment for the required axis of the optical system and correct inclination.

The optical system consists of the ordinary condenser and front lenses or objective, the latter being mounted in tubes, and generally connected to the

stage by means of telescopic tubes, so that a shorter or longer focus objective can be used at will. In the improvement the jacket in which the objective is mounted is fixed by a collar or flange working in a groove fitting to the racked bar, a toothed-head pinion working the same along a racked bar to the necessary distance to get the lenses with collar, say six, eight, nine, ten, twelve inches, or longer focus objective. The skeleton supporting framework consists preferably of a parallelogram of brass tubes or bars, with cross bars for either two or three front tubes to come through the openings, or allow the rays to come through when the antern has a light inside, the racked bars being connected to the cross bars of framework by an adjustable fitting working vertically and laterally. The improved jet consists of the ordinary tubes and taps which convey the oxygen and hydrogen gases separately to the mixing chamber or jacket of ignition, but have in addition improved method of moving the whole gear from the condenser by a screw adjustment to a supplemental slide or tray attached to the ordinary supporting tray: also a quick-threaded screw for raising and lowering the jet, so placed on the tray that the jet balances, and by means of two pillars, one in front and one behind the adjusting screw, instead of rack as usual at back, it works up and down with perfect ease and smoothness. The fittings of the pillars have clamp screws attached for rapidly fixing after once the proper position is obtained. A lateral slide with tangent screw fixed to the foundation slide or tray permits of the movement of jet sideways, and so ensures a fine adjustment for the light laterally. In addition to the above the following adjustments can also be, and are, adapted for special purposes, viz., a supplemental slide actuated by a screw for the gallery holding lime cylinder and working on the gas tubes of jet, to carry the lime to or from the nipple of jet; also a series of plug that passes through both tubes and closes the orifices of same, and prevents the gas passing, with the exception of a minute portion of hydrogen just to keep the flame alight. This can be turned in several ways, but preferably it is done by means of a rod extending to outside of lantern, with pinion working in a toothed wheel attached to head of plug at other end. The advantage of this is, that having once adjusted the hydrogen and oxygen gases by means of the ordinary taps to give the best light, the gas can be turned off or increased as often as required and yet get the same light as at first by simply turning the rod attached to plug as described.

[A fairly good illustration of Mr. Steward's improvement in lanterns was given in our ALMANAC for the current year at page 637.—ED.]

A GLASS PLATE OR OTHER TRANSPARENT SUBSTANCE COATED WITH A NON-ACTINIC FILM, AND USED AS A NEGATIVE FOR PHOTOGRAPHIC AND OTHER PURPOSES.

No. 14,752. JOHN MALLOCH, 76, Lawnmarket, Edinburgh.—*July 19, 1890.*

My invention, which consists of a glass plate or other transparent substance coated with a non-actinic film, has for its object to produce a negative for photographic, photo-lithographic, photo-mechanical, and like printing purposes—that is, excluding all the non-actinic film from the glass plate with a needle, or other sharp-pointed instrument, the lines of clear glass from which a true negative for the purposes before mentioned is produced. I can thus obtain an absolutely clear and true negative for the purposes before mentioned.

If desired, the non-actinic film may be coated with, or have incorporated with it, substances sensitive to light, which others most would render a photographic impression on the plate previous to printing.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—A glass plate or other transparent substance coated with a non-actinic film, which may be further coated with, or have incorporated with it, substances sensitive to light, all as herein before described.

[It is rather a pity that this invention comes so late.—ED.]

A NEW AND IMPROVED SHUTTER FOR USE WITH ANY KIND OF PHOTOGRAPHIC APPARATUS.

No. 15,714. CHARLES HUDDLE, 'Ezra,' Mare-street, Hackney, Middlesex.—*July 12, 1890.*

My invention is a shutter made to provide a simple and ready means to expose photographic dry plates when in the camera. It is made to work either before or behind the lens, but mostly in the old-fashioned slot. The novelty in this shutter is that it requires no setting or winding of springs, as all other shutters do before an exposure can be made. To make an exposure it is only necessary to press a small button, and immediately the pressure is made it automatically sets itself ready for the next exposure.

To effect this I make a shutter of thin sheet brass or other material shaped so as to cover the lens, and made with a short arm projecting at right angles to the lens and pivoted at the far end of the said short arm; close to the pivot I fasten on to the said arm a small slip catch, which is acted upon by a short and upright spring which is attached to a thin brass driving rod running in guides, which has a small button at bottom. This thin brass is held back just underneath the said slip catch by a spiral spring of suitable strength. The shutter is also held over the lens by a second spiral spring. Now on pressing the small button the shutter is lifted to a sufficient height to uncover the lens. The short spring at top of driving rod then leaves the slip catch and allows the shutter to spring back to original position. Then on removing the pressure from the said button the driving rod springs back to its original position also, and is immediately ready for the next exposure. The shutter can be made to travel, that it can be loosened and tightened at will. The shutter can be adapted to any kind of photographic apparatus, but it is invented chiefly for use with the detective kinds.

ERRATA IN 'THINGS IN GENERAL.'—Line 22, second column, page 500, *for* "being," *read* "yet, it appears." In last line of second paragraph, *for* "anti-cameras," *read* "instruments;" a little further, *for* "its," *read* "his;" *for* "at least spar," *read* "a floor spar." Third line from bottom, *for* "coneless," *read* "coreless."

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 19	North London	Wellington Hall, Islington, N.
,, 19	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 20	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 20	Bury	
,, 20	Manchester Camera Club	Victoria Hotel.
,, 20	Edinburgh Photo. Club	5, St. Andrew-square.
,, 20	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 21	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 7.—Mr. W. Ackland in the chair.

MR. A. HADDON referred to the two prints that Mr. Scholzig had shown at the last meeting, one of which had had thorough washing before being toned, and the other had been merely passed through water before toning. Both prints had been kept for the same time in the toning bath, and the unwashed print appeared thoroughly toned whilst the other was still brown. Mr. Scholzig had expressed his opinion that the unwashed print had received so much gold deposit that it would not be attacked by the agents used for silver, and might, therefore, be considered permanent. In order to test this, he had now prepared three solutions—one of nitric acid and water at twenty per cent., one of cyanide of potassium at ten per cent., and one of saturated solution of bichloride of mercury. He requested the Chairman to cut strips from the two photographs, which were placed side by side in the test solutions. Both prints yielded very much to the nitric acid and cyanide solutions, the unwashed one slightly less than the other, whilst neither showed any reduction in the mercury solution.

MR. W. E. DEBENHAM said that the presence of free nitrate of silver in the unwashed print no doubt accelerated toning action, and, therefore, as both prints had been only an equal time in the toning bath, the unwashed print might be expected to stand better. If, however, instead of taking the washed print out as soon as the other was toned it had been left in the solution until toned to about the same colour as the other, he believed it would have stood the test the better of the two, as Mr. W. K. Burton had shown that when a print was thoroughly washed before toning more gold could be deposited before over-toning set in. He thought, therefore, that so far from slight washing tending to permanency, the reverse was the case.

MR. DEBENHAM then opened the subject of the evening—*At Home Portraiture*—by showing on the blackboard the position of the sitter, camera, and reflector, and laid particular stress on the place which the latter should occupy, particularly that it should not run back so far as to cause the shadow at the extreme edge of the face. When this was done, either in the studio or in a room, the face often appeared to be about the same tone as the background and not be relieved from it. As to the time of exposure, his experience had been that such very long sittings as had been said to be required by some workers for whom he had great respect were not generally necessary. In the collodion days of course he always used portrait lenses for that class of work, but latterly he had used Sutter's rapid aplanats for cabinet-size portraits, and a lens of the B series by the same maker for larger sizes. These were more portable than portrait lenses, and the latter would generally be stopped down to be no more rapid than the lenses referred to.

MR. F. A. BRIDGE narrated an experience with a large group which had to be taken in a room lighted only by a skylight. He had used large white cloths behind so as to catch and reflect a large amount of the top light. The most successful portraits taken out of the glass room he had found to be those taken in painters' studios. Here the posing was a great difficulty. The artists thought they must do it themselves, but they did not know at all what they wanted.

MR. J. S. TEAPE agreed with Mr. Debenham, that very long exposures were not generally necessary in private rooms. He had found very little more required than in the photographic studio. He showed by a diagram on the blackboard the way in which he had utilised the light in a corner room having windows on two sides.

The subject for discussion on August 21 was fixed to be *Cloud Negatives*.

Messrs. Dirck Hursh and Otto Scholzig were elected members of the Association.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

AUGUST 12.—Mr. B. J. Taylor in the chair.

After the routine business of the meeting the award of Messrs. George Davison and Lyonel Clarke, the judges in a recent competition (subject, "A Genre Study"), was made known, the result being that the President (Mr. B. J. Taylor) was declared the winner. No other picture was deemed of sufficient merit to award a second prize, which was therefore withheld.

HOLBORN CAMERA CLUB.

ABOUT twenty-five members attended the Southern Counties Cyclists' Camp at Busbridge Park, Godalming, those who could get away going down on the Thursday night, when they had a very busy time getting our two tents decorated with flowers, flags, and lanterns. On Saturday night a most successful lantern show was given in the open by the Club, who took down lantern, screen, cylinders, and slides of previous camps and other subjects. Members were busy each day with the camera, taking the tents of the various cycling clubs, which in some cases were very prettily decorated; and there was unlimited scope for picture making in the park and surrounding country. Apartments were secured in the village for those who did not care to sleep

under canvas, and a most enjoyable time was spent by every one who attended the outing.

All those members who can are requested to turn up on Friday next with prints for comparison. Mr. Benest will also give the benefit of his experience on exposure.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

"DISCURSIVE NOTES ON LENSES."

To the EDITOR.

SIR,—I repeat that the real question at issue is one of strict optical and mathematical principles, and there is not one word in your editorial comment to refute the explanation I have given to show that neither the periscopic of Steinheil nor Zentmayer's construction (introduced into the discussion by yourself) can be *perfectly* achromatic. You again support your position by quotations from two good men, Carey Lea and Doctor Sellars, who found the Zentmayer lens to have a coincidence of the chemical and visual foci. (Steinheil's periscopic lens has now dropped out of it.) Now I have pointed out to you optical reasons that will prove it to be possible to achromatise Zentmayer's lens, but from your figures the absolute condition cannot obtain, although it would *be far better corrected* than the original periscopic of Steinheil.

You say, "Whatever may be the precise degree of assimilation of the chemical and visual foci obtained by the Steinheil nnd Zentmayer lenses, there can be no doubt whatever that the sharpness of the pictures produced by them was of a very good order of excellence." This I agreed to, and gave a reason for agreeing in my letter to the *Amateur Photographer*, but I explained that the *absolute* "degree of assimilation" referred to was impossible in Steinheil's periscopic, and so also is it in Zentmayer's as described by you. Your words, "Whatever may be the precise degree of assimilation," convey the idea of uncertainty in your own mind of the optical aspect of the question, but there is *no* uncertainty in mine.

You make a good deal out of the history of the wide-angle rectilinear. You may be right, but I still thing you are wrong; however, it really does not matter at all. I possess the lenses composed of three single glasses you refer to, for which the patents were not completed, and know as a fact that they were not completed because it was impossible to cure the flare spot given by them; this fault was overcome in the wide-angle rectilinear introduced about eight months after my late father publicly expressed a "hope" of constructing a lens that should not have the drawbacks of the Steinheil periscopic.

This wide-angle rectilinear lens in the larger sizes would have an *exterior appearance* somewhat similar to the Zentmayer lens, but in the smaller sizes was and is perfectly symmetrical. In the larger sizes there is a saving of optical means in employing a smaller back lens and still accomplishing the end in view, viz., to include a large angle.

In your concluding "dig" you force me on to a pedestal I never attempted to mount myself. I don't appreciate it. Invidious comparisons I have *not* made, an *optical explanation* I have. This I expected you to acknowledge or refute, without retiring behind the shelter of history and quotations.—I am, yours, &c., THOS. R. DALLMEYER.

25, *Newman-street, W., August* 11, 1890.

[While it may be quite easy to prove mathematically that achromatism cannot be effected by lenses of one kind of glass, the fact must not be lost sight of that while Mr. Dallmeyer has not seen and consequently has not tried the Zentmayer lens, all those who have been more fortunately situated in this respect than he assert its achromaticity. It looks very much like the case of the man in the stocks. "They can't put you in the stocks," says the lawyer. "But I am *in* the stocks," rejoins the victim. "No matter," replies the lawyer; "it is against the constitution, and they *can't* do it." "That may be, but here I am *in* the stocks." It was doubtless very wrong of the lens to work to visual focus, especially when it could be proved that it would not, or ought not, do so. Nay, at the time the controversy relative to this was at its hottest (for a big controversy did rage on this subject from 1865 to 1868), one eminent photographer, Mr. Gardner, of Washington, who had subjected the lens to a crucial trial, and who had failed to find any need of adjustment for correction, remarked, "*If it should turn out that it conflicts with any theory in optics, we may safely accept the result and dispense with the theory.*" And we have already adduced other evidence to show that, contrary as it was to all law and theory, the man was really in the stocks—the lens worked at its visual focus. When, in 1865, we indicated a "possible" or probable means by which achromatism might have been secured in a lens (the Steinheil periscope) of which we then hearing a good deal, but had not seen even a description of, we stated that our hypothetical correction "could, we suppose, be accomplished by any qualified optician;" it appears that a "qualified optician," Zentmayer, had done so, a fact of which we were not aware at the time of writing. This he had done by a determination of the curves requisite to effect this. "Perfect achromatism" does not obtain in any photographic lens. The achromatism of a photographic lens and that of, say, a telescope object glass is different, a fact of which Mr. Dallmeyer is well aware. A photographic lens is considered practically achromatised when its visual and chemical foci are coincident; but try such a lens as a telescopic objective and what do we find? Fringes of colour in abundance. On the other hand, try even the highest-class telescopic object glass as a photographic lens and we find that it will not produce a sharp picture at its visual focus: it is over-corrected for photography.

All this confusion of terms might have been got rid of had more attention been given to Robert Hunt's suggested discriminative appellation of *actinic* versus *achromatic* correction, for what is achromatism in the one case is not so in the other. Photographers care little for mincing niceties in terms; what they do want, and fortunately can now obtain, are lenses that will cover well with a moderately large aperture and require no adjustment as between the visual and the working foci. But that we do not wish to unduly protract this matter, we could give Mr. Dallmeyer and the public another reason than he has done why the late Mr. J. H. Dallmeyer did not complete his patents for objectives formed of single lenses. In conclusion, we retire "behind the shelter of history and quotations," because the lenses of which we have been treating have long ago been withdrawn from the arena in which they at one time were; and having no access to them, contemporaneous history is all that one can fall back upon. Steinheil, whose patent was stopped by Zentmayer, as regards America at any rate, allowed his wide-angle objective to drop, and at the instigation of Dr. Monckhoven, in 1866, devoted his attention to the invention of a lens of a doubtlet form which should, by a smaller expenditure of optical means, have a large angular aperture coupled with great covering power. How well he succeeded in doing so the thousands of rectilinear doublets in use at the present day, and known by almost every conceivable name, bear testimony.—ED.]

"FREE LANCE" AND FLUORITE.

To the EDITOR.

SIR,—"Free Lance" says, "If the Zeiss objectives *eventually prove to be constructed with one of the components a fluor spar lens*, I don't think the makers can be accused of anything but cuteness, for no one would have accused them of false representations if the ordinary optical glasses of commerce were used in connexion with the Jena glass." Now it so happens that *no proof is necessary* that one of the components is a fluor spar lens. A paper by Professor Abbe, *who is the maker of the lenses*, appears in the June part of the *Journal* of the R.M.S., in which he says, "With the introduction of the new microscope objective, the 'Apochromatic,' the mineral (*i.e.*, fluor spar), has come into regular use in Jena, and has been further extended by other opticians in their imitation of the Zeiss construction." The paper contains much other valuable information as to the mineral and its optical uses.

Now "Free Lance" could not but know that such a paper was in existence, for I referred to it when pointing out in a recent number an inaccurate statement by another on the same subject, and he could easily have made himself acquainted with the facts.

The microscope and its literature seem to be restricted to the few, and it would be well that before writing about any of the matters connected with it your contributors should be very sure of their facts. It is not a subject which can be learned in a few weeks, or months, or even years.

How could Dr. Lindsay Johnson be "*uncertain of his power*," when he had the admission by the maker of the lenses that he was right, and the other man was wrong?—I am, yours, &c., F. R. M. S.

[Without desiring to enter into this controversy, if such it be, we take advantage of this subject being discussed in the foregoing letter to say that fluor spar is, to our personal knowledge, now being made use of in London, by one firm at any rate, in the construction of their best microscopic objectives.—ED.]

A ROLLER-BLIND AND FLAP SHUTTER.

To the EDITOR.

SIR,—I see, in the last issue of the JOURNAL, that there is a patent being taken out for a roller-blind and flap shutter by Mr. Edwards which is the same that I showed at the Manchester Amateur Photographic Society, July 10, 1888. In August our Secretary made one from the same kind, which is fully described in the enclosed extract of report. I thought that I would have been able to have sent you the first shutter that I made to look at, but my friend is on his holidays and has it with him. If you would like to see it, when I get it I will send it you.—I am, yours, &c., J. A. FURNIVEL.

5, *Kay-street, Ardwick Green, Manchester, August* 11, 1890.

[The above is referred to in the report sent us of the July 10th

meeting:—"Mr. J. A. Furnivel, a new improved shutter, for giving slow, timed, and instantaneous exposures." The allusion at the meeting of August 14, 1885, runs:—"The Secretary exhibited an improved flap and roller-blind shutter. The improvement consists of an automatic spring to hold the flap up or down, as required."—Ed.]

"WHAT ARE THE BEST USES TO WHICH PHOTOGRAPHY CAN BE APPLIED?"

To the Editor.

Sir,—For the first time in my life I went in for a prize competition of the *Tit Bits* model. This not because I was very anxious to gain the prize—a 7*l.* or 8*l.* amateur's outfit in photography by the good firm of Mawson & Swan, at whose warehouse in Soho square the articles were on view. I never went, however, to inspect. My chief object was to test the value of this competition, and to expose it if not fairly conducted.

I confess I felt there was really no guarantee that the best would win. All these competitions seem to be managed in a very "hole-and-corner" manner.

As the Editor of *Short Cuts* announced that if this competition was extensively taken up a more important one in photography would follow, and as he states that 2291 replies had been received for the present one, I think photographers should be warned not to waste their time and brains over a competition of this kind, where they have no assurance that the judge who is to decide is acquainted with the subject and is above all suspicion of partiality or unfairness.

Believing that after many years' experience I was not unfamiliar with the best applications of our noble art science, I determined to try my luck and test Mr. "Short Cuts." Soon after the announcement I sent in the short article which follows this.

The competition was to close on June 12. Here was unfairness No. 1. The Editor arbitrarily extends it to July 12. Let that pass, however.

Seeing some time after I had sent in my communication a "cutlet" by the Editor informing "Photographer" that it was not an essay but something short that was required, and thinking that perhaps my tolerably brief communication might be considered not "short," and perhaps classed as an essay, I sent in a second as-short-as-I-could-make-it answer. I give this also below.

Some time after this Mr. Editor makes a new condition, viz., that all communications must be accompanied by the printed notice of the competition cut from a copy of *Short Cuts*. To this no one could object had it been stated at the outset. It was not. So here is unfairness No. 2. However, I duly sent the cutting with a note to the Editor mentioning my two communications.

At length, in *Illustrated Short Cuts*, August 2, the award is made. The prize is given to a gentleman who has written an *essay* more than *a fourth longer* than mine, and who has named specifically only two of the best applications of photography, both of which I had named specifically in my second communication, and inferentially in my first. He says not a word of lantern slides—perhaps *the* most important of the applications of photography, embracing, as they do, astronomy, microscopy, portraiture, landscape, architecture, &c., and invaluable as a means of education.

Now, I do not mean to say that there may not be some one who has "spotted" still more important applications of the art than I have done, but I do most distinctly assert that the prize winner has not given such a specific and practically exhaustive reply as I have done in my second communication, sent in in order to comply with the Editor's own condition. I would also that my first communication in pointing to the value of photography as a means of training to good habits and acquiring knowledge is more to the point than a puerile dissertation about "the Great Cause of All" and the mystery of nature. I purposely kept my essay, if such it can be termed, as brief as possible, although I could easily have dilated on the points stated.

That your readers may judge for themselves whether the award has been fairly made or not, I append first the prizeman's article, second my first communication, and third my last.

The prize was awarded to D. Hanneford, 30, Avenue-terrace, Forest Gate, E., to whom a complete photographic set, by Messrs. Mawson & Swan, of Soho-square, valued at 7*l.* 16*s.* 6*d.*, has been sent.

His answer is as follows:—

"The Best Uses of Photography.

"It has been well said by Sir William Hamilton that 'On earth there is nothing great but man; in man there is nothing great but mind.' To broaden and improve the mind of man, then, must be a work of paramount importance, and to employ anything to that end must be to make the best use of it.

"In applying, therefore, to the question, 'What are the best uses of photography?' we must consider how that wonderful discovery can be best applied to improving the human mind.

"The answer, in my opinion, will be found in the application of photography to the furtherance of the sciences, especially astronomy. The telescope, armed with the highly sensitive photographic plate, has revealed to the modern observer a universe of which Newton and Herschel had not the faintest conception. It has drawn for us the picture of suns whose distances and dimensions are inconceivable in their greatness. Nor is this all: with the assistance of the spectroscope we are enabled, by comparing observations of the heavenly orbs made at various times, to learn their composition and the changes taking place in the evolution of worlds and systems separated from us by infinitude.

"Here, then, the mind is enlarged by the contemplation of the stupendous grandeur of creation.

"Again, photography has lent its aid to the microscope in revealing to us the other extremity of the infinite—the infinitely small. A drop of water, which to the unaided eye is scarcely visible, is shown by the microscope to be a world teeming with life the most complex and wonderful. For years these wonders were for the eye of the wealthy observer only, a microscope being a luxury only for the few; but photography steps in, and with little expense hundreds of the most accurate pictures of life in this universe of the infinitely minute are ready for distribution, and thousands who before knew nothing outside their own commonplace sphere are made acquainted with the marvels of nature.

"To what a grand extent must these uses of photography act upon the human mind to expand it. When we contemplate the infinities around us, and ask the questions, Whence comes it all? and whither does it tend? we find ourselves in the presence of an awful mystery, and we re-echo the cry of the Psalmist, but with greater meaning, 'The Heavens declare the glory of God, and the firmament showeth His handiwork.'

"Our ideas of the Great Cause of All are also raised, and with greater knowledge comes greater reverence and greater charity, and each fresh agent of science lends its aid to exterminate those twin sisters—ignorance and bigotry—and herald the millenium of peace and goodwill to mankind."

My first article was as follows:—

"Speaking generally, I think the best uses of photography are:—

"I. The production of slides for the optical lantern to be used for educational and scientific purposes. Accompanied by oral description in the form of lecture or otherwise, good photographic lantern slides impress the minds of children and adults through the most effective combination of senses—seeing and hearing.

"II. The practice of photography in any of its numerous branches is also eminently educational for its votaries as regards technics, science, art, and mental training.

"No one can be a good photographer who does not endeavour to understand the 'why' and the 'wherefore;' no one can be a good photographer who has not learnt to be careful and systematic in working; no one can be a good photographer who has not learnt the 'power of littles;' and lastly, no one can be a good photographer who lacks perseverance.

"III. Another *best* use of photography. It promotes brotherly feeling; there is a good deal of freemasonry among the members of the craft where it is practised not for lucre but for love; even among professionals there is some solidarity.

"IV. Yet another *best* use. Memorials of the living and the dead—*veros effigies*, which bring before us individuals; memorials of past and present—the monuments of Assyria, Egypt, Greece, and Italy; or life and scenes in the present 'Darkest Africa.'

"There can be, however, no best uses of photography singled out from its numerous applications. There is only one best use of anything—its efficiency for the object in view. Photography is found invaluable to the astronomer; it is also invaluable to the producer of tintypes on Ramsgate Sands. Perhaps one of those tintypes of a 'puling infant' will bring more joy to the heart of its loving mother than she would get by looking at Common's splendid photographs of Nebulæ.

"We are all tempted to consider that to be the best use of anything which we use, the way we use it, and the good which its use brings us. The best uses of photography are, therefore, legion."

My second communication, sent July 1, 1890, was as follows:—

"Sir,—In case you may consider my answer sent you in May last to be not sufficiently short—the word 'short' is as indefinite as the proverbial 'piece of chalk'—I send below more briefly what I consider the best uses to which photography can be applied:—

"I. Lantern slides for educational, scientific, and recreative purposes.

"II. Portraiture.

"III. Views—landscape and architecture.

"IV. Photographic engraving, collotype, &c., for book, periodical, or newspaper illustration.

"V. Astronomical and microscopical work.

"To sum up in one short answer:—

"VI. Every use of photography which brings pleasure or profit to man, woman, or child."

—I am, yours, &c., Duncan C. Dallas.

TIMING DURATION OF FLASH LIGHTS.

To the Editor.

Sir,—In the "Foreign Notes" of your issue for the 8th inst., I notice that Professor Eder, of Vienna, has been using silvered hemispheres attached to a wheel for timing the duration of flash lights and speed of instantaneous shutters. If your readers will refer to your Almanac for 1889, page 498, they will find the same method described, together with examples of the calculations necessary to arrive at the time of exposure.

—I am, yours, &c., D. E. Benson.

Manchester, August 11, 1890.

SAMUEL FRY & CO., LIMITED.

To the Editor.

Sir,—Will you kindly allow us to notify the public, through your columns, that we have purchased the business, goodwill, and stock-in-trade of Samuel Fry & Co., Limited, of Chandos-street and Kingston-on-Thames? The business will be continued at both places as before, under

the style of *The Fry Manufacturing Company*, of which we are the proprietors.

Full announcement will be made in your advertising columns to all our customers and friends generally.—We are, yours, &c.,

5, Chandos-street, Charing Cross, London, W.C., August 11, 1890.

S. HERBERT FRY.
A. E. HAYMAN.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Splendid marine engine, two double-action oscillating cylinders, one and a half inch bore, fitted with force-pump complete. Photograph, stamp. Wanted, studio chair or accessories.—Address, GANNON, Chelmsford.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:

George Atkinson, Chester.—*Photograph of pedestal fountain and statue of Right Hon. W. E. Gladstone.*

J. H. ELLERBECK.—We can think of no other at present than Romain Talbot, Berlin.

W. GRIFFITHS.—If you will refer to page 453 of last year's volume you will find the information desired.

CHIPS.—See what we said when publishing the specification a few weeks ago. If you call we can inform you all about the apparatus.

C. C.—Probably a lithographer in your town would let you have a little transfer ink to experiment with; if not, you can obtain it from Messrs. Hughes & Kimber, Fetter-lane.

T. WARD.—A year or two back a patent was taken out in this country for the application of celluloid as a support for negatives; the patent was completed, but we know nothing more of it.

A. Y. E.—Spectacle eyes, as supplied by the wholesale opticians, are in the rough, that is, the edges simply "shanked off." You would have to centre them and trim the edges yourself.

C. HAMPTON.—Carbon tissue, ready sensitised, may be obtained from Messrs. Marion & Co., the Autotype Company, or the Woodburytype Company, and possibly from others. It will keep at this time of year from a week to a fortnight after preparation.

PERPLEXED says: "I enclose a print upon which you will see some bright yellow spots, and, as I have recently noticed those spots upon many of my prints, I would be glad if you can suggest the probable cause of them."—The spots appear to be due to air-bubbles adhering to the prints when they are first put into the fixing bath. The remedy is obvious.

R. W. J.—From the description we imagine that the apparatus bequeathed to you by your late uncle is not of much value. Most of it appears to be for taking Daguerreotypes or paper negatives. As the lenses bear no name they are probably of French origin. Clearly the appliances are not well adapted for modern photography without considerable modification.

RETOUCHER.—Your remedy is in the County Court. The negative, according to your own account, was retouched in the ordinary course of business, and a definite charge made. Unless you can prove that the photographer obtains such work fraudulently we cannot take any steps. Your surmise may be correct or there may be no ground whatever for it. Any way, your remedy is in the County Court.

W. J. R. (York.)—With extra thickly coated plates, or those containing a large proportion of iodide, a backing on the plates is not so necessary as with thinly coated ones without iodide. But however thickly coated the plates may be they would certainly be improved by backing when taking interiors such as you describe. A longer exposure is not required with backed plates, though one may be given without so much injury as without the backing.

APPRENTICE.—Without seeing the indentures we cannot give an opinion. Simply learning to develop negatives and printing and toning on ready-sensitised paper can scarcely, we imagine, be considered being taught the profession of a photographer. Better consult a solicitor, fully explaining to him what are the different phases of the business. The small salary you receive is doubtless in accordance with the agreement. Your guardian ought to see into the matter.

J. MCKAY.—Start by giving a definite aperture, or by making a definite aperture in the stop of each lens. This may be *f*-10 or *f*-11, or even larger if the lens will bear it. Then adopt the tentative system by focussing on distant objects, and noting how far a sufficient degree of sharpness to suit your requirement extends towards the foreground. This represents what is popularly termed depth of focus of the lens. Of course, the smaller the aperture the greater the range of penetration.

W. D. (Ely Valley.)—The quantity of leather necessary for the bellows of a camera will depend upon its length and whether it is made conical or square—particulars not furnished. Russian leather suitable for the purpose may be obtained from any dealer in bookbinders' requisites. It is not sold by the yard, but by the skin. The interior of a camera and lens may be blackened with lampblack mixed in ordinary negative varnish, or in brown-hard varnish thinned with methylated alcohol.

BART writes as follows: "I recently ordered goods from a well-known firm to be sent by Parcel Post, and sent cash with order; the goods have not come to hand, and the Postal authorities say they have no proof of posting, and refuse to compensate; the sender declares his books prove the posting of goods. Can I recover value from the sender through County Court?"—In reply: We should say you can not. You selected the channel through which the goods should be forwarded, and if the sender can prove posting them his responsibility ends there.

C. F. H. writes: "Will you kindly tell me the cause of the silver bath dissolving the albumen from the paper in sensitising? The bath was made up of silver nitrate and distilled water only, and after floating ten or twelve sheets began to dissolve the albumen. I was under the impression that the bath must be very acid, so added carbonate of soda, but this seemed to make matters worse instead of better. I shall be very much obliged if you will kindly tell me the cause and remedy."—Probably the bath was too weak to coagulate the albumen. Try the effect of strengthening the solution. If this does not effect a remedy add some alcohol to the bath. It is quite possible the paper may be at fault.

PAUL JONES complains that on visiting the Royal Gardens at Kew with his camera he was refused entry because he had not an admission ticket entitling him to take the apparatus. He says the gardens are public property, and, therefore, every one ought to have the right to take photographs therein.—The parks, museums, and National Gallery are all public property, but this does not give any one the right to take photographs in them. Had our correspondent written to the authorities at Kew a permit would have been granted. The same would be the case with any of the public parks and buildings. If this restriction were not made such places as the gardens and parks might be crowded with itinerant photographers touting for custom, to the great annoyance of visitors.

H. M. writes: "I rented a house and shop for photographic purposes; before I rented it I obtained permission to put a studio on top of the shop. I got the studio nearly done, and was stopped by the borough surveyor, who told me I had to submit plans for it before I could go on. I have submitted plans which are not approved of. What I want to know is whether the agent is responsible or not, and if I can recover damages, as I shall have the place to pull down again."—The landlord is not responsible. He gave permission for the studio to be erected, and he appears to have thrown no obstacle in the way. It is the local authorities who have stopped the building because their bye-laws have not been complied with. The landlord has no power over the borough authorities. In taking premises where a studio has to be erected, after the landlord's sanction has been obtained, that of the local powers has to be secured, and this should always be got before finally taking the premises.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, August 20, *Photometers and Actinometers*; August 27, *Printing through Coloured Media.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, August 21, *Cloud Negatives*, opened by Mr. J. S. Teape; August 28, *Pictorial Definition*, opened by Mr. P. Everett. Visitors invited.

REMOVAL.—Messrs. Horace C. Lewis & Co. (Limited), late of Ranelagh-street, Liverpool, have had occasion to remove their business to the larger and more commodious premises at 31, Bold-street, Liverpool, where they keep a large stock of photographic requisites.

TRADE CATALOGUES.—We have already acknowledged the receipt of that of Messrs. Lancaster & Son, Birmingham. After a careful perusal, we quite endorse our previous dictum respecting its merits, not alone as a well-arranged compendium of the specialities of this well-known firm, but as a book, its typographic excellence entitling it to rank as a work of art.

John J. Griffin & Sons (Limited): A goodly work of 188 pages, replete with the selected productions of numerous manufacturers. It also contains a variety of useful formulæ for every-day work.

W. H. Walmsley (Limited), Philadelphia: In this catalogue of ninety pages we have, for the most part, goods of American inception and manufacture, although England and the Continent are not left unrepresented. It is well illustrated.

The Blackfriars Photographic and Sensitising Company: This catalogue, while containing all necessary apparatus and requirements in photography, makes a special feature of what appertains to printing and mounting photographs.

Ross & Co., New Bond Street, W.: From the 1890 catalogue of Messrs. Ross & Co. we learn that their new factory at Clapham is now in operation. In twenty-four pages are contained descriptions and price lists of their various lenses, cameras, shutters, stands, lamps, chemicals, and outfits.

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THE BRITISH

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SHOULD PYRO-AMMONIA BE USED A SECOND TIME?

When a tyro is for the first time introduced into the dark room of an expert to watch the process of development, almost the first question he asks is, "I suppose you use pyro and ammonia?" and next he puts the query, "Do you use the same solution more than once?" We have heard these queries repeated many times over; it is our present object to put the *pros* and *cons* of the latter practice in such a way that every one may form his own conclusion. As to the possibility of using a pyro-ammonia developing solution several times over, that is beyond discussion. Most photographers at some time or other have been compelled to adopt it without regard to any question of advantages or otherwise. We have ourselves seen half a dozen plates, one after another, placed in the same developing tray without any change of the contained developer.

The advantages to be gained by so doing are, we may say, primarily, economy; and, secondly, saving of time in mixing solutions. When there are many plates to develop, no one to assist in the operation, as is often the case, the available time limited, the saving of time effected by dropping a fresh plate in the solution as soon as the first is taken out, and so on, and with a series of several dishes, is by no means inconsiderable. Especially does such a consideration appeal to the mind when the work is done on tour, after a hard day's tramping and photographing: the only dark room, the hotel bedroom; the only light, the travelling lamp. In these conditions, we repeat, the saving of time is an important consideration.

Let us now look from the point of view of economy, which simply resolves itself into a question of calculation. Let us suppose that four ounces of solution be employed for a half-plate, that size being, perhaps, the most commonly employed of any; further, we may assume the pyro to be used at a strength of one and a half grain to each ounce of solution, the ammonia to be employed in equal weights with the pyro, and the bromide one-fourth that weight. Six grains of pyro would then be used for each plate, or seventy-three plates for an ounce of pyro. The following are, perhaps, average prices:—

	s.	d.
1 ounce of pyro	1	0
4 ounces of sulphite	0	3
1 ounce of ammonia solution	0	1
¼ ounce of bromide	0	1
Total	1	5

That is, seventy-three half-plates can be developed for seventeen pence, or a little less than three pence per dozen—one farthing each—if the solution be used not more than once; if used twice, there is a saving of three halfpence per dozen. We think our readers will arrive at the conclusion that *le jeux ne vaut pas la chandelle* on the ground of economy, when the drawbacks are considered. In the first place must be considered the want of uniformity in the solution after once using, owing to volatilisation of a portion of the ammonia, and accumulation of bromide from the action of the ammonia on the bromide of silver. The exact extent to which weak solutions of ammonia part with the gas to the air has not been experimentally determined, and, in fact, to do so would involve a complex series of tables, as of course it would be a function of the combined effects of temperature, extent of surface, and depth of fluid exposed to the air. Neither, also, has the actual amount of bromide introduced into the solution from the bromine in the film during the reduction of the silver salt been determined. Two important factors — diminution of ammonia and increase of bromide, and to an appreciable but unknown extent—cannot but tend to uncertainty of result. The aim of all work should be to bring to development the utmost amount of exactitude possible, and so eliminate one cause of failure. Some of our readers may exclaim that such exactitude is unnecessary, and that they can do good work without it. But our own opinion, and one we have always expressed, is that all the chemical work of photography should be done by weight and measure—no drops of this nor pinches of the other should be permitted. When a plate has received the minimum of exposure, it is necessary to be acquainted with the maximum proportion of ammonia to pyro the particular brand will stand. Too little or too much may mean the loss of a negative, or, at least, the production of an inferior one when a perfect negative would be obtainable.

Finally, we would point out that, even with the full amount of sulphite we have reckoned, every successive plate placed in the solution will, when developed, be of a yellower cast than its predecessor (a point, we are aware, considered as no detriment by some workers), and which colouration is rarely entirely removeable by after treatment.

To sum up, there is a decided balance of advantage in favour of the employment of fresh solution for each plate; and that only when time is very restricted should the solution be employed a second time.

GRAIN OR NET NEGATIVES FOR PROCESS WORK.

The negative having been completed, the next step towards rendering it available for use is to transfer it from its glass support and convert it into a film negative. This, though a somewhat troublesome operation with gelatine, is a compara-

tively easy matter, fortunately, when collodion forms the vehicle for holding the sensitive salts, and a variety of methods of transfer offer themselves for choice; but whichever may be selected, it is imperative that one or two simple precautions be taken to ensure the clean stripping of the collodion film from the glass.

Directions have already been given at an earlier stage for the preparation of the glass with French chalk previous to coating with collodion. Instead of that, if preferred, a solution of pure beeswax in highly rectified benzole free from grease may be applied to the plate, and polished off with a clean silk rubber until a barely perceptible trace of the wax remains; but the French chalk plan is perhaps the more reliable and the easier of application. This treatment, while it causes the collodion film to adhere better to the glass during the various operations of development, washing, &c., causes it, curiously enough, to strip with greater ease when the film is dry. With a perfectly clean plate and suitable collodion it is not absolutely necessary, but the preliminary treatment goes far to ensure a successful issue.

Another point to be looked to is the thorough washing of the negative before the final drying, as if any trace of chemicals be allowed to remain in the collodion film it becomes more liable to tear as well as to stick to the glass in places where the stripping is attempted. In order, therefore, to ensure the perfect removal of every trace of soluble matter, it is well, after a thorough rinsing under the tap or from a jug, to allow the plate to soak for a few minutes in hot distilled or rain water previous to drying. Further, whatever the final process of transfer may be, it is necessary that the collodion film be first dried, as this, by the shrinkage it causes, enables the film to detach itself more readily from its support.

The methods of transfer may be divided into two classes, namely, those in which an already prepared transparent film is caused to adhere to the negative, and those, again, in which a solution is poured on to it and allowed to dry into a skin of suitable thickness. The first are in some respects perhaps simpler, though requiring considerable care; but the results obtained with the latter are, on the whole, more satisfactory.

The choice of materials for the former process consists of thin sheet gelatine, either soluble as obtained at the dealers in artists' materials, or in the insoluble form as now employed for negative purposes. Celluloid in the thin sheets now obtainable is also available, but that employed for cut sizes of negatives—that is to say, the unrollable—is rather too thick for some purposes, though it answers very well.

In using the soluble gelatine sheets it is, of course, necessary that the material be thoroughly softened and swelled by immersion in cold water before applying it to the negative, and this brings us to the first difficulty, namely, its curling up under the action of water. However, a little skill and patience will overcome this difficulty, and the natural adhesiveness of the gelatine then suffices to cause it to attach itself firmly to the collodion negative. The latter must be immersed in perfectly clean, cold water, free from dust or floating particles, until the collodion film is thoroughly permeated; it must then be introduced, film uppermost, into the same dish as the softened gelatine skin, which is allowed to float over it, when the operator, taking hold of both negative and transfer skin by opposite corners in the manner well known, slowly draws them out of the dish in such a way that the water runs evenly from between them, leaving the two surfaces in intimate and perfect contact. Should any air bubbles remain between, it is preferable to float off the skin again and repeat the operation rather than to attempt to smooth them out by squeegeeing or other pressure, owing to the extreme tenderness of the collodion film. A gentle stream of water allowed to flow on to the film, or careful treatment with a camel-hair brush, in slight cases will often prove effectual; but there is always a danger of injury to the collodion as well as to distortion of the gelatine.

Assuming perfect contact to have been secured, the edges of the transfer skin, which in its swelled condition should extend each way half an inch beyond the edges of the glass, should next be carefully folded over the back of the latter, the negative being meanwhile placed face downwards upon a sheet of plate glass with a piece of fine, damp linen stretched tightly over it. The edges may then be accurately and neatly arranged and brought into contact, a little gum or albumen being used if desired to ensure perfect adhesion. Great care must be observed not to move the negative while this is being done, or the collodion film will be damaged; and when the work is complete, it is lifted from the underlying plate glass by means of the intervening linen, and the latter then carefully peeled away and the negative set away to dry.

If insoluble gelatine or celluloid be employed, the proceedings are practically identical, with the exception that an adhesive will have to be employed to attach the transfer skin to the collodion film. The trouble arising from the curling of the new support will be avoided in the case of these materials. In applying a soluble adhesive to either negative or transfer skin, or both, there is always a danger of its penetrating the collodion and causing it to adhere to the glass permanently, unless, indeed, the adhesive be in such thick solution as to be practically unmanageable for the purpose. The best plan is to first coat the transfer skin with a thin layer of chrome-gelatine, *i.e.*, gelatine containing a small trace of chrome alum, and to allow it to set thoroughly, or even to become quite dry. The grain negative is then wetted, as in the previous case, and the transfer skin applied in exactly the same manner, the subsequent operations being identical, with the exception that in the case of ordinary celluloid it will not be possible to fold over the edges. This, however, thanks to the adhesive used and the absence of contractility, is not now so necessary.

The negative, when covered with its transfer skin, is then placed in a not too warm place, free from dust, until it is perfectly dry. It is not advisable to attempt to hasten the drying by means of a *strong* current of air, less still by heat, but when apparently quite dry the temperature may be raised to ensure the removal of the last traces of moisture, after which the negative should be exposed for some time to ordinary atmospheric conditions, in order that it may resume a normal state before stripping. This is effected in the ordinary way by cutting round the edges of the negative with a sharp penknife, and then, raising one corner, with the thumb and finger gently but firmly peeling the compound film from the glass. It may be advisable in the case of either of the gelatine stripping films, to coat with transfer collodion before removal from the glass. After stripping, the negative should immediately be placed under pressure for a short time.

Of the materials available in the alternate method of stripping may be mentioned solutions of indiarubber or gutta percha, collodion, and gelatine; but the advantages of the last are so great that we shall confine ourselves to a description of the method of its use. For the purpose, all that is required is a strong solution of gelatine with the addition of a slight trace of hygroscopic matter to give it flexibility. For the purpose,

we know of no better formula than that published by Mr. J. W. Swan some six and twenty years ago, which we have long employed for similar purposes with the greatest satisfaction. It consists of—

Gelatine	1 ounce.
Glycerine	½ drachm.
Water	4 ounces.

The solution is made in the ordinary way, and must of course be filtered through linen, or other suitable material. A small proportion of alcohol—not more than five per cent.—may be added to hasten the drying, but it always introduces a danger of unevenness of film without any very considerable acceleration of the drying.

The dried negative is warmed to about 140° Fahr., carefully dusted and placed on a levelling stand, and sufficient of the foregoing gelatine solution poured on to it to form a layer about an eighth of an inch deep when liquid. This part of the operation must be performed with celerity, as if the plate get cold, or the gelatine become chilled, it will, owing to its thickness, set unevenly. If this occur, the plate must be rewarmed, the gelatine poured off and reapplied. The plate is allowed to remain on the level until thoroughly set, when it is transferred to a moderately warm drying cupboard, perfectly free from dust. In a well-ventilated chamber or cupboard the drying will be complete in about twenty-four hours, when the film may be coated with transfer collodion, and when that has dried stripped in the manner already described.

This gives us a film negative consisting of soluble gelatine "sandwiched" between two films of collodion, which is, of course, liable to all the vicissitudes of gelatine films. It is questionable whether any great advantage is likely to accrue in practice from the substitution of an insoluble, or, at least, partially insoluble gelatine film, since, though the latter will not *dissolve*, it is equally prone to swell and cockle in the same manner as the soluble film under accidental damp; and as such negatives are scarcely likely to be submitted to such conditions as to be in danger of solution the advantage is dubious. In practice we have never found the slightest inconvenience from the soluble gelatine film.

If, however, any of our readers desire to be ultra particular, and render the stripping film insoluble, they may introduce a little chrome alum into the gelatine solution. But with a thick solution, such as that given, the use of chrome alum is attended with grave inconveniences if used in anything like useful proportions, hence we prefer the following modification, though, of course, the soluble film may be immersed in chrome alum after drying. Instead, therefore, of incurring the necessity for a second drying, and with a view also to avoid the dangers arising from the introduction of chrome alum into the gelatine, we prefer to substitute potassium bichromate, adding two to three grains to each ounce of solution. The negative is levelled and coated with this in the ordinary way, and when perfectly set it is immersed in a solution of moderate strength of bisulphite or metabisulphite of potash previously cooled to as low a temperature as possible. This reduces the bichromate and forms chrome alum in the film, thus producing the effect desired.

Or another method of using the bichromatised gelatine gives a result that is practically identical with the Vergara or Froedman film, which has the additional advantage of swelling but slightly under the influence of water. In this case allow the bichromated gelatine to dry, and then expose to strong daylight for an hour or two the back and front of the negative; this renders the gelatine quite insoluble, and a subsequent immersion in the solution of bisulphite of potash will remove the brown colour caused by the bichromate. If this colour seem reluctant to discharge itself, a little hydrochloric or sulphuric acid added to the solution will hasten it. After this treatment it will be necessary to wash well, and the film will then dry in a short time, and can be stripped in the usual manner.

Death of Mr. John Spencer.—We are sorry to learn of the death of Mr. John Spencer, of Glasgow. He had for several years confined himself to the Colonial and Foreign department of photographic dealing, and thus, doing an export trade only, he was able to offer his numerous *clientèle* all over the world the advantages of a home office of their own at 125 West Regent-street. He was much respected, and enjoyed the confidence of all his customers for his prompt and upright dealings. He had been ailing for some time, but there was nothing in this to excite alarm either in himself or his friends. He died at Milnathort, Kinross-shire, on the morning of Sunday, the 10th inst., aged fifty-four years.

Amateur photographers *en route*, when they have to avail themselves of strange dark rooms, more especially those provided at hotels and lodging houses, will do well to be on their guard as to the light, whether it be natural or artificial. We have heard of several instances of unaccountable fogging of some plates, while others, out of the same package, and changed under different conditions, have turned out satisfactorily. Too frequently, under such circumstances, the maker of the plates has had to bear the blame. A friend who recently had to use the dark room of an hotel in the North told us that, although the ruby light was no doubt safe enough, sufficient white light streamed in round the door to fog even the slowest plate if submitted to its influence. When using a dark room with which one is not familiar, unless it be at a photographer's, extraneous light should always be guarded against. It is not always detected at once, therefore every one should shut himself in the room for a few minutes, so as to get accustomed to the light, in order to see that all is right before opening the slides.

Now that detective cameras have become so common, we are sorry to learn that they are frequently used in a very objectionable, not to say offensive, manner. On this point a word of caution may not be out of place when working in "slums" and rough neighbourhoods. A few years back a detective camera would not be recognised as a photographic apparatus by the general public. Now, however, the case is different, for however the thing may be disguised, almost every one is familiar with its purpose. Many people have a particular objection to being photographed, even when it is done legitimately, and they would have a greater objection to its being done surreptitiously. One gentleman of our acquaintance, himself an amateur photographer, told us that if he found any one pointing a detective camera at him the apparatus would probably "come to grief," and he would take the consequences. It would be interesting to see, in a court of law, if a man would be justified in forcibly resenting his portrait being taken in a public thoroughfare against his wish or without his consent.

Silver is still advancing in price. It has now reached fifty-four pence halfpenny per ounce—the highest figure for many years past.

At the Mansion House Police Court, one day last week, a City watchmaker was, under the Merchandise Marks Act, mulct in a penalty of ten pounds and five guineas costs for selling a watch bearing a false trade description as to the country in which it was produced. The watch bore the name and address of the seller, which implied that it was made in London, whereas it was manufactured abroad and the name put on here. This case, by the published reports, appears to be precisely on all fours with what is done daily with photographic lenses. English dealers put their names and addresses on foreign manufac-

tured instruments. Many of them, no doubt, are quite unaware that by so doing they are infringing any law, inasmuch as this custom has prevailed for so long a period. From the earliest days of photography it has been almost universal for dealers to purchase French lenses and put their own names upon them.

There is no reason why foreign-made lenses, whatever names they may bear, should not be as good as English, and, as a matter of fact, many of them are. There appears to be, with some persons at least, an idea that all foreign goods are inferior to those of home manufacture; therefore, an enhanced price is frequently obtained for foreign goods beyond what would be paid for them if they were sold as such. The term "English make" has such a charm to some as to reach the absurd. Here is an example. We recently saw a quantity of hard German chemical glass ware at a dealer's in miscellaneous goods. While purchasing some the dealer assured us that it was *real* English glass, evidently having the notion that this, if believed, would add to its value, instead of the contrary. The following, however, eclipses the above. The other day we heard an itinerant vendor of cubes of camphor assuring the public that it was "genuine English camphor."

The prominent notice given to Herr Verescz's photographs in colour has, no doubt, directed attention once more to chromo-collotype. It may be remembered that a few years ago this process was started to be worked by a firm in London. Although some really excellent work was produced—far better than anything we have seen since—the venture did not prove a success. To produce results equalling chromo-lithos, with which they had to compete, their production, we believe, proved too costly. One of the difficulties in chromo-collotype is in getting accurate register between the different negatives, and afterwards in the printing. The latter is owing to the unequal expansion of the paper, caused by contact with the moist gelatinous surface of the plates. Unless this can be overcome a sharp picture will not be easily obtained.

It is rather a matter of surprise that the process of the late Mr. Woodbury for producing photographs in colours has not been utilised commercially, seeing that it is one capable of yielding very effective pictures, and is not difficult to work. In principle it is analogous to colouring a photograph from the back, but it is done mechanically. The different colours are roughly lithographed on the paper with one or more printings; then a Woodburytype print, in thin and transparent gelatinous ink, is made upon it. Some of Mr. Woodbury's examples, as well as others produced in France, that we have seen were really very good, notwithstanding that many of them were made with the crudest of appliances. Some day, perhaps, this process will be utilised commercially, as many of the difficulties pertaining to chromo-collotype would be absent in chromo-Woodburytype.

THE ART OF RETOUCHING.

Chapter XVI.—Method No. III.

My own experience of retouching began in Paris, very many more years ago than I care to set down on paper; still, it is not my intention to lay down my own system, or systems, as being infallible, or the ones fittest for imitation. Indeed, I consider in retouching there is as much freedom as there is in painting. I do not believe in any hard-and-fast method. I wish, therefore, to be as general as possible, and give for instruction the methods producing results which, in my humble judgment, I consider to be the most correct as well as artistic. For this purpose, therefore, I wish to make a few remarks upon the various methods of retouching as practised in Germany, France, and the Continent generally.

I will take Germany first, as the methods most practised there are bold and decidedly artistic. Even when they fail to realise my ideas of what *should* be *negative retouching*—which to be really good *must* preserve likeness—they possess a certain independent merit of their own, entirely owing to their decided and skilful treatment. A good German retoucher treats a head—say the ordinary vignette cabinet size—somewhat as he would a crayon drawing of similar dimensions. This, needless to say, is a rather bold treatment for a negative, and one very likely to efface the leading markings in a finely lighted negative. Still, in this manner I have seen some very beautiful results produced; but the retoucher must be very skilful, or he will have to pay for the beauty of *effect* by the comparative loss of *resemblance*. Now this is a price that, to my thinking, is, and ever should be, prohibitive as regards *portraiture*.

He generally begins by very carefully filling up all the transparent spots or lines, as in the methods already described. He carries this out, however, in a slightly different manner to those I refer to, inasmuch as he uses the *point* of the pencil much more, lightly dotting or spotting until he has removed all the markings—such as blotches, freckles, and other optical exaggerations—until the face presents, comparatively, a smooth and even surface, free from all traces of such blemishes.

He now starts upon the modelling of the face, which he accomplishes by means of cross hatching as a foundation, placing a line or touch here and there, as his eye may catch a defective or unfinished portion of the face showing a certain want of gradation.

The next points treated are the *high lights*, which he at once proceeds to put in their respective places, and then gradually softens into the half tones and shadows, until the negative assumes that appearance of rotundity and delicacy of modulation so grateful to the eye of a retoucher. To produce this effect is the sole object he has in view at starting, and its consummation not only affords him pleasure, but is a kind of reward for his pains and skill.

As a retoucher following this school becomes more and more experienced, so his touches or strokes of the pencil will become bolder and bolder, under which latter treatment a negative will possess much greater artistic value, inasmuch as it will be freed from that mechanical stiffness so generally observable in a beginner's work. As is natural to suppose, broad and bold cross hatching, even in skilful hands, will not always secure a finished picture, so our retoucher of the German school must start filling in all or any of the defects which may appear between the lines or cross hatches. In this way not only a bold and dashing effect may be gained, but also a very "taking" picture will result. Notwithstanding all that can be said in favour of this method, it will always have its glaring disadvantages as regards *portraiture* generally. For what is termed *publication* pictures it is undoubtedly good, as a brilliant result is sure to be obtained, and the loss of likeness is not in every case a disadvantage. In pictures of this class the resemblance is a matter of very secondary consideration. The "*public*" will not buy an *ugly* portrait, especially when it is of some one they do not number among their friends; but they do buy a "pretty picture," and make themselves believe it is also a very correct likeness. Whether the public be right or wrong in this regard I will not dare to offer an opinion, I can only say with the old showman, "They pays their money and they has their choice."

The method practised most generally by the French retouchers has at least *one* very great advantage over their German rivals, inasmuch as the likeness is very much less likely to be lost; this, too, although there is but a trifling difference in the handling. Indeed, in most of these methods the commencement is nearly the same, that is to say, the retoucher begins by levelling up or spotting out all the defects on the negative until it becomes *even* throughout, and then working upon it until it presents a sufficiently soft appearance. When they have worked a negative to this stage (having levelled the face and removed all the inequalities) the majority of good French retouchers effect the necessary modelling by making very fine, long, downward strokes, somewhat curved. This treatment will not produce the effect of that stipple which, I think, would be the most suitable, but it will, all the same, make the face so treated very smooth and soft.

This method, too, is not so vigorous as the German, but as you may easily see upon consideration, the likeness is considerably less in danger of being lost. Personally, I must say I much prefer it to the other, inasmuch as a somewhat similar result may be gained without so much risk of losing what to me always seems the most essential quality of a portrait—the *likeness*. It is also quite as acceptable in fancy or "*publication work*" as is its rival.

Before the "dry" plates became generally in use, the old-fashioned collodion plates required the help of a medium in order to give a *tooth*

to the film. As a rule, the negatives were treated with a solution of gum, or a mixture of gum and dextrine, dissolved in warm water. This solution washed over the negative (collodion) would give it a surface as readily worked upon with a pencil as a sheet of ordinary drawing paper. Like everything else in life, however, it has its disadvantages, the worst being a certain liability of the film to *split* when varnishing. This unfortunate quality is, of course, accounted for by the natural absorption of moisture by the gum and dextrine. The Germans, in order to avoid this trouble, mostly retouched *on* the *varnish*, using a medium such as already described in order to obtain the necessary tooth for working. So much for old style.

In the modern "dry plate" system this danger of the films splitting is altogether obviated, and each artist can follow out his especial style to his heart's content. We have only to use a medium, of which there are numbers in the market, to give the necessary surface for taking the pencil, and then dash away in pursuit of the desired result. We have, however, unfortunately, at times to put up with a very great trouble, notwithstanding all our advancement. There are various kinds of mediums which, although giving a splendid tooth for working upon, fail to retain the work upon it during the process of varnishing. Necessarily, this misfortune entails double work upon the retoucher, and is nothing short of a calamity to the poor, hard-worked, and (I don't hesitate to say it) generally underpaid retoucher who works "on piece."

The coming off of the work during varnishing may result from a variety of causes. If the film should be slightly damp, the plate not properly treated or too much so, or the varnish not of a proper consistency, all will result in worry and extra trouble for the retoucher. Still, like all who worship, however humbly, at the shrine of art, we must be prepared to take "the rough with the smooth." I may here tell all intending retouchers that they will find much more of the former than the latter as they struggle along. They will also find some difficulty in finding a medium that will make it *more toothsome*, and even varnishing will not make it smooth.

There are some very fine specimens of work come from Russia, notably St. Petersburg and Moscow. I cannot positively say *how* they have been retouched, but, judging from the subjects before me, I feel inclined to believe the German school, but in a modified form, predominates. Vienna, too, sends us some very fine specimens of the photographic art. The retouching there, in my opinion, although very fine and pretty, bears the stamp of being somewhat *over-laboured*. As I said before, excessive work, or too bold and dashing a style, may be all very well for fancy pictures, but they are simply absurd when employed in portraiture. I would not dwell so much on this point were it not that my object has been in this work to treat retouching almost solely in its connexion with portraiture; and good *portraiture* with *likeness* is to me an impossibility. The more lead one uses the more likely they are to lose the likeness, consequently the *less* used the better.

Taking a look all round, I think America has sent us as fine specimens of photography and retouching as any country in the world. No doubt there has been a growing tendency to *over-work*, which has greatly injured the general quality of the work, but a severe reaction has set in and a better standard of work is being established. Still, the really *first-class* American photographs, as compared with similar works produced upon the Continent, will not suffer by the comparison, and, if anything, less fault will have to be found with them. They do not look so over-worked and hard. Even in cases where we, as experts, know they have been so treated, it will not be observable to the eye of the ordinary observer. The climate of England, generally, is not over favourable to the production of really excellent photography. Still, there *are* times when it is *favourable*, and the results gained on such occasions will, I am confident, hold their own beside the best produced in any other country in the world.

A few remarks on the treatment of so-called "Rembrandt" pictures may not be amiss just here, as I think it will nearly complete our study of retouching and its methods as strictly applicable to portraiture. In many cases this kind of picture will be found somewhat more difficult to manage than the generality of the ordinarily lighted ones. Many times photographers attempting this style of lighting either make the light upon the profile *too strong*, or the shadow *too intense*. To the retoucher one fault is as troublesome as the other. Negatives which might have been capable of yielding very decent results are often spoiled by after intensification, thereby effacing all the details in the light side of the face.

There is no light in nature, however strong, but has detail and modulation, and so also should it have in a negative. "Rembrandts" are mostly profile, so we would start work at the edge of the light upon the forehead, and soften it into the surrounding parts until the temporal arch is reached; in this case the drawing of the arch should be preserved by the placing of a light to show its formation, but always keeping same in harmony with the prevailing shadows and half tones. Great attention should be paid not to efface the modelling, but rather to preserve the relative importance of each detail. There is no indication of the malar bone and the palpebral muscles, which should be lost. I do not mean unduly accentuated, but sufficiently relieved so that they will show well when printed to that density necessary to show off this style of picture to the greatest advantage. There never can be a really good Rembrandt picture which will not print with clear, brilliant shadows.

The light on the nose must be carefully worked, and the drawing of same rectified if necessary, also the corner of the eye, and the oft-times deep shadow formed by the orbitar arch. In under-exposed negatives the retoucher will have a deal of trouble treating these latter points. The lights on the cheek bone (giving formation to the face), the lips and chin, are all points which demand careful attention. Where the negatives are very defective, owing to under-exposure, the work necessary, both before and after varnishing, can be supplemented by matt varnishing and stumping on the reverse side. This latter must only be resorted to after the ordinary work has been carried as far as possible.

Should there be little or no variety in the tone of the background, a pleasing effect may be produced by indicating a light close to the figure or face on one side (generally the one remotest from the light), and somewhat more distant from it on the other. Before attempting this, examine any portrait so lighted, painted by a good artist, and found your own work on similar principles. REDMOND BARRETT.

ON THE PROPER ESTIMATION OF LIGHT FOR PHOTOGRAPHIC PURPOSES.—III.

HAVING in my previous articles referred to the importance of employing the most suitable light for various outdoor subjects, and stated the necessity of employing good sunlight for different classes of work, before passing on to the consideration of the second part of this subject, viz., indoor exposures, it remains to be stated that at times an operator will have to make exceptions to the employment of sunlight in some few cases of outdoor working. Undoubtedly one exception is in the case of where groups have to be taken in the open air, when an operator is so unfortunate as to have intense sunlight for such work. Some spot should be selected where the group can be arranged under the shade of some friendly house or tree.

Another exception in the case of outdoor work is the photographing of dark glens or other similar confined places. By all means let an operator expose on such when he can have under his control as large an amount of light as possible, but in such a case let the light be a bright, diffused one, and not when such is lit up in some parts with the direct beams of a glaring sun, while the other portions are much too dark.

Another exception may be noted before passing on, and that is when taking views which contain some figures having white drapery, such as a little girl with an interesting sun-bonnet on, when such offers, contrive to pose such in the shade, not under the full blaze of sunlight.

I remember once being an eye witness of a little bit of photography of this kind. An interesting little girl draped in a light costume was reclining on a grassy lawn, surrounded by daisies and her pet dogs, her brother was intent on making a picture of her as she lay; the dogs were charmingly placed, and had a nice peaceful set about them. At the time, to have attempted to move the group to some sheltered spot would only have ended in failure to get them so nicely posed again; but, unfortunately, the sun was shining intensely at the time, so what was to be done? First impressions are generally the best, so, quick as thought, I ran into the house, and seizing an umbrella I hurried to the spot, just in time to hold it up in such a position as to be outside the view of the lens. The result was all that could be desired; the whole drapery came out soft and nice, and this little

picture has been admired over and over again. The heavy shadow of the umbrella gave also a good balance of shade to the picture. When in the case of such figure studies, the umbrella dodge comes in quite handy to subdue glaring sunlight.

So much for the consideration of a few of the many subjects likely to be met with at outdoor exposures, and if it be necessary that the utmost care be given to see that the proper light only be employed for such, it is also none the less important, when dealing with indoor exposures, that the utmost consideration be given to matter of the proper lighting of the numerous class of subjects which are continually offering themselves to the camera.

Undoubtedly, under this class first in importance comes portraiture; and no matter whether the operation has to be performed in a studio or private house, with its many drawbacks, the very first essential to success is the lighting of the sitter. It is not my intention at present to offer any lengthy opinion anent some of the errors which now and again one meets with in studio work. My present aim is rather to offer a few practical remarks which may be of service to very many workers who are at times seized with a desire to make pictures of their friends indoors. To such I offer the following remarks, knowing well that very excellent results can be obtained if only some little thought be given to the subject, especially in the matter of the lighting of the sitter.

First, as to the light to employ. Choose the time of day when the sunlight does not stream into the room which it is intended to use for the purpose; but don't let it be supposed that by this I mean that sunlight ought not to be "outside." The better the quality and quantity of light there is outside, the better the results inside. A sky with bright, fleecy clouds overhead is not to be despised either for this work. When dull, inky clouds are overhead, home portraiture should never be attempted.

Next in importance comes the selection of a suitable room for the purpose. Choose one having as large a window as possible, and which will permit of the upper sash being lowered. Get your wife or sweetheart to procure for you from a draper's a few yards of book muslin, and with the aid of laths or other suitable pieces of sticks cut to similar lengths tie the four corners together, so as to make a square frame; this done, stretch over it the book muslin, and tack the same on with nails. This little preparation made, the operator is now in a position to deal with the light at his command.

Now let him place his friend on a chair, with the side of his face to the window, and on stepping back let him take a good view and study the effect of the light on his face; it will be found one side is brightly lighted up, and the other is in deep shadow. To attempt to expose a plate under such conditions of lighting would only end in utter failure, and is just what we see in so many instances does really happen with novices. To put matters to rights, however, now bring in the aid of the muslin screen; let it be so placed between the sitter and the window as to incline inwards at the top, and so as to intercept all the rays of light that fall on the face of the sitter. This done, now step back again and see how differently the sitter is lighted. The off-cheek, which appeared in dense shadow before, will now appear to be lighted up. Now bring into requisition some reflector, such as a clothes-horse, over which has been thrown a clean sheet; let this be placed not exactly on the off-side, but rather in front of the off-side, so as to reflect on the front part of the off-cheek as much light as is required to lighten up the shadow side of the face, bearing in mind that the shadows in this class of work are very deceptive in the amount of energy they produce on a bromide plate. It is a safe rule at all times to lighten up the shaded side rather more than appears to be necessary to the eye. On development, it will be found that there is more contrast than was apparent to the eye when posing.

From my remarks on this head it will be at once obvious that the light which plays the most important part in portraiture is diffused light, and therefore, in such cases as the taking of portraits in an ordinary room, some steps must be taken to provide for an artificial diffusion of the light which enters through the window. I know of no better plan than the muslin gauze referred to. In fine weather the upper sash of the window can be run down, and the screen so fixed in a slanting manner as to permit of the sitter being placed under a slanting light; this, of course, means the employment of a window of good height.

Another class of indoor subjects, anent which some errors in judgment exist, is the taking of interiors—such as a large drawing room. I have over and over again found the opinion expressed that such are best taken with as much sunlight as possible, and the blinds are run up and the time of day chosen when the sun streams into the room. This is quite opposed to my ideas, and does not tally with my practical experience. Interiors are best taken on a day when the light outside is very good, with plenty of white clouds overhead, and sunshine does not come streaming into the premises. Let any one judge of the appearance of, say, a well-lighted church under the conditions I have stated, and then note the difference in the contrasts when the sun's rays come streaming through a window into some part of the building; the moment this happens the badly lighted portions of the building suddenly appear to get blacker than before, and the contrasts become too severe. When working on interiors in which there are marble or plaster figures prominently in the picture, too much attention cannot be given to this point, and only such a time chosen as yields a really good diffused light. If any one cares to try an experiment of the difference in photographing interiors with sunlight as against diffused light, let me suggest that he begins with a conservatory. I know of no better test subject; quite lately I took a series of glass houses on a picked day with diffused light of the proper kind. The sun was low down, just simmering behind white clouds, this gave the light from one direction, and just yielded a nice contrast to a subject that would have otherwise been too evenly lighted by the abundance of light coming from all points, the light emanating from a low source helped much to improve shadows that would have been otherwise simply buried underneath a flood of light from a higher source. When photographing interiors of conservatories or glass houses, a good diffused morning or evening light should be chosen.

Upon the many different class of subjects that frequently offer themselves to be photographed indoors, it is not my intention to offer remarks upon; it is too wide a subject for treatment in such an article as this. It may as a rule, however, be taken that for most work to be done indoors a good diffused light, with just as much direct light as will yield the necessary amount of relief in light and shade, should be employed. This holds good in the photographing of models, statuary, and many articles, such as travellers' samples, &c., too numerous to mention. Paintings also are best done without sunlight entering the room.

In framing the above remarks I am satisfied I have referred to a subject that cannot receive too much attention on the part of a novice, or any one, who, for the first time, should have to do some work which is outside his customary walk or practice. When such has to be undertaken, the first thought that ought to be given to the subject is that of the lighting of the same. If an error be committed in this respect no amount of dodging or altering matters in the after manipulations will compensate for the error in lighting. It is the fundamental basis of the whole structure, and is a subject well worthy of the study of all who aspire to do good work with the camera.

T. N. Armstrong.

SYSTEMATIC EXPOSURE FOR AMATEURS.

Unquestionably, blind adherance to tables is sure to lead one blindly astray, at the same time it must be admitted that few have a memory so retentive but that an aid of some sort is found to be at times a source of great assistance—especially to the amateur, who exposes his one or two plates only occasionally, and who, in consequence, has not the opportunities of keeping his eye in, and of timing exposures from the illumination of the picture on the focussing screen, which constant practice gives to the professional.

Viewing the matter in this light, an *aide-mémoire* in the form of a simple table or two is by no means to be despised.

The first thing to obtain is a *datum*—a known exposure (on the plate it has been decided to use) for a known subject, under known actinic conditions, from which other exposures may be deduced.

Take, first, the lens. The stops, it will be observed, are marked either *f*-8, *f*-11·31, *f*-16, *f*-22·62, *f*-32, *f*-45·25, *f*-64, or else with the corresponding Universal Standard numbers, 4, 8, 16, 32, 64, 128, 256, both systems having the same values—*and it must be remembered* that the exposure required for any one stop is double that of the one preceding it.

Secondly, the subject. The following classification by Dr. Eder is a very good one; call it Table No. I.

½.—Sea and sky.

¼.—Distant bird's-eye view.

1.—Panoramic view—nearer.

2.—View with bright foreground and light-coloured buildings, village street scene, &c,

4.—View with dark foliage, dark buildings, dark foreground, groups and living objects out of doors.

8.—Group or portrait under cover or near a window.

12.—Woods, thick foliage, avenues, ravines, badly lit river banks, rocks, reflections, &c.

The figures on the left hand are the comparative or proportional duration of exposures suitable for the subjects in bright sunshine;

they correspond with the figures in the left-hand column of Table No. I., and may be called the *numbers* of the subjects.

Thirdly. Actinic conditions, which Dr. Eder values as follows:—

TABLE No. II.

Sun.	Diffused.	Dull.	Very dull.	Gloomy.
¼	½	¾	1	1¼
½	1	1½	2	2½
1	2	3	4	5
2	4	6	8	10
4	8	12	16	20
8	16	24	32	40
12	24	36	48	60
16	32	64	128	256

The figures are not seconds, they are proportional values of light.

Now to find a datum, from which to deduce exposures. Select any subject, say No. 2, Table I., a village scene, fairly light road, with light-coloured cottages; choose a bright day, sun shining, so as to well light up the picture; load a slide with the class of plate it has been decided to work with, say, for example, an Ilford special, Sens. No. 25, or any other; set up the camera, put in stop No. 64 or *f*-32 (which is the same), and by trial ascertain the exposure that will give a good negative full of detail. Then rule a paper thus, which call—

TABLE No. III.

Stops.	4	8	16	32	64	128	256
Subject numbers.							
⅛							
¼							
1	[illegible]	[illegible]	¼	½	½	1	2
2	[illegible]	¼	½	½	1	2	4
4	¼	½	½	1	2	4	8
8	½	½	1				
12	½*	2	1½				
16	½						

In the top line write the numbers of the stops *f*-0 or U.S., as the case may be, and in the left-hand column the numbers of the subjects from Table No. I. If an Ilford special rapid plate has been used, the proper exposure will probably be one second. Enter this or whatever the exposure may be under stop 64 (the stop used), and in line 2 (the number of the subject), then it follows, that as each stop requires double the exposure of the one preceding it, the proper exposure for the same subject with stop 32 will be half a second, for stop 16 quarter of a second, for stop 8 one-eighth of a second, for stop 4 one-sixteenth of a second, for stop 128 two seconds, and for stop 256 four seconds. Enter these in the table, then fill in line 4, which is twice the exposure of line 2; line 1 is half that of line 2, &c., and so on until the whole table is filled in.

Now, having made the table to suit the plate, the next thing is how to use it. Take any subject, say No. 4, view with dark foliage, &c., a creeper-covered cottage, or ivy-clad ruin, with grass and water in front, hedges, &c., light diffused, that is, a cloud before the sun, stop 32. In Table II. take 4 (the number of the subject), in the left-hand column and under *diffused* will be found 8; turn to Table III., and on the line 8, under the stop used 32, will be found 2, which is the exposure in seconds for an Ilford special plate. Again, a group, subject 4, light *dull*, stop 16, Table II., subject 4, under dull, gives 12. Turn to Table III., 12 in the left-hand column under stop 16 gives one and a half seconds, the exposure required. With the great latitude development gives, it is hardly possible to lose a plate by following this guide. The only possible error may be in the actinism of the light, which at times is most deceptive. As a check on this, a trial plate may be exposed and developed, and the time of exposure compared with the datum, or a Sterling actinometer may be used. The one I have acquires the given tint in one second in ordinary sunshine, which happens to be the exact exposure a 25 Sens. plate requires for subject 2 with stop 64. Consequently, if on any day or at any time it takes two or four or more seconds to come up to the given tint, double or quadruple exposures must be given. The exposure for an Ilford *rapid* plate may be taken as double that of a *special*, and for an *ordinary* three times; but it is best to make Table III. with the plate one ordinarily uses. Always give the benefit of any doubt to over rather than to under-exposure.

To those who may feel inclined to smile at the subdivision of seconds, I would say, by way of explanation, that, except for groups and portraits, I work with a set of Swift's portable doublets of medium angle, all which have the same size mount, and I expose with a Newman's shutter, graded from two seconds to one-sixty-fourth, which works in front of the lens with the hood removed. For groups and portraits I use a long-focus single lens with a taper mount which takes the same shutter.

JOHN A. D. LLOYD.

Bombay.

* Practically near enough.

HOME PORTRAITURE.

It seems to be generally admitted that the amateur begins by undertaking the most difficult branches of work first, and after meeting with divers discouragements either abandons the whole affair or else gradually discovers the error of his ways and gets hold of the right end, and moves on to success and satisfaction. The beginner's idea of a photograph is a picture of somebody, and of a camera as an apparatus for taking people's pictures with, and in many cases that is all he wants it for; and when he is carefully advised to start with slow plates, and essay only well-lighted views, he naturally resents such ill-timed suggestions, and generally goes home immediately and proceeds to "take the baby."

This proceeding, however, is rarely a success, and usually it is only after many tribulations that really satisfactory home portraits are produced; but there really seems to be no good reason why some of the trials and failures might not be avoided, or why one may not profit by the hard-bought experiences of others in this most desirable and pleasant branch of amateur work.

To make fairly good portrait work, however, requires suitable tools; but these need not necessarily be the most expensive. The lens should be of fairly long focus—about twelve inches—and the rapid rectilinear type will generally be found most available. If the cost of this be found too high, good work may be done with a single achromatic landscape lens of about fifteen inches focal length, in which the fixed stop has been reamed out to a size of not less than one inch to one and a quarter inches. This enlargement of aperture will, of course, materially reduce the marginal definition of the field; but when that is wanted, smaller diaphragms may be inserted, and for portraits, where only the very centre of the field is to be employed, the increased opening will give the desired speed, while with this length of focus and limited field the spherical distortion is so small that it may be neglected. For portraits, great depth of focus is not needed, and indeed in many cases is undesirable, and if good definition is obtained upon the features, so that the true expression is secured, the sharpness may well be permitted to diminish for the remainder. Of course the possession of a fine portrait combination is much to be desired, and where the expense of this is prohibitory the intermediate types, such as Steinheil Antiplanet or the New Voigtlander Euryscope, are nearly as good.

As far as the camera goes, anything which is steady and light-tight will answer, and it is unnecessary to spend money in that direction. For cabinet portraits, 5 × 7 holders are about right, giving a moderate margin for masking and trimming.

The amateur is generally limited in his supply of screens and backgrounds, but sometimes the extemporised affairs are more pleasing than the orthodox professional pilasters, balustrades, or gates; and if care and taste are displayed in handling the subject, the less conspicuous the background the more satisfactory the result is likely to be.

A framework somewhat resembling a large clothes-horse can readily and cheaply be made at a neighbouring carpenter shop, and should be about eight feet high by ten feet wide, and for convenience of storage it may be pinned together so as to be readily knocked down and stood away when not in use. Upon this frame various things may be draped, and often very effective results obtained. There should be one curtain of grey flannel, giving, when photographed, a neutral tint just right for vignetting, and soft enough to hang in easy folds without looking harsh or stiff. This may be hung from the top by hooks and rings, or may be smoothly drawn when the picture is to be vignetted and the folds are not desired. Many styles of shawls produce effective backgrounds, especially when far enough back of the sitter to be somewhat out of focus; while in most cases the easy chair which does duty for a posing chair is much less obtrusive and more effective if entirely concealed under drapery whose apparently careless folds are not altogether accidental.

When the floor at the feet of the sitter is to appear in the photograph, it should be kept subordinate to the other details, and a brilliant carpet pattern is best covered by some quieter rug or mat. Skin robes or mats are often very quietly effective, and seem to hold the light which they receive in a way which has shown itself very serviceable in more than one instance.

The great point, however, in amateur portraiture is the illumination. The absence of a skylight, and the difficulties in the way of controlling

the light which is to be had—these are the common causes of the defects to be seen in most home portraits. A room should be chosen with as high a ceiling as possible, and with a projecting bay window whose openings extend as high as can be secured. If there are other windows, let them be closed, so that the light shall come approximately from one direction. Never mind the exposure; west or south will do, if only the quantity and direction of the light can be controlled.

Place the camera close to the middle window, leaving only room enough to get behind it, and close the lower shutters behind the camera, leaving the upper ones above it partly open to secure a slight front illumination. Upon one side the shutters of the bay window should be opened entirely, so that the most brilliant light falls upon the sitter from that direction, and then by regulating the amount of opening upon the other side the shadows may be softened to any desired extent. At first the effect should be examined upon the focussing screen of the camera, which should be of the finest ground glass obtainable. Use the full opening of the lens, and focus upon the eyes of the model, and the definition of the rest will take care of itself. A microscopic sharpness, by which every thread in the garments may be counted, is readily obtained by using a smaller aperture; but such precision is not wanted.

Never mind about head-rests or their substitutes; but try to place the sitter in such an easy and comfortable position that such supports will not be needed. Avoid straight lines in the composition, and if the lens is of sufficient focal length there need be no fear of undue distortion of points nearest the camera. Standing just behind the camera, direct your sitter to glance in the direction which in your judgment gives the best effect, and then selecting some object upon which the eyes may rest, the exposure may be made. With rapid plates, such as Seed 26, or Cramer 35–40, two or three seconds with bright daylight will be sufficient, using an aperture of *f*-8; but the beginner must expect to waste a few plates in gauging the light of his extemporised gallery. After having arranged the details of this part of the work, however, the amateur will soon find the photographic side of the work a matter of routine, and be able to devote his thought and attention to the higher and more artistic matters of posing, draping, and composition, in which, if he will, he may find a source of endless delight. HENRY HARRISON SUPPLEE.

—*American Journal of Photography.*

THE RATIONAL DEVELOPMENT OF HAND-CAMERA EXPOSURES.

HAVING just returned from a fortnight's tour in Brittany with that indispensable antidote to *ennui*, a hand camera and a plentiful supply of Thomas's cyclist plates, concerning which I have nothing but the highest praise to offer, combining as they do a high rapidity (28 Warnerke) with a liberal coating of emulsion, thus ensuring two valuable qualities not generally combined in the ordinary run of drop-shutter plates, and having been favoured with exceptionally beautiful weather during the whole period I was away, I was enabled to bring back some delightful mementoes of the places I visited.

While premising that I am not an experienced adept at that most difficult branch of our art, hand-camera work, I thought that a short article dealing with my failures and successes might be of use at this time, when so many of our confraternity are touring with that most delightful of accompaniments, a hand camera. Before I started, I debated long and earnestly as to whether I should take a light bamboo tripod of my own construction, or discard everything save camera and plates; and as I was riding a safety bicycle, my decision not to encumber myself with the "sticks" proved a valuable one, for, with few exceptions, my negatives were as sharp as one could wish—and this I attribute to my resting the camera, wherever practicable, against some solid object, such as a post, a parapet, a wall, or a tree, which I invariably found at hand when I wanted them; I am convinced that a sharper and better negative is secured by their kindly aid than by holding the camera in the hand or pressed against one's body.

Before starting, an enthusiastic hand-camera friend gave me what he considered *the* "straight tip:" "Hold the camera with both hands in front of your stomach, take a deep breath, and then fire." I rigidly carried out his instructions, but whether it was my extreme anxiety to do the thing properly, or my nervousness, or what not—the plates that I fired off in this interesting attitude were the finest specimens of naturalistic photography I have ever seen—nothing was defined, but all was extremely "suggestive," and Whistler & Emmerson had it all their own way. I shall, in future, continue to use my original method, viz., to press the camera against the side of chest firmly, and thus secure, as has been my experience, a sharper negative. There is one caution that my failure in one or two cases (as shown in my negatives) will in future bid me observe, and that is to see that the ledge or parapet on which I rest the camera does not cut off some of the view, for though no obstruction appeared in the view as shown by the finder, yet the lens proper, being in closer proximity to the parapet, was obstructed by the latter in one or two of my negatives, spoiling what would otherwise have been a successful exposure. This point is worth noting. Another thing I learnt from one or two of my failures was, that near and moving objects broadside on require a very quick exposure or blurring is sure to result. I found also that however accurate one's eyesight may be, it is very difficult to get the skyline horizontal on the plate without a spirit-level, and in future I shall always take one, or preferably have one sunk into the camera top.

Having digressed from the heading of this article, which is supposed to treat of the all-important subject of development, I will now state my experiences and the lessons I have learnt in the dark room. Contrary to the experience of many, I have no doubt, I have not succeeded with our latest ally—eikonogen. I made up a solution after Warnerke's formula, and started with it upon a few plates; but as I was anxious to get them developed and fixed before Christmas, I put "eiko" back on the shelf and made a fresh start with our old and trusty friend "hydro"—Thomas's formula, diluted with an equal quantity of water, thus encouraging detail and keeping down the harsh high lights and hardness that the strong solution is apt to produce. As soon as the sky was well out I examined the plate, and if detail was gradually and satisfactorily appearing I left it to take care of itself. If I found it coming up too rapidly, I at once placed it in a dish of old developer well restrained with bromide (which I keep at hand for this emergency), and I found it gained density while further detail was checked. If, on the other hand, I found signs of harshness in the high lights with flagging detail, I adopted a plan known to most workers, and which is of the utmost value in cases of under-exposure or of violent contrasts, viz., to apply a strong solution of hydro, or preferably eiko (this brings up detail rapidly and effectually), with a large camel-hair brush to the shadows, and I found I could save an under-exposed or harsh negative, and secure a much more harmonious result.

This plan, combined with that of tilting the dish and with it the developer on to the foreground and off the sky directly the latter has well appeared, is of great value in hand-camera development, and avoids those very "chalky" results one so often sees in shutter work. I am convinced that hydroquinone properly used, *i.e.*, weakened, and not used at its full strength at the beginning of development, combined with a judicious application of the stronger solution by means of a brush to the shadows and detail that are hanging fire, is as excellent a developer as one could possibly desire for shutter exposures; and if a rapid, and at the same time thickly coated, plate like the one I have mentioned is used, one can obtain splendid negatives full of half tone and detail, qualities that are too often lacking in the results of hand-camera work.

LOCKE MACDONA.

SNAP-SHOT PHOTOGRAPHY.

How to Use a Detective Camera.

THE young man whom you see sliding along the street with a peculiarly shaped grip* in his hand is not a commercial traveller, nor is he just about to begin a journey. Follow him at a distance and you will see him glide into a hall-way, open his grip, pull out something that looks like a flat board, turn what appears to be a long screw, slam down the cover, throw up a diamond-shaped piece of leather in one end of the box, and then step jauntily into the street. Suppose it is in Mott-street that you encounter him for the first time. He appears to be watching the entire neighbourhood, and you might be inclined to think that he is a detective, with several assumed names about his person, except that he doesn't wear a cloak. Opposite the Chinese joss-house he stops, lifts his queer box up to the level of his breast, and lo! every Chinaman in front of the building takes a dive below, out of the way of impending danger; for he believes that the man with the grip is going to riddle the building. The mysterious individual has noted all this, but even while the pigtail of the last Celestial is whisked about as its owner disappears in the hall-way, the man with the grip has pressed a button and his work is done. He has caught an exposure of the building and the flying Mongollans, and he knows that under good conditions he will have as a result of his labours a very good photograph of the joss-house. The mystery of the man and the box stands revealed in all its hideous proportions. Its owner is an amateur photographer, and the little grip is a detective camera.

* A "grip" in America is almost synonymous with a hand-bag in England.—ED.

It is astonishing to consider the number of snap cameras now in use in New York. Turn where you will you are likely to run against a man mooning around with one of these machines. He is relentless and terrible. He will take you so that you will appear in the worst possible light to your friends if only he can get you in a good one to snap his weapon. No cowboy in the wilds of Texas takes greater pleasure in punching an ugly steer than does this gentleman of the gelatine film when suddenly there bursts upon his vision a group of boys playing "craps," toughs discussing politics, Chinamen paddling about, or a pretty girl posed on a curbstone waiting for a horse-car.

The snap camera man is not always skilful. In fact, he works for weeks before he can secure an exposure with that deftness and swift accuracy so characteristic of the veteran photographer. His first efforts, as a rule, are generally failures, and he spends a large share of his patrimony in plates and chemicals before he learns how to get a really good negative.

It was a Parisian who hit upon the novel idea of a detective camera. He made a small camera, which he concealed in his hat. A shutter in front was so cleverly arranged that the joint could not be seen. At first he used wet plates, but he soon saw the disadvantage he was labouring under. About that time the lightning dry plates were put on the market, and the Frenchman's hopes rose high. He could take his hat anywhere with him, and no one, at a glance, would suspect its double purpose. Placed on a table, facing the person to be taken, the little button at the back could be pressed and the exposure made. In some respects the hat camera was immeasurably superior to the toys now on the market.

The perfect detective camera should be all that the name implies, and the name manifestly becomes a misnomer when the camera is encased in a yellow wooden box. There are certain kinds of satchel cameras made that to all outward appearances are simply "grips," but by far one of the best of the late inventions is a camera in the shape of a book. It has three compartments, each supplied with a lens, and when a roll of gelatine film is placed in each section, the capacity of the book reaches 300 exposures. Carried under the arm, a camera of this description has such an innocent appearance that no one gives it a glance. It could be carried among a gang of thieves, exposures could be made, and the operator could depart without suspicion of the real use of his book.

Another detective camera that has met with considerable success lately is in the shape of an opera glass. It is really an opera glass with the larger glasses removed and disc plates substituted. The shutter is in the smaller end, and a nicely concealed spring operates it. The focus can be adjusted easily, as the screw in the centre is arranged for that purpose. Of course the negatives are small, but they can be enlarged by any of the many appliances known to the photographic world. Two meniscus lenses of equal focussing powers should be substituted for the concave glasses at the narrow end.

On the principle of enlarging, a neat camera has been invented which can be carried on the person and its presence remain practically unknown. It is placed inside the waistcoat, and the only external evidence is the lens, which is easily mistaken for a button. The picture taken by a camera of this kind is an inch or an inch and a half in diameter, and it can be easily enlarged without losing any of its essential details.

It might be well here to give a few pointers to amateurs who have recently supplied themselves with detective cameras. Never carry your box as though you were conscious of its ulterior purpose, or as though you were looking around for the express purpose of "snapping" some one. Strike an average focus, and in the quiet of some friendly hall-way set the shutter, open the slide and take out the plate slide, and there you are. When you are abreast of the object you desire to take, level the instrument on a line with your breast, touch the spring, and lo! once more, there you are! Then go along to another hall-way and readjust the plate slide, reverse the plate holder, and once more you are ready to "scoop" another crowd. Do everything neatly and with the utmost dispatch possible, and you will never be troubled. This rule is too often violated by amateurs, and they are subjected to all sorts of petty annoyance by street urchins.

An all-important fact in connexion with photography lies in the illumination. There are good days and bad days; days when the sun shines so brightly that shadows are distinct and outlines are sharp and perfect. To obtain a negative under the best conditions the exposure should be made when the sun's rays have attained an angle of about thirty-five degrees on an object situated about twenty feet from the operator, who should have the sun behind his back. The general tone of the light should be blue; a yellow, hazy atmosphere will never give a satisfactory negative.

Remember this, that while you have an apparatus that will work much better automatically than a slot machine, the success of the exposure depends mostly on your appreciation of the laws of light and shade. No matter how perfect a machine may be, good results cannot be obtained if the operator is not careful to observe the needs of the moment. The camera may be pointed too high or too low, directly in the sun's path, or the hand may press the button at the wrong moment, or with a tremor that will cause the shutter to slide unevenly.

The enthusiastic student of photography may obtain a good deal of amusement, and not a little knowledge, by experiment with the "pasteboard camera," as it has been called. Take a long cigar-box and blacken the inside. Make a pin-hole in the centre of one of the ends, and place a sheet of carbon paper beneath the lid and jam it down. If a 4×5 dry plate is placed at the end opposite the pin-hole, with the sensitive side toward the latter, the lid jammed down, and the box taken from the dark room to an open window where there is a view of some building or other object, a very fair picture will be obtained on returning the box to the dark room and developing the plate at the end of half-an-hour's exposure. By interposing a meniscus lens the aperture of the pin-hole may be greatly enlarged, and the taking of the picture much quickened.

It may be added that thousands of good exposures are ruined annually by fault of developers. Not enough attention is given to this subject, and the result is a general condemnation of all the cameras in existence. The first and most important rule is not to permit a ray of light to enter the dark room; second, see that your hands are clean, and wash them thoroughly after each immersion in the separate baths. The trays should be perfectly clean, and that one used for the oxalic agent in the development of bromide prints should be used for no other purpose. The hypo is so cheap that it is really no saving to use a wash of it more than once. One of the best developers has for its fundamental part a quantity of eikonogen, a German product, very costly, but quite cheap when compared with the work it does. After the plate has been developed it should be thoroughly washed in clear, cold water, and then immersed in the hypo bath until it is thoroughly fixed—say ten minutes. Then it should be immersed in a running bath of clear, cold water for half an hour, until all the hypo has disappeared. Then put the plate aside to dry, a process that cannot be hurried up if you want a good picture.

—*New York Sun.*

"PRESS THE BUTTON."

Photographers who merely "press the button" and leave some one else to "do the rest" are really not entitled to the honourable name, and have not reached even the borderland of the delight which the true practice of photography inspires. In saying this, I wish it to be distinctly understood that I do not in any degree undervalue the wonderfully and deservedly popular little instrument that has given a new verb and noun to our language, as it has brought within the pale of photographic influence many thousands who, without it, would probably never have dreamed of entering its ranks; nor have I a word to say against the family of so-called detective cameras, so long as their distinct limitations are clearly recognised. They each play an important part and supply a felt want in photographic practice; but I do emphatically assert that he who can afford to possess only one camera, and is content with either the one or the other, has altogether mistaken or misunderstood the capabilities and possibilities of photography.

But the pressing of the button is not altogether confined to the owners of the Kodak and the detective; it is practised by many who realise the value of larger pictures and time exposures, who coolly hand the exposed plates to a professional developer, and exultingly show the results to admiring friends, appropriating all the credit, although having only done a fraction of the work. In this the so-called photographer makes two grand mistakes; he has to be content with negatives far below the standard available from a well-selected subject on a properly exposed plate, and he deprives himself of *the* greatest pleasure in the practice of photography, the exercise of the creative-like power of rendering visible the invisible image. No matter how great an adept the professional may be, he cannot produce the possibilities on a plate the subject of which he has not seen and the lighting of which he has not studied; and I speak from a pretty long experience when I assert that it is not in human nature to give the loving care essential to the highest class of development to any plate that is not his own.

Of course, I know the excuse that is generally given for this state of matters—want of time, inability to develop properly; or, worst of all, the messy nature of the operation. But neither of those will hold water. Plates keep well enough after exposure to admit of one being developed now and then as time can be found; he who cannot *learn* to develop is too stupid for either selection or exposure, and he whose hands are too dainty for immersion in pyro, or whose habits are so slovenly that he cannot keep the solutions in their proper places, should take to some other hobby.

Something may also be said on the question of printing, which, although more of a mechanical operation than any of the others, is yet one in which skill and personality have considerable influence. It, even more frequently

than development, is relegated to the professional printer, and, I must admit, with more reason. The amateur prints only by fits and starts, and generally only a few prints at a time. The sensitising of a few small sheets of paper at a time is attended with waste, and when that is saved by recourse to "ready-sensitised" paper the resulting tones are not generally satisfactory. Then where a toning solution is specially prepared for only a few prints, it is attended with considerable loss; and "keeping" toning solutions very often do not keep, and the operation is consequently disappointing.

The true photographer, however, knows how greatly the pleasure in any picture is enhanced by the feeling that it is wholly the work of his own hands and head, and will not delegate any portion of the work to another; and it is manifestly unfair that in public exhibitions he should be required to compete with those who seek the highest skill obtainable to help to do what he must do unaided. Then, again, organizers of exhibitions are gradually, and I think wisely, more and more insisting that the exhibits shall be altogether the work of the exhibitor, so that those who seek the printer's aid must either have an elastic conscience or be altogether excluded.

Although I have said that better results may be got on freshly sensitised than on ready-sensitised paper, and consequently the former should be employed when much printing is to be done, yet some very fine prints may be made on some varieties of the latter, and I have some before me now that not even an expert could tell that they had not been made under the most favourable conditions. The toning solution which I employ, and which is at least three months old, is according to a formula given on page 23 of this volume of the *Beacon*. It answers admirably, giving any desired tone, keeps perfectly, and is always ready for use. I tone two or three prints from time to time as required, and return the solution to the bottle again.

For the benefit of those who may not have the January number, I copy the formula:—

Solution of chloride of gold (one grain to the drachm)	½ ounce.
Nitrate of silver	30 grains.
Hyposulphite of soda	4 ounces.
Water	20 ,,

Dissolve the hyposulphite in five ounces of the water, the gold in five, and the silver in the remaining five ounces. Pour the solution of gold gradually, with constant stirring, into the solution of hyposulphite, and then add the solution of silver in the same way. This order of mixing must be strictly followed, and the solution allowed to stand two or three days before using.

The prints may be either washed in the ordinary way or placed into the solution direct from the printing frame, and the whole operation is so simple and certain that there is no excuse for sending negatives to the printer.

ALEX. LAMSON.

—*The Beacon.*

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,519.—"Improvements in Detective or Hand Photographic Cameras." W. W. BEASLEY.—*Dated August* 11, 1890.

No. 12,552.—"Improvements in Means and Methods of Vignetting Photographs." J. H. BERD.—*Dated August* 11, 1890.

No. 12,613.—"An Attachment to Guns for Taking a Photograph or Image of the Object Aimed at." V. F. VON KALCHBERG.—*Dated August* 12, 1890.

No. 12,669.—"Improvements in Photographic Cameras." T. MILLER.—*Dated August* 13, 1890.

No. 12,675.—"Improvements in Hand Cameras." W. G. ROBERTS.—*Dated August* 13, 1890.

No. 12,711.—"Improvements in Photographic Lens Shutters." J. J. FOSTER and H. FLACK.—*Dated August* 13, 1890.

No. 12,734.—"Improvements in Instantaneous Shutters for Cameras and the like." L. C. NIEBOUR.—*Dated August* 14, 1890.

No. 12,741.—"Improvements in Photographic Objectives." Complete specification. E. GUNDLACH.—*Dated August* 14, 1890.

No. 12,766.—"Improvements in Photographic Apparatus." Complete specification. E. BLOCH.—*Dated August* 14, 1890.

No. 12,814.—"Photographic Printing Meter." H. A. L. BARRY.—*Dated August* 15, 1890.

WAYZEGOOSE.—On Saturday, August 16, the *employés* of Messrs. Percy Lund & Co., printers and photo-material dealers, of Bradford and London, held their wayzegoose at Morecambe. The party had engaged a Pullman car, which was attached to the usual Morecambe day trip, and arrived in Morecambe soon after nine. In the afternoon they assembled at the summer gardens, where tea was provided. Fifty-five sat down, after which the whole of the party were photographed by one of the firm's *employés*. A short programme of vocal and instrumental music and recitations was afterwards gone through. Brief speeches were made by Mr. Percy Lund and others.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
August 25	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 26	Great Britain (Technical)	5A, Pall Mall East.
,, 26	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 27	Burnley	Bank Chambers, Hargreaves-street.
,, 27	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 28	Burton-on-Trent	The Institute, Union-street.
,, 28	Halifax Photographic Club	Mechanics' Hall.
,, 28	Liverpool Amateur	St. George's-crescent North.
,, 28	Oldham	The Lyceum, Union-st., Oldham.
,, 28	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 14,—Mr. A. Cowan in the chair.

A letter from Dr. Emerson was read, accompanying a set of photographs, and it was ordered that the thanks of the Society be sent to the donor.

Mr. J. R. Gotz showed the latest development of McKellan magazine hand-camera. In this instrument the plates being kept in sheaths are brought forward by a spring. As each plate is exposed a box at the bottom of the camera is made to rise and receive it. By this means there is no fall or violence likely to break the plate or raise dust.

The CHAIRMAN pointed out that it would be desirable in hand cameras to have a rising front, otherwise it was so likely to occur, that there would either be distortion by tilting, or that the picture would contain a great deal too much foreground.

Mr. H. HADDON, Mr. J. J. BRIGINSHAW, and the CHAIRMAN considered that a finder was a very necessary adjunct to a detective camera.

Mr. P. SCHÖLZIG brought up some more specimens of printing that had been conducted with or without the use of coloured glass. Blue he had found to have the same effect as white light. The prints as shown on matt-surface paper required to be printed very dark, as they lost much in toning.

Mr. J. S. TEAPE had printed specimens on paper supplied by Mr. Schölzig, and on some sensitised in the ordinary way which he had received from Mr. Debenham. In the case of Mr. Schölzig's paper, there was still the same marked increase of brilliancy corresponding with lengthened exposure. With the other paper he still found some difference, but not to be compared with that which existed in the ready-sensitised commercial paper. He had also tried the experiment suggested by Mr. Hastings at the last meeting of pre-exposing the paper, but could not see that it made any difference in the detail.

Mr. W. E. DEBENHAM said that his previous experiments had led him to the conclusion that the use of green glass conduced to less intensity of the image rather than more intensity, and that therefore, whilst it would be injurious with a negative lacking in density, it might be beneficial in cases where the negative was slightly too dense. He now brought forward examples in support of that view. Three prints from a negative which was a little too vigorous were shown, one printed rapidly in full light. This was shown particularly by the absence of detail in the print in the shadows of the drapery. A print made under green glass of a depth that slowed the printing about twelve times was a decided improvement, as owing to the reduction of the intensity caused thereby the shadows possessed more detail, and this was further exemplified in another print made under denser green glass requiring about twenty-five times the original exposure. In this case, however, whilst the contrasts were less, and the detail consequently greater, the tone was not thought so agreeable. Other examples were shown, including a set of three prints from a negative made respectively under very deep blue, green, and uncovered. Here the negative was of normal intensity, and the print under green glass suffered from want of contrast, whilst that under the blue glass was a little warmer and more vigorous than that made without covering. The explanation suggested was that the organic salts of silver which gave the characteristic richness to an albumen print were particularly insensitive to the rays passing through green glass, the image from which would therefore be essentially a chloride one.

The HON. SECRETARY mentioned an experiment of his own in which green glass had been useful in giving a print with less contrast, and thereby showing more detail in the shadows.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

A MEETING was held of the above Association on August 13, Mr. William Benham in the chair.

There were seven applications for assistance, of which six were granted. The amount of grants voted was 15*l.* 4*s.* 6*d.*

HACKNEY PHOTOGRAPHIC SOCIETY.

AUGUST 14,—Dr. Roland Smith presided.

Mr. ROBERT BECKETT discoursed on *Intensifying, Reduction, and Varnishing*. His formula for intensifying was—

Mercuric chloride	½ ounce.
Hot water	1 pint.
Hydrochloric acid	60 minims.

The great thing was to give plenty of washing to the negatives. For blackening he used a fifteen per cent. solution of ammonia, but if denser negatives were required he advised sulphite of soda. He had been very successful in intensifying under-exposed plates. For reduction he used Mr. Farmer's formula. For local reduction Mr. Beckett advised methylated spirit. He then varnished a negative, preferring to demonstrate, which he did very successfully.

The SECRETARY showed paper, &c., made by Messrs. Geering & Co., of Stamford-hill. He had tried their pyro developer very successfully.

Mr. Poulson showed the Quadrant hand camera.

At the monthly excursion to Carshalton, under the guidance of Mr. W. L. Bocker, a good muster was held and successful exposures were made. Other photographic societies would do well to go to Carshalton and Beddington.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

AUGUST 11.—Mr. E. S. Paul in the chair.

Messrs. Norris, Gosling, and Cox were elected members.

Mr. H. WALKER said he had found that several of the automatic arrangements for changing plates in hand cameras were defective, causing the plates to get fixed at awkward times.

The methods of changing plates in certain cameras was discussed.

The advantages of a turntable fixed to a camera was adverted to.

On Monday, September 8, a paper on *Collotype* will be read. Visitors invited.

Syllabuses of the next six months' meetings may be obtained on application to the Secretary.

SOUTH LONDON (LATE EAST DULWICH AND PECKHAM) PHOTOGRAPHIC SOCIETY.

AUGUST 15.—The President in the chair.

At the close of the ordinary business the meeting was made special, to take into consideration a proposed change in the title of the Society. On the motion of the President, it was unanimously resolved that the Society in future be called "The South London Photographic Society."

On and after Friday, October 3, the meetings will be held in Hanover Hall, Hanover-park, Rye lane, S.E., the Society having increased so largely in numbers since its foundation (in April, 1889) that a larger room for its meetings is absolutely necessary.

MANCHESTER PHOTOGRAPHIC SOCIETY.

AUGUST 14.—Mr. Abel Heywood, jun., in the chair.

The CHAIRMAN alluded to the coming exhibition in December, and also asked for the names of members who intended to contribute negatives for the Manchester Survey.

Attention was called to the nomination paper and the list of members who were eligible for office in October next.

The CHAIRMAN also read the following proposal for rules made by the Hon. Secretary (Mr. H. M. Whitefield), viz.:—"That the Council has power to fill any vacancies that may occur during its term of office. That if any officer shall be absent from four consecutive monthly meetings of the Council, unless prevented by illness or other unavoidable cause, he shall be deemed to have vacated his office. In the Lantern Section, Rule 1, to substitute the word October for September."

Mr. JOHN SCHOFIELD reported that, owing to lack of funds (many subscriptions being still unpaid), the Council could not at present do anything in the way of purchasing apparatus, as intended.

The CHAIRMAN appealed to the members to assist the Hon. Treasurer (Mr. W. G. Coates) in the discharge of his duties, and also save the Society the extra expense which frequent applications for subscriptions incurred.

Reports of recent outdoor meetings were given.

The Derby meeting was abandoned, and the time of departure for the Matlock Bath excursion, August 23, was changed to twenty-five minutes to ten (Central).

Mr. EDGERTON exhibited and explained the working of a French-made quarter-plate hand camera holding twelve plates, the plates being in sheaths and removed after exposure by the aid of a leather bag fixed on the top of the camera. He also exhibited a Thornton-Pickard roller shutter arranged for hand-camera work.

Mr. T. R. CROLEY and Mr. STEVENTON who attended by request, each gave an account of their methods of working gelatino-chloride paper, chiefly Obernetter's, and strongly recommended the process for small work, exhibiting many excellent examples.

Mr. CROLEY also showed what could be done in large sizes, having several 12 × 10 photographs, variously toned and mounted on boards, displayed in the room; also some matt-surface prints produced by squeegeeing on ground glass. For toning, the following formula published by the makers is much too concentrated; Mr. Croley dilutes with an equal quantity of water:—

Sulphocyanide of ammonium	5 drachms.
Water	30 ounces.
Chloride of gold	15 grains.
Water	15 ounces.

To two parts of sulphocyanide solution add one part of gold solution.

Mr. STEVENTON, after many experiments, prefers the following:—

Sulphocyanide of ammonium	2 drachms.
Chloride of gold	4 grains.
Water	10 ounces.

The best results are obtained from thin negatives. Print deeply, as the intensity is much reduced in toning and fixing. Trim prints after toning. Use clean baths freely. Fix in the hypo bath for fifteen minutes. Use ferrotype plates to squeegee the prints upon.

In the discussion which followed, opinions differed as to the keeping properties of the toning bath after mixing, whereupon Mr. Benson showed prints on Leamington's paper which had been toned in a bath six months old.

Mr. Wrigley exhibited some beautiful prints on Obernetter's paper, half-plate size.

Mr. BRADLEE was called upon to explain his method of toning silver prints on albumenised paper. He advocated the use of the chalk toning bath, which will keep in unlimited time after mixing without any sediment of gold being formed. Mix one day before using:—

Powdered chalk	Size of a walnut.
Chloride of gold	15 grains.
Cold water	2 quarts.

To save measuring, a glass bottle known as four-pound sweets, capacity two quarts, is used. To tone, use half a pint of the above solution for each sheet of paper. Time usually occupied in toning, fifteen minutes. After washing, and before toning, immerse the prints for five minutes in salt water—strength, water, two quarts; salt, half an ounce; after which well wash, and tone slightly under rather than over. Fix in a saturated solution of hypo, one part; water, four parts. A new toning bath invariably gives mealy prints, but this is easily avoided in subsequent tonings if the old and used bath is kept and mixed with the new in equal parts. Several toned prints were exhibited.

Mr. Schofield showed a 10 × 8 print on albumenised paper sensitised on the plain surface and having a matt appearance.

Mr. C. H. Coote exhibited successful negatives on Thomas's celluloid films.

In reply to a question by Mr. Benson, as to the best means of lighting for an underground exposure, object twelve feet distance, the atmosphere to be polluted as little as possible, it was generally considered that the best result would be obtained by burning two feet of magnesium ribbon doubled.

Votes of thanks concluded the proceedings.

DUNEDIN PHOTOGRAPHIC SOCIETY.

THE first exhibition of this Society was opened on June 28, and continued for a week, during which time it was visited by a large number of the public. The Society is composed of amateurs only, and, though it is young, the show of work by members was considerable, and called forth much praise. On the walls were many specimens of enlargements, embracing portraits, landscapes, yachts, and animal life. Although prints on albumenised paper largely predominated, there were not wanting examples on other papers—platinotype, aristotype, and bromide. Perhaps one reason for the small number of platinotypes and aristotypes is to be found in the bad keeping qualities of the material, both papers deteriorating to a very great extent before they reach the colony. Silver prints were represented by an extensive collection in all sizes, from 10 × 8 to quarter-plate, illustrative of New Zealand scenery, yachts, portraits, groups, &c. Great artistic taste seems to have been exercised by many members in these pictures, noticeably in the beautiful cloud effects, reflections, and atmosphere to be seen in not a few.

It is intended to hold an exhibition annually.

This Society enjoys the reputation of being the most southerly photographic society in the world, and as its location is amid some of the grandest and most beautiful scenery south of the Line, the work of the members may be expected to be, in views at least, very interesting and pretty.

NORTHERN TASMANIAN CAMERA CLUB.

THE first annual meeting of the above Club was held at Mr. R. L. Parker's Rooms, St. John-street, Launceston, on July 9. There was a good muster of members, Dr. H. A. Roome occupying the chair.

Mr. Walter Brickhill was unanimously elected a member.

The SECRETARY then read his report, in which he stated that during the year the list of members had increased from ten, during the first month, to twenty-eight at the present time. The meetings had been fairly attended, considering so many members reside in the country, and that next year the Committee would endeavour to make the meetings even more attractive. One field day was held in November, and it is hoped that more of these pleasant and useful excursions will take place. Two prize competitions have taken place—one in landscape, and one in outdoor portraiture. The winners of the first certificate were—in landscape, Dr. Roome; in portraiture, Mr. F. Styant Browne; second in landscape, Mr. F. Styant Browne; in portraiture, Dr. Roome; third in landscape and portraiture, Mr. R. L. Parker. The circulation of collections of photographs, the work of members, had proved satisfactory, a good number contributing, the criticisms being given in a fair and good-natured way, and some changes were about to be made which would make these circulations even more popular. Papers were read, and practical work in enlarging and developing indulged in, and lantern slides exhibited, all tending to make the meetings enjoyable and instructive. One death had occurred among the members, that of the late Captain Arthur, R.N., whose loss was deeply regretted. The income and expenditure were submitted in the Treasurer's statement, and it was satisfactory to find that a substantial balance was left to carry forward to the new year. The library was well patronised, and thanks were due to the President (Mr. William Aikenhead), Messrs. R. L. Parker, and S. Spurling, for donations of books.

At the conclusion of the Secretary's and Treasurer's report, office-bearers were elected for the ensuing year, with the following result:—*President:* Dr. H. A. Roome.—*Vice-President:* Mr. R. Lewis Parker.—*Committee:* Rev. A. H. Champion, Messrs. R. Kermode and A. C. Bonner.—*Secretary, Treasurer, and Librarian:* Mr. F. Styant Browne.

Dr. ROOME then read a paper entitled *Practical Hints on Photography.*

The Camera Club have reason to be pleased with the result of their first year's work, and it is hoped and expected that at the close of the second year the Secretary and Treasurer will be able to give a still better account of the prosperity of the Club, and that it may become a well-established institution for the furtherance of the pleasurable and instructive pursuit of amateur photography.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Monthly technical meeting, **Tuesday, August 26, at eight p.m., at the Gallery, 5A, Pall Mall East.**

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, August 28, Demonstration of Mr. Varley's Magazine camera, and discussion on the *Uses and Abuses of Hand Cameras*; September 4, *Pictorial Impressions*, opened by **Mr. P. Everett. Visitors invited.**

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

"DISCURSIVE NOTES ON LENSES."

To the EDITOR.

SIR,—I am equally anxious not to protract the discussion, but your editorial comments following my last letter must not go unanswered. Let us see how the matter, as it originally stood, now appears.

First, you state in a letter appearing in the *Amateur Photographer* that Steinheil's periscopic lens was achromatic. I denied it on purely optical grounds, and gave my reasons (in a manner I thought interesting to general readers, and entirely without prejudice to Mr. Walker or the Eastman Company, and received the thanks of the editor in that sense for the matter). These you do not refute, and even say that about a quarter of a century ago *you yourself found that it was not achromatic!*

Second, I point out that your explanation given in 1865 could not hold with regard to Steinheil's periscopic, *and proved it!*

Third, I said that I believed the introduction of the "wide-angle rectilinear" was brought about by overcoming the defects inherent in the periscopic of Steinheil, and I still think I am right, but I have not laid any stress on this. The discussion might here have ended, but by the introduction of other matters by you that have caused the discussion to become unduly protracted, and in no sense have I *challenged* you.

Now to your last editorial comments. You seem at first in a jocular mood. Is this a huge joke—"*While it may be quite easy to prove mathematically that achromatism cannot be effected by lenses of one kind of glass*"—or do you really mean it? The object of my letters has been to prove that *it is possible* by correct relation of the foci of the two component elements and the correct separation! A "*qualified optician*" would not say that he had accomplished achromatism or actinism of single lenses by "a determination of the curves requisite to effect this!" He would say that he ascribed *certain foci* to the two elements and the *correct separation*, and would think of the curves afterwards!

It is a pity for photographic lenses that they cannot be "perfectly achromatic" with the glass we employ. Were there no secondary or tertiary spectrum a *perfectly* achromatic object glass would be a *perfectly actinic* lens too! The relative dispersions of some of the Jena glass are of considerable value in this respect by enabling a nearer approach in actinic lenses to perfect achromatism.

You say: "Photographers care little for mincing niceties in terms;" but some photographers may also be of a scientific turn of mind and like explanations. A photographic lens is made actinic by combining the yellow or most powerfully visual rays with the very feebly visual violet rays that really make the photographic image, so that what is seen best is photographed best. Here the outstanding secondary colours are more or less prominent, if there is much irrationality in the dispersions of the two glasses employed, but they would have very little deleterious effect on the photographic plate, because they are of a non-actinic character. In an achromatic object glass, on the other hand, formed of the same kinds of glass, as the chemical rays (violet end) do not act powerfully on vision, the effort is to concentrate only the most visually active rays. This is usually done by combining the D and F lines that approximately accomplish the destruction of colour fringes; the secondary colour now traceable in the best object glasses being that of the chemically active of violet rays that are *not*, therefore, corrected at the plane of the visual focus, but have little detrimental effect on vision.

Were there no secondary spectrum, then a *perfectly* achromatic and actinic lens would be one and the same thing.

Now, sir, I have repeated in my last letter that the correction in the Zentmayer lens "would be *far better* than the original periscopic of Steinheil." Steinheil's periscopic required an adjustment of $\frac{1}{30}$ of the focus to bring the plane of the chemically active rays on the plane of the plate for visual focus, and worked at *f*-40. The measurement of the circle of confusion, if it were not so used with a lens of 15-inch focus, would measure $\frac{1}{1000}$ of an inch, or slightly over $\frac{1}{100}$ of an inch, for ordinary vision appearing very fairly sharp when viewed at the focus of the lens, or at some greater distance. The exact degree of chemical and visual coincidence of foci, after knowing the foci of the two elements of the one kind of glass composing the Zentmayer construction, will depend upon the separation of the elements. Thus, Zentmayer's lens being *far better* than Steinheil's periscopic in construction, the degrees, could, as I pointed out, be made absolute, and may be, as *I have agreed*, well within the limits of sufficiency of accuracy for ordinary performance, and even to satisfy the trials of the gentlemen referred to in your quotations. But pray, sir, do not, as a shelter, side in giving away our science of optics in agreeing with the author of your italicised quotation, viz., "*If it should turn out that it conflicts with any theory in optics, we may safely accept the result and dispense with the theory,*" but assert the fact only that the lens was *satisfactory for all practical purposes* if you choose.

To nod significantly in saying you "could give Mr. Dallmeyer and the *public*" (italics mine) "another reason than he has done why the late Mr. J. H. Dallmeyer did not complete his patents for objectives formed of single lenses" I consider undignified. You are not satisfied even with this, but conclude your comments by bringing in *yet another* innuendo, involving *another* new subject you might like to discuss, viz., that the "Rapid Rectilinear" lens was a copy of Steinheil's "aplanat." This is an old and well-worn discussion; why disturb my late father's ghost? I know that the effort to increase the rapidity of the wide-angle rectilinear brought about the rapid rectilinear—an *independent research* and *independent invention* of my late father's. He was too dignified and honourable to apply for and work a patent of an invention *not his own*. Your acquaintance with him does not seem to make you mindful of *his* statements on the matter. His *friend*, the late Dr. Monckhoven, *knew* him, and dedicated his celebrated work to him. It was from Dr. Monckhoven personally that I first learned to respect Steinheil, an impression subsequently strengthened through the latter's optical inventions.—I am, yours, &c.,

THOS. R. DALLMEYER.

25, *Newman-street, London, W.*

[Commencing at the end of the above letter, and not being afraid to speak our opinions out openly, we neither desire to "nod significantly" nor to indulge in "innuendoes" respecting the patents or the rapid rectilinear of the late Mr. J. H. Dallmeyer. But from the foregoing letter we infer that the writer's information is scarcely quite complete in regard to them; hence, in the interest of opticians, the public generally, and the future historian of photography, it may be well to ventilate the subject, especially as Mr. T. R. Dallmeyer has in the above given us material out of which to take texts for one or two brief historical homilies.

Without either avowing or disclaiming the innuendo charged against us, viz., "that the rapid rectilinear was a copy of Steinheil's aplanat,' we may say that, unfortunately for the former, the aplanat had been patented and issued anterior to the advent of the rapid rectilinear, and the whole world now knows that the lenses are as like to each other as the proverbial two peas. The history of the aplanat is as follows:—First of all, let us bear in mind that in Mr. J. H. Dallmeyer's patent for his wide-angle rectilinear, of date September 27, 1866, the claim which bears upon subsequent proceedings runs thus: "The constructing of lenses composed of two achromatic or actinic combinations, of which the higher refracting denser material or flint glass lens occupies the external or exterior position in each combination." Now, having the above date in mind, let us see where Steinheil stands. On January 19, 1865, he, or more correctly they—for the actors are Dr. C. A. Steinheil, and his son Dr. H. A. Steinheil—obtained a patent on the Continent for a lens in which the denser material or flint glass occupied the external position in the combination. Here, then, we have, as regards the claim in the patent, the wide difference in the period between January, 1865, and September, 1866. But, Mr. Dallmeyer may inquire, Was this patent lens the aplanat? We are hastening slowly, and will come to it presently. In January, 1865, at a time when the Petzval portrait combination, the orthoscopic, and the triplet, were the rapid lenses then known, Dr. Monckhoven set before Dr. Steinheil some conditions to be fulfilled by an objective likely to find general employment by photographers for views and reproductions. These were, *inter alia*, that it should be aplanatic—that is, to give clear pictures with *f*-10, that it should with this aperture delineate an angle of 20°; its smallest diaphragm should not be smaller than *f*-30, with which it should give a clear picture of 60°; it should be free from distortion, and should work to visual focus; and, writes Dr. Monckhoven (Mr. Dallmeyer's *friend*), "A short time afterwards I received the objective in question. The aperture is one-seventh of its focus; it works, therefore, as fast again as the triplet, of which the opening is only one-tenth. With its whole opening the objective works very quickly, and can be used for portraits, &c. Steinheil's objective deserves, on account of its simplicity and excellence, to be in the hands of every photographer." Messrs. Steinheil say that it was in the winter of 1865 that they calculated the lens, and they issued them commercially in July, 1866. This is corroborated by Dr. Monckhoven, who stated in *Photographische Correspondenz* that he received his one in July, as above. We have already stated that it was in the September following that J. H. Dallmeyer applied for the patent for his wide-angle rectilinear, and some considerable time elapsed after this ere his rapid rectilinear was introduced. It may have been the result of "independent research," but it is unfortunate that the research seemed to have been instituted so very long after Steinheil had been in the field. But, and—as Mr. T. R. Dallmeyer would say—"it is a big but," even though Steinheil had not antedated J. R. Dallmeyer to the extent he did, and though he (J. H. Dallmeyer) had not made an attempt to stop the introduction of the Steinheil lens in this country by threatening law proceedings on the ground of its infringing his (?) patent—a fact perhaps as unknown to Mr. T. R. Dallmeyer as it may be to many of our readers—the result of this attempt against Steinheil was to establish the fact that while Steinheil was undoubtedly long before Dallmeyer in the introduction of the lens, Mr. Thomas Grubb, of Dublin, had been long before either of them, having patented such a combination

in 1857. In Grubb's Specification, having described the construction of his aplanatic lens, he claims it "to be used either alone or as a view-lens, or in combination with other lenses of similar or ordinary construction; and Mr. F. H. Wenham, writing fifteen years ago concerning the matter, says: "Mr. Grubb has deservedly acquired a world-wide fame as a scientific optician. We have to award him the credit of being the pioneer and inventor of the present rectilinear or symmetrical form of doublet lenses, and his invention involves the arrangement in which 'the higher refracting denser material or flint-glass lens occupies the external or exterior position' in each combination, as thus claimed years afterwards in Mr. Dallmeyer's patent."

It is perhaps needless to say that after the true history of the introduction of Mr J. H. Dallmeyer's "patent" lens had been given, and public attention had been aroused to his claims, he did not fulfil any intention he may have had to prosecute Steinheil or any other English makers, who invited this course, for infringement, but allowed the matter to drop. Will it surprise Mr. T. R. Dallmeyer to learn that his father's rapid rectilinear had not been introduced in the beginning of the year 1866, its very existence being ignored in the descriptive catalogues of the firm's productions in the annuals for that year, while appearing in those for 1865? And on what principle should we award parity of introduction to two similar optical productions, one of which was well known to have been placed before the public in 1866 while the other came in 1868? We hope that we will be acquitted of speaking by way of "innuendo" in these utterances, as we fail to discover any method by which we can speak plainer than by giving the dates and facts, as we have done.

The letter alleged by Mr T. R. Dallmeyer as having been contributed by us to a contemporary was really a personal one, written in an individual capacity to Mr W. H. Walker, the Managing Director of the Eastman Company. On re-perusing it we think it a wonderfully mild production, and rather wonder what there was in it that prompted Mr. T. R. Dallmeyer to rush so speedily to the rescue of those likely to have had their equilibrium upset by it. But in order that our readers may judge for themselves, we reproduce it, premising, as already stated, that it is an individual or personal letter from one friend to another.

"Nithsdale, Wood Green, July 5th, 1890.

'MY DEAR WALKER,—Herewith I return the No. 4 Kodak lens, which I have examined. I find it to be neither better nor worse than the average productions of our best English makers. The lenses are adjusted on the Grubb principle, first applied to landscape lenses by the late Mr. Grubb, F.R.S., and, subsequently, to quick-acting symmetrical rectilinear combinations by Dr. Steinheil. It is this form, now used by all opticians for that class of objective, that, when made of flint glass, gives it such rapidity of action, coupled with good covering power and rectilinearity. The mounting and centring mechanism of the lens is a marvellous piece of workmanship, which must of necessity have cost the inventor much time and trouble before it was completed; and you must supply some three or four specimens at a time in order to be able to sell them with the Kodaks at the price you do.

"Turning to the cuttings, from which I perceive I am quoted as having said that it is possible to purchase lenses at two pence each by which photographs can be taken. Quite correct. There is no spectacle lens—and I am speaking of them as we buy—but what a photograph of a certain sort can be taken by its agency. But why expend even twopence on a lens when any one who, from ignorance, carelessness, or poverty, is desirous of practising the most straightforward economy can take a photograph, such as it is, without any lens at all, by simply making a pinhole in a piece of opaque paper? The logic involved in the question of relative cost is simply ludicrous. A spectacle glass can be bought for twopence or even sixpence, and, therefore, a properly constructed photographic lens should cost no more! In the window of a shoemaker's shop I saw, the other day, a card on which were stuck a dozen 'Mr. ——'s famous corpus,' price one penny each. I bought one and find it has a good lens, which compares considerably. Now, by parity of reasoning, what is to prevent some wholesale firm sending to the manufacturing districts and introducing the scientific opticians who, realising their inventions at from three to a hundred guineas each, to carry still further the economy of production, bestow a telescope, warranted to show the constellations in the moon, one to be bought for ten or a dozen shillings, therefore the Americans were only partially victimised by the opticians, who made them pay some thousands of pounds for their world-renowned Lick telescope.'

"With respect to the lens of your No. 1 or small Kodak, do you know its history? If not, I will give it to you. Some years ago (1856) Prof. Steinheil, of Munich, invented and patented it. It was manufactured and sold by Voigtländer, and sold under the name of the patentee, from the periscopic form of its two lenses. It was rectilinear, and covered a pictorial field sharp to the edge. I once had a three-plate stereoscopic camera, with which was taken by a periscope of sixteen inches focus. The lenses were then considered so light, and gave a bright image without stop or diaphragm. It formed a puzzle to many how a combination formed of such cheap kind of glass (common crown) could give an image in which the chemical and visual foci were practically coincident; but, in course of my writing I wrote at the period, I demonstrated by a diagram how it was effected. This lens was not manufactured by either of the two leading London makers then, because it was patented, and, naturally, each was pushing a good proportion of his own. It is from an experience of a small or No. 1 Kodak lens of that form in my possession, that I perceive it to be a meritorious production of a poor lens, possessing, although, owing to recent improvements in the manufacture of optical glass, it would have fair rapidity of working, without [illegible] as I can see, the other good properties.

"The principle of obtaining achromatism by two single lenses—*non*-achromatic, *per se*—does not appear to be generally understood; but a good practical demonstration of its reality may be had by every one in the reversing glasses situated in the lower end of the terrestrial eyepiece of every pocket achromatic telescope.—Yours faithfully, "J. TRAILL TAYLOR.

"W. H. Walker, Esq."

[It was, perhaps, only natural that Mr. T. R. Dallmeyer, believing as he did that the so-called "Rapid" cemented doublet of the present day was invented by his father, should scarcely relish its being attributed to Steinheil; but, as we have proved by dates, the rapid rectilinear, in all but name, was really invented by Steinheil, and was on the market quite a number of months before J. H. Dallmeyer made them. As for the Steinheil lens composed of a pair of single or non-corrected crown-glass elements, this having been discussed already, scarcely needs further allusion. We all know that "Queen Anne is dead," and we fail to discover any advantage of a reiteration of an admitted fact. We have shown that in the hands of Zentmayer the original Steinheil idea ultimated in such a degree of achromatism having been obtained that the visual and chemical foci coincided, and we now state on the authority of those familiar with the work of Mr. J. H. Dallmeyer's fellow-countryman, Zehtmayer (for unless we are misinformed, Mr. Zentmayer, too, was born in Germany), that this coincidence recognised an aperture equalling *f*-16.

For ourselves, we look upon photography by non-achromatic single lenses much as we do upon photography by pinholes, good enough as a matter of pastime or experiment, but something we would not care to indulge in ordinary practice. We like the best achromatic lenses we can obtain, and fortunately the skill of our opticians renders this now a matter of easy attainment.

The great length of this "append" renders it impossible for us to say aught concerning the triple lens, but should occasion arise we will talk of it again.—ED.]

ANIMAL STUDIES AT EDINBURGH EXHIBITION, 1890.

To the EDITOR.

SIR,—Some of those who make Animal Photography their specialty have been working quietly for a long time to get their studio removed from the instantaneous class at exhibitions (where they are mixed up with yachting scenes, breaking waves, and street scenes) to their proper place, viz., under the heading, *Scientific;* and as the Executive of the Edinburgh Exhibition have just written to say that they will do this, I hope that all who can will enter as many as possible and make a good show, as it is the first time that we have been thus rightly classified.

May I urge this point upon Hon. Secretaries of other exhibitions? as unless one tells a direct untruth by entering photographs under the heading instantaneous, which have had from one to two seconds' exposure, he rarely has a chance to exhibit them at all.—I am, yours, &c.,

Camera Club, 21 *Bedford-street*, W.C. GAMBIER BOLTON.

"WHAT ARE THE BEST USES TO WHICH PHOTOGRAPHY CAN BE APPLIED?"

To the EDITOR.

SIR,—Having perused the letter in the JOURNAL from your correspondent, Mr. Duncan Dallas, would you allow me space, as a competitor in the above competition, to endorse a great deal of what your correspondent complains of as to its fairness and impartiality?

After carefully reading the prize winner's article (I may, perhaps, be nearer the mark in dubbing it sermon) I fail to see where the article touches in only two respects, and that in a very meagre manner, on the subject for competition, "The Best Uses to which Photography can be applied." I do not know, sir, if Mr. Hanneford, the prize winner, is a photographer, but, if so, his knowledge of the practical uses to which photography can be applied is very limited: indeed I, like Mr. Dallas, treated, among others, on the following subjects:—Photo-Micrography, Photo-Zincography, Instantaneous Photography, Astronomical Photography, Landscape Photography, Lantern-slide Making, Woodburytype Criminal Photography, &c. Unfortunately, I have not a copy for your perusal, as I thought no more about the matter till I saw the correspondence in the paper. I do not for one moment contend that the prize should have been awarded Mr. Dallas for his article, which many of your readers no doubt will admit is more up to the mark; but I think, sir, that out of the great number of competitors who entered for the prize, one surely might have been selected which had more photographic merit. The gentlemen appointed as judges ought to be photographers of some note in the profession, to whom the competitors could look and feel assured that the award would be honestly and judiciously given. Looking at the result of the competition I think, sir, that your readers will agree that the gentlemen selected as judges have not decided the competition from a professional point of view on its merits in respect to prolonging the competition beyond the time first specified. I think this was a mistake, as of course it lessened the chance of the competitions already sent in gaining the prize. Then, as to the alteration

made in cutting the coupon from the paper and inclosing it with the competition. This, no doubt, was an oversight in the first place on the editor's part, but I think, sir, Mr. Dallas will find that the editor distinctly stated in the paper that those competitors who had already sent in their competition would not be debarred by this new rule, so on that point I regret I cannot agree with Mr. Dallas, as this, no doubt, was done to prevent any one not being a legitimate subscriber to the paper from entering the competition. Taking it altogether, I think, sir, the thanks of the competitors, and of the photographic profession generally, are due to Mr. Dallas for his able and sensible letter on the above subject, "The Best Uses to which Photography can be applied."—I am, yours, &c.,

Bowes Park, August 16, 1890. JOSEPH SMITH.

To the EDITOR.

SIR,—I was glad to see in your last issue the letter of Mr. Duncan C. Dallas *re* the above subject. Believing that the competition in *Short Cuts* would be conducted fairly, I ventured to send in a paper (a copy of which I append hereto) as an answer to the above question, although at the time I was in considerable doubt as to what was meant by "a short answer," the question asked being so comprehensive. My first misgiving as to the fairness of the manner in which the competition would be conducted was in the alteration of the date of sending in papers from June 12 to July 10, and I wrote to the editor of the paper, as follows:—"Dear Sir,—In the issue of *Short Cuts*, dated the 24th of May last, you first gave the particulars of a photographic competition, and therein offered a prize (one of Messrs. Mawson & Swan's complete sets, value 7*l.* 16*s.* 6*d.*) for the best short answer to the following question, viz., 'What are the best uses to which photography can be applied?'—the competiting papers to reach you '*not later than June* 12.' As one of your readers, and taking an interest in the matter, I became a competitor, and forwarded my paper, or answer, to you a day or two before the date above stated (viz., the 12th of June). I was expecting in the present issue (dated the 21st inst.) to see who the successful competitor was, but instead thereof, was *much* surprised to find that the announcement was still continued slightly altered, part being left out, and the date for sending in altered from *June* 12 *to July* 10. I find on referring to my number for last week (June 14) that it was first altered in that number, but escaped my notice. I cannot understand this, as it is manifestly unjust, the time being limited by the original and subsequent notice *to the* 12*th of June*. All papers received *after* that date would therefore be disqualified, *and could not be accepted in competition*. The continuing of the notice, I must think, cannot be otherwise than by mistake, and I shall therefore be glad to hear from you that it is so, otherwise I am afraid your subscribers and readers will lose all faith in your paper and the competitions you have, or may in future announce. I propose to send a copy of this letter to the photographic papers, and in the meantime await your reply, which I hope you will favour me with at your earliest convenience.—I am, &c. &c."

To this communication I received no reply, although I enclosed a stamp for same. The whole affair from beginning to end has been conducted in such a manner as to give great cause for discontentment, and certainly is a disgrace to the paper. I therefore agree entirely with Mr. Dallas in saying that "Photographers should be warned not to waste their time and brains over a competition of this kind, where they have no assurance that the judge who is to decide is acquainted with the subject, and is above all suspicion of partiality and unfairness."—I am, yours, &c.,

WILLIAM OUIN,
Certificated in Photography by the City and Guilds of London Technical Institute.

P.S.—The following is a copy of the answer sent:—

"(*a*). For illustrating books and papers; (*b*) As a means (by the aid of the optical lantern) of illustrating educational and scientific papers and lectures; (*c*) For obtaining permanent pictures of ancient buildings, monuments, old documents, and other archæological antiquities, &c.; (*d*) As a pleasant and instructive means of illustrating a holiday in the country or a tour abroad; (*e*) The creating of a higher standard of knowledge in pictorial art, as exhibited by pictures taken direct from nature, instantaneously or otherwise.

Waverley-road, Park-lane, Tottenham, Middlesex, August 19, 1890.

[But, Messrs. Smith & Ouin, you have both omitted a most important use of photography, viz., the taking of *portraits*. This surely ought not to have been forgotten.—ED.]

THE FOCUS OF PHOTOGRAPHIC LENSES.

To the EDITOR.

SIR,—In the number of your JOURNAL issued January 31, 1890, I notice a communication to the Photographic Society of Great Britain by Sir David Salomans, Bart., entitled, *The Distance beyond which all Objects will be in Focus with any given Lens.*

I cannot understand upon what he bases his calculation of the distances contained in his table, excepting the formula given in the beginning of his paper, and I have been unable to see how he derives this formula.

After making a number of calculations and verifying them by a series of experiments, I arrived at the conclusions set forth in the enclosed paper, published in the *Journal of the Franklin Institute*, and as they differ from those of the communication above referred to, I send the paper, hoping that it may receive criticism, for while I feel that the points that I have made in my paper are correct, still it is by the interchange of ideas that we learn.—I am, yours, &c.,

Cheyney, Pa., U.S.A. W. A. CHEYNEY.

CONSTANT FOCUS AND DEPTH OF FOCUS IN PHOTOGRAPHIC LENSES.

Since the introduction of detective cameras we have heard and read much about lenses having a fixed or constant focus for all objects at all distances from the lens, from four feet upward, and this has led to claims being made, for the lenses of different manufacturers, which have been surprising and at variance with all known laws of optics. This condition of affairs induced me to make a series of experiments, with a number of lenses made by different manufacturers, in order to convince myself as to what extent these statements could be relied upon. The result of which I give you, as follows:—

There is no such thing as a constant focus for any lens; the plane of absolute sharpness varies for every point, at which the object may be, between an infinitely distant point and the lens.

That there is a plane of absolute sharpness in all well-corrected lenses there can be no question, and the determination of this plane only depends upon the extent to which the image on the ground glass is magnified.

There is, however, a distance through which the ground glass may be moved, and yet the error in the sharpness of the image cannot be detected by the human eye, this distance varies inversely as the ratio of the diameter of the aperture of the lens (the diameter of the opening in the diaphragm used) to the equivalent focus of the lens (the distance from the optical centre of the lens to the ground glass, when an object infinitely distant would give an absolutely sharp image).

This grows out of the fact that the human eye cannot detect an error in sharpness, when the error is not greater than one two hundred and fiftieth part of an inch.

To illustrate this I present Fig. 1.

Here we have the cone of light from a lens working with an aperture of *f*-8 represented by the lines *b d* and *b e*, and the position of the plane of absolute sharpness by the line *a b c* (being the position of the ground glass). Now when the ground glass is pushed up to the position indicated by the line *f g h i*, we have what would be a mathematical point at *b* increased to a blurred spot having a diameter represented by the line *g h*, and whenever the length of this

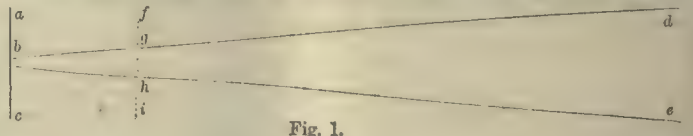


Fig. 1.

line *g h* is one two hundred and fiftieth part of an inch or less, it will be impossible for the unaided human eye to detect the error.

But I stated before that this movement of the ground glass varies inversely as the ratio of the diameter of the aperture of the lens to the equivalent focus thereof, and in order to show this I will call your attention to Fig. 2 given below.

In this figure we have the cone of light from a lens working with an aperture of *f*-16, and the conditions are the same as in the former example, excepting



Fig. 2.

that while the line *g' h'* is equal to the line *g h*, it will be twice as far from the point *b'* as *g h* was from the point *b*.

Now these conditions are true for a point back of the ground glass.

Here let me say that this distance from the point in front of the ground glass to the one behind it, between which the error in sharpness is inappreciable, gives rise to what is known as depth of focus in a lens, which is here shown to vary according to the ratio between the diameter of the aperture and the equivalent focus of the lens, and which depends for its existence upon the inability of the human eye to detect the error.

This accounts for the fact that our beautiful little negative, in which we have taken advantage of all the depth of focus of our lens, when it comes to be enlarged gives an unsatisfactory picture. Why? Because we have enlarged the error of focus until the eye is able to detect it.

Still, there are some of us who do not desire to make enlargements from our negatives, and for the benefit of those I will go further with the results of my experiments.

I found the following rule to be true by actual experiment with lenses of nine of the most reliable manufacturers, as well as by computation:—

Multiply the diameter of the aperture of a lens by the equivalent focus thereof; divide the product by the greatest imperceptible error, and to the quotient add the equivalent focus. The sum will be the distance of an object upon which a lens should be accurately focussed in order that all objects beyond a point one-half of the above distance shall be apparently in focus.

Thus let *f* equal the equivalent focus, *a* equal the diameter of aperture, and *e* equal the greatest allowable error; then *d* will equal the distance of an object upon which, if the lens be accurately focussed, all objects beyond *d*-2 will apparently be in focus:

$$\frac{a \times f}{e} + f = d;$$

Or, say we are using a lens with an equivalent focus of eight inches and the *f*-8 diaphragm, then we have

$$\frac{1 \times 8}{\frac{1}{125}} + 8 = 2008 \text{ inches} = 167 \text{ feet } 4 \text{ inches.}$$

Now, if we focus upon an object 167 feet 4 inches from the lens, all objects beyond 83 feet 8 inches will be in apparent focus.

Or again, if we use a lens, the equivalent focus of which is four inches, and use the *f* 16 diaphragm, we have

$$\frac{4 \times 4}{\frac{1}{125}} + 4 = 254 \text{ inches} = 21 \text{ feet } 2 \text{ inches.}$$

And here, if we focus on an object 21 feet 2 inches from the lens, then all objects beyond 10 feet 7 inches will apparently be in focus.

As the result of the foregoing, I give the following table :—

Equivalent Focus in Inches.	Diaphragm.	Distance of Object Focussed upon.		All Objects in Focus beyond.	
		ft.	in.	ft.	in.
8	*f*-8	167	4	83	8
8	*f* 11·31	125	8	62	10
8	*f*-16	84	0	42	0
7	*f*-8	126	1½	63	0½
7	*f* 11·31	94	8¼	47	4½
7	*f*-16	63	4½	31	8½
6	*f*-8	94	3	47	1½
6	*f* 11·31	70	9½	35	4½
6	*f*-16	47	4½	23	8½
5	*f*-8	65	6½	32	9½
5	*f* 11·31	49	3½	24	7½
5	*f*-16	32	11½	16	5½
4	*f*-8	42	0	21	0
4	*f* 11·31	31	3	15	7½
4	*f*-16	21	2	10	7
3	*f*-8	23	8½	11	10½
3	*f* 11·31	17	10½	8	11½
3	*f* 16	11	11½	5	11½
2	*f*-8	10	7	5	3½
2	*f* 11·31	7	11½	3	11½
2	*f*-16	5	4½	2	8½

By an examination of the foregoing table, two facts are seen: (1) That, while the lens is shortened in an arithmetical progression, the distance of the object in focus decreases geometrically, thus showing the reason that short-focus lenses have a greater depth of focus than those of long focus; and (2) that the distance to the object in focus decreases directly as the diameter of the diaphragm is smaller, thus demonstrating the cause of the increase of depth of focus by the use of smaller diaphragms.

And, finally, you should know that the lenses used in these experiments were of the kinds known as rectilinear or moderate angle, wide angle and landscape, or single combination lenses.

Chemistry, Pa., October 10, 1889. WILLIAM A. CHEYNEY.

PRINTING UNDER COLOURED GLASS.

To the EDITOR.

SIR,—From Mr. W. E. Debenham's paper—*On Quick and Slow Printing, and the Use of Coloured Mediums*—it appears that his experiments have revealed the exact opposite results with home-sensitised papers to those which have been obtained by a good number of experienced workers that have recently tried printing under green glass on ready-sensitised paper of commercial manufacture. With the latter paper the green light has been clearly proved to produce the following effects :—

When using a thin negative, it not only increases the detail to a surprising degree, leaving the whites pure, but it also increases the brilliancy and richness of the print. Moreover, the principal advantage derived from the use of green glass is the pleasing black tones which have been so long aimed at, and the ease with which these can be produced. If the green glass gives opposite results on home-sensitised paper, and refuses to produce rich black tones, so much the worse for the home-made article. The *essence* of Mr. Debenham's experiments is, therefore, that it is practically impossible to obtain good black tones on home-sensitised papers with the same ease as it can be done on ready-sensitised paper.

To illustrate the successful results of the green-glass process on the latter paper, I enclose some prints out of several hundreds of equal specimens that have been already distributed.—I am, yours, &c.,

31, *Brayfield-road, Clapham-road, S.W.* OTTO SCHÖLZIG.

[In the specimens which accompany the above there is certainly a well-marked distinction between the tones of the prints, those stated to have been printed under coloured glass being of a rich, dark tone.—ED.]

PREPARING PLATES FOR ENGRAVERS.

To the EDITOR.

SIR,—In your issue of August 15th you publish a specification of "Joseph Malloch," in which this would be patentee claims the invention of "a glass plate, or other transparent substance, coated with a non-actinic film, and used as a negative for photographic and other purposes." You, Mr. Editor, append a note: "It is rather a pity that this invention comes so late." Well, sir, it is only another exemplification of the old adage that there is nothing new under the sun, and with so many instances of re-invention of old ideas before you, you will not be greatly surprised to hear that the idea is almost as old as photography itself, and certainly as old as the zinco process, for which, in my business, I find it most useful. I would recommend Mr. Malloch not to waste his money further in enriching the Patent Office with no benefit to himself. I am in a position to inform him that "a glass plate, or other transparent substance, coated with a non-actinic film, which may be further coated with, or have incorporated with it substances sensitive to light, all as hereinbefore described," was used by Mr. John Leitch, one of the pioneers of the photo-zinco process. This was a collodion film, but it will be seen that such a film comes well within the conditions of Mr. Malloch's claim. Further, the same process has been used for many years by a Mr. Hancock, who is, or was, connected with the comic periodical, *Moonshine*. Again, I can state that experiments were successfully made by Messrs. Brown, Barnes, and Bell, of Liverpool, long before Malloch's application. These, I admit, are all dealing with collodion films, while Mr. Malloch's plate is coated with a pigment. But even this is not new. The idea has been well known among French photographers for some years, and there is an existing patent in Belgium, while Professor Husnik has published the same idea from his Austrian studio. Several processes of the kind have been described by Colonel Waterhouse, of the Indian Ordnance Survey, years ago. I myself have made some hundreds of experiments in this direction, and have made plates on the same lines and, as I imagine, with the same materials as Malloch's, which in a comparative test by an experienced artist were held to be better. Mr. Malloch has not, in fact, succeeded in overcoming the difficulty which was the stumbling-block of my early experiments—viz., the avoidance of chipping in the cross-hatching. I fear the subject is not sufficiently interesting to the general reader to go into details, but I trust that any one who wishes to use this process will not be deterred by the fear of this claim standing in the way. If Mr. Malloch were to put his plates on the market at a reasonable price he might do some business with those who prefer things ready to hand, but to charge 3*d.* (or is it 5*d.*, Mr. Editor?—I forget) for a quarter-plate negative glass smeared with a dab of paint is playing it low down on the amateur or professional who accepts his invention as the realisation of a "long-felt want."—I am, yours, &c., W. G.

London, August 20, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Five years' BRITISH JOURNAL OF PHOTOGRAPHY, 1873 to 1877, clean and well-bound; wanted in exchange, 5×5 or half-plate lens of rapid symmetrical type.—Address, BERNARD GREEN, Cockermouth.

Cabinet lens by Vogel, three and a quarter inch diameter, nine-inch focus, just as new; exchange for good studio camera stand to take half-plate camera.—Address, HOUSTON, Photographer, Caroline-street, Cardiff.

Will exchange the following for a good magic lantern:—Head rest, two printing frames, quarter-plate negative box, and about fifty odd numbers of journals.—Address, H. FLETCHER, 267, Friern-road, East Dulwich, London, S.E.

Will exchange fifty ruby vignette glasses (C.-D.-V.), half-plate camera, 10×8 camera, Watson's snap shutter, carved oak flower stand, pedestal, and tripod stand, for good whole-plate studio camera or lens.—Address, R., 35, New-street, Ashford, Kent.

Wanted, microscope in exchange for 12×10 studio camera, lens, one slide, with carriers down to quarter-plate, or half-plate portable camera, lens, one double slide, by Lancaster, studio quarter-plate camera and lens, whole-plate burnisher, lantern, and other things.—Address, S. WILKIE, 35, Richmond-road, Dalston, E.

Will exchange mahogany box camera, one single dark slide, about 10×8, with whole-plate, half-plate, and quarter-plate carriers, for quarter-plate Lerebour or other good lens, also single condensing lens, unmounted, fourteen-inch diameter, for half-plate French or other portrait lens.—Address, W. H., 2, Cumberland-road, Hanwell, W.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

STUDIO.—Light green or dark blue calico blinds will be the best for your studio.

S. W.—The dark slides are at fault; light gains access through the rabbet of the shutter.

R. W. (Liverpool.)—Apply to the Westminster Fire Office; they have, we believe, a very liberal tariff for photographers' risks.

T. LANGTON.—We have communicated with the advertiser complained of, and he informs us that he has now forwarded your enlargement.

C. BANYARD.—1. Try a single lens of eighteen inches focus.—2. The eikonogen formula given on page 645 of current ALMANAC will answer your purpose.

W. HOOPER.—We shall be pleased to see you any Tuesday or Wednesday forenoon. We will then talk over the abnormal deposit on the wax paper and negative.

E. H. EARL.—The dark spots on the prints proceed from blisters. If you carefully examine them you will find the albumen is detached from the paper in those parts. The remedy is to avoid the blisters, and the trouble will cease.

S. J. H.—In photographing the collection of china a great advantage will accrue from the employment of orthochromatised plates if a pale colour screen be used. The orthochromatising solution referred to will answer the purpose admirably.

PARSON.—If the paper becomes decidedly brown within a few hours after sensitising, and the bath upon which it is floated is acid, it is evident that the paper is faulty. Obtain a fresh sample and see how that behaves under the same conditions.

C. STORY.—There is no fault in the lens; your difficulty is with the camera; it does not expand sufficiently. To copy a picture the same size as the original, the camera must be capable of expansion to twice the equivalent focus of the lens employed.

49.—1. We have not tried the method, and we do not see why the prints should change as stated with such treatment. We fancy you have omitted something else.—2. Simply deep toning with suitable negatives. The tones depend more upon the character of negative than upon formulæ.

A. C. says: "I have heard that faded prints can be restored by immersing them in a solution of bichloride of mercury; is this a fact, and, if so, why is this method of restoration not generally adopted?"—It is not a fact that treatment with bichloride of mercury will restore totally faded pictures; it will remove the yellowness, but it will not bring out any details that have entirely disappeared.

A. Y. E.—1. If the sensitised paper is coloured to the extent shown in the piece forwarded it will be quite useless to attempt to get brilliant prints upon it, whatever toning bath may be employed. The paper is quite useless. —2. If there is a dark deposit at the bottom of the solution its not toning is easily accounted for—the gold has become precipitated.—3. Better make up a fresh solution.

C. A. J. says he has spilt some methylated spirit over a camera and did not detect what had happened till some time afterwards. He says where the spirit touched, the polish is completely destroyed, and asks what can be done with it. The camera will have to be repolished. Unless C. A. J. is capable of doing this himself it had better be placed in the hands of a French polisher to do the needful.

J. MARSHALL.—Before commencing the erection of the studio, plans will, no doubt, have to be submitted to the local authorities. We make this remark because the building will be very conspicuous on the street frontage, and some modifications may be required by the local board. The design, as shown in the sketch, for the studio proper is all right, though perhaps a little less glass in the roof on the east side would be an improvement.

W. M.—There is no work now in print devoted entirely to posing. The work referred to is not, so far as we are aware, published in England; but it may be procured through any of the foreign booksellers. Fifteen grains of chloride of gold and one ounce of tungstate of soda in fifteen ounces of water would be too strong a solution to use for toning. The proportions are good if they be reduced so that fifteen ounces of water contain only two grains of the gold and a proportionate quantity of the tungstate.

A SILVER PRINTER says: "I shall be glad if you can tell me, through your JOURNAL, the proportions and the flux to use for reducing burnt silver paper cuttings and chloride of silver (washings) to a metal state."—The best flux to use for mixed residues is equal parts of carbonate of potash and carbonate of soda. The same weight of flux as residue should be taken and intimately mixed before placing in the crucible. If while firing and the heat is strongest the contents of the pot appears thick and pasty, a small lump or two of nitrate of potash may be dropped in very cautiously.

AMATEUR writes as follows: "I have lately been experimenting with fuming albumenised paper previous to printing, and like the results very much; the only drawback is that the prints do not redden in the washing water previous to toning, and consequently there is great difficulty in telling when the prints are sufficiently toned. Can you tell me any remedy for this? I do not like using either salt or acetic acid in the last washing water before toning, as it so much prolongs the toning and takes more gold."—The best plan is to immerse the prints in a dilute solution of salt in water if the toning cannot be judged without. This treatment does not materially prolong the time of toning, and if the prints do take more gold (?) that should be conducive to permanency.

SERENO writes: "I have nearly a gallon of old negative nitrate of silver bath; having no use for it, I wish to utilise it as a printing bath for albumenised paper. Would you please tell me how I can do that; how to get rid of the iodides, &c.?"—Here is a method given by Mr. F. G. Eliot many years ago which answers very well:—Take a solution of citric acid—sixteen grains to the ounce of water—and add to the bath in the proportion of one drachm to each eight ounces of solution; shake well, and then put in a piece of blue litmus paper, which will become reddened; next add liquor ammonia drop by drop, with constant shaking, until the blue colour of the paper is permanently restored; filter, and then acidify with nitric acid; afterwards add nitrate of silver to make up the strength required.

MECHANIC.—If the bitumen will not dissolve in benzole it is quite useless for photographic purposes. Have you really got bitumen?

W. G. writes: "*Thymoquinone.*—I have an entry in my note-book, copied, I believe, from your JOURNAL, that this substance, 'which is now manufactured commercially in large quantities, is more sensitive than bitumen.' That was all the information vouchsafed. I have tried to obtain it in London, and it can neither be made, say the wholesale chemists, nor obtained anywhere in England, but can be procured from Berlin in not less quantity than one gramme, which would cost 7*s.* 6*d.* Can you say (1) whether this is a fair price? (2) whether it is a fact that it cannot be made in the ordinary course of business? (3) whether there is a mistake as to its being obtainable in London? (4) whether in any case it has sufficient advantage over bitumen to render it worth trying?"—Perhaps some reader will kindly afford the information desired.

J. O. D. says: "1. Would you please inform me, in your 'Answers to Correspondents,' what is the cause of the iron and oxalate developer precipitating? Sometimes I get along well enough with it, and then, with everything exactly the same, it, what the ladies would call, 'turns.' I always use five parts of oxalate to one of iron. I might mention that the solutions fresh made to-day served me just the same. Does the iron 'go bad' while in crystals?—2. I should also like to know what is the best way of getting the yellow precipitate off the dishes; it sticks worse than any glue to the ebonite trays."—1. The only way we can account for the difficulty is that sometimes our correspondent adds the oxalate solution to the iron instead of the iron to the oxalate. Supposing both solutions to be saturated it would be better to increase the proportion of the oxalate. Any change in the crystals would not account for the trouble.—2. Clean the dishes with dilute hydrochloric acid.

DAGUERRE'S MONUMENT IN AMERICA.

IT says very much for the pluck and enterprise of American photographers that they determined to make a monument to Daguerre that would keep his name—as one of the great initial forces in photography—ever fresh before the citizens of the New World. After selecting a design, the cost of executing which was to be somewhere about six thousand dollars, subscriptions were appealed for, and, to the honour of the country, came in rapidly. The memorial was meanwhile being proceeded with.

The *locale* of the Daguerre monument is in Washington D.C., in which lordly city the Photographers' Convention has this year been held, under the presidency of Mr. J. M. Appleton. No time was lost in having all in readiness for the Convention, and one day was set aside to be exclusively devoted to giving honour to the illustrious Frenchman. Indeed, the unveiling of the monument thus prepared seems to have been considered as the great event of the Convention. The work (granite and bronze) was designed and modelled by the sculptor, Mr. J. Scott Hartley, New York. It stands sixteen feet high, and is placed in the Rotunda of the National Museum.

That everything was carried out successfully the following cablegram from Mr. J. M. Appleton, the President of the Convention, attests:—

"Daguerre unveiled; grand success. Association sends greetings.
"APPLETON, *President.*"

We have here merely to say that we admire the pluck displayed by our American brothers in doing that which ought to have been done long ere now in Europe.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, August 27, *Printing under Coloured Media*; September 3, *Supplementary Exposures.* Monthly Saturday outing, August 30, at Pinner. Train from Baker-street at twenty-six minutes past two.

EFFECT OF THE RISE IN PRICE OF SILVER.—Mr. Otto Schölzig writes: "Owing to the continued rise in price of silver nitrate, I find I am unable to maintain the old prices, and have been obliged to raise the prices of my sensitised papers by 10*s.* per ream. The successful results obtained by printing on my paper through green glass has created such an enormous demand that I have to apologise if at times a trifling delay in the execution of orders takes place. The price of Dr. Jacoby's platinum paper has also been raised from 2*s.* to 2*s.* 6*d.* per sheet, owing to the high price of platinum salts."

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1582. Vol. XXXVII.—AUGUST 29, 1890.

WET COLLODION STANDARD OF SENSITIVENESS.

From what is constantly appearing in photographic literature, with reference to the relative rapidity of gelatine and collodion plates, it would appear in the minds of many that the collodion process is a far slower one than it is, or, to speak in the past tense, was. When one sees dry plates estimated at several hundreds of times the sensitiveness of wet collodion, it naturally raises a smile in those familiar with the working of that process. The majority of those who have taken up photography only during the present decade (and this includes many who profess to write authoritatively on the subject) really have no conception of what was, and can be, achieved with wet plates; and, moreover, they seem to consider the sensitiveness of wet collodion as being a definite and constant quantity. Let us deal with the former point first, by asking the following question:—

What has been achieved with gelatine plates that was not accomplished, long prior to their introduction, with collodion? Instantaneous street views, both in London and in Paris, were taken by Mr. W. England and Mr. Valentine Blanchard something like a quarter of a century ago which were quite as sharp and perfect as any that have been done since. These pictures, it is true, were only of the stereoscopic size. But we well remember a 12 × 10, taken direct, of the Quadrant, Regent-street, more than thirty years ago, which was as fully exposed and quite as sharp as any that have been produced recently on dry plates. The spokes of the wheels of the vehicles in motion were sharply defined, while the upraised feet of pedestrians hurrying across the roadway were quite sharp. Again, the animals at the "Zoo" were photographed both by Mr. Frank Haes and Mr. F. York, as well as others, with wet collodion, and these pictures have not yet been surpassed. The methods by which the exposures were made—in these days of elaborate and complicated shutters—might possibly be considered primitive, yet the results did not suffer.

It is true that all these pictures were taken with lenses of the portrait type, which, if worked with their full aperture, would represent *f*-3½ or *f*-4. Yet who at the present time would attempt such subjects, even with the most rapid plates, with an aperture much less than *f*-8? This would be equal to an exposure of only four or six times that required with the full opening of the portrait combinations, if it were used. Again, Mr. G. W. Wilson about the same time produced some excellent seascapes, with breaking waves, and he employed the old-fashioned single landscape lens, with a much smaller aperture than that with which the single lenses of recent makes are provided. Mr. Wilson's instantaneous shutter was simply his Scotch bonnet used with dexterity. With these facts before them, modern photographers will see that some writers have, from lack of knowledge on the subject, either very much underrated the rapidity of collodion plates, or enormously exaggerated the sensibility of gelatine ones.

With regard to the "sensitiveness of wet collodion," which is quoted as a standard for comparison with dry plates, often by those who have never in their lives seen a wet plate, either prepared or developed, every old collodion worker knows quite well that plates by this process can be made to vary in sensibility nearly or quite as much as by the gelatine simply by preparing the plate under different conditions. For example, the highest possible sensitiveness is, perhaps, attained by employing a neutral silver bath, or one slightly verging on alkalinity, and a simply iodised collodion made with the purest materials and iodised immediately before using, the developer being pyrogallic acid restrained with acetic acid. By the way, it may be mentioned that the large street view just referred to was obtained under these conditions. If, however, the same collodion were kept a week or two after iodising, and the bath acidified with nitric acid, the exposure might have to be increased twenty or thirty-fold. With the chemicals in the delicate equilibrium just mentioned great care and experience was necessary to retain them in that condition, and any variation affected the rapidity of the plate.

With bromo-iodised collodion an acid bath could be employed, and an iron developer used in place of the pyrogallic acid. Yet then the plates varied very considerably under different conditions. Some collodion, even when freshly iodised, gave much more rapid plates than others, while the condition of the bath and its temperature had a marked influence upon the sensibility. So also had the developer, its strength, temperature, and method of using it.

Hence it will be seen that although a given dry plate may be twenty or thirty times as sensitive as one collodion plate, yet it may be but twice, or even less, the rapidity of another. A degree of sensitiveness amounting to fifty or sixty, and quite recently several hundred, times that of wet collodion has been claimed, and without doubt collodion plates could be prepared to substantiate the claim, although, on the other hand, collodion plates can be prepared which would prove that the claims were utterly untenable.

On many former occasions we have strongly protested against the absurdity of the sensitiveness of wet collodion being taken as a standard by which to compare gelatine plates, and we do so once more. "Wet collodion" is about as definite a term as would be the strength of a solution described as, a lump of salt in a jug of water.

RECOVERING FOGGED PLATES.

It not unfrequently happens that a plate, or plates, in the hurry of a busy studio become fogged by the action of light reaching them accidentally, as from the untimely opening of the dark-room door, or from carelessness in not closing the lid of a plate box. The question is frequently asked, Can such

plates by any treatment be restored to their original state and rendered available for use? Another question we have more than once been asked to answer is, Whether a plate that has been exposed in the camera can have its image so completely removed as to be rendered fit to receive another exposure? The two questions, though involving the same theoretical points, require to be considered differently in a practical sense, and though both may be answered in the affirmative, it remains to be decided whether the game is worth the candle.

The mere removal of the invisible image, or, what amounts to the same thing, the destruction of the light's action upon the sensitive film, if considered independently of the effect of the necessary treatment in other ways upon the film, is a very simple matter. Captain Abney showed, a dozen years ago, that any of the powerful oxidising agents would effect this end, specially singling out for the purpose nitric acid, potassium bichromate, potassium permanganate, and ozone. To these might be added many more, perhaps the most powerful being chromic acid and hydroxyl, or peroxide of hydrogen. Another class of substances may also be mentioned as distinct from oxidising agents, as, for instance, the hydrogen acids of the halogens, as well as some of their salts of the dyad metals, for whose metal the halogen has a less affinity than for silver. Thus, hydrochloric, hydrobromic, and hydriodic acids, as well as their ferric, cupric, mercuric, and zinc salts, with perhaps some others, will all, when allowed to act upon a theoretically pure film of silver bromide, destroy any effect that may have been produced by the impact of light, and restore the surface to its original condition of impressibility. In the very earliest days of photography it was attempted to found a direct positive process upon this principle; a sensitive surface was first exposed to light to produce the maximum effect of reduction, and was then submitted to treatment which caused it, on being again exposed, to evolve iodine or its equivalent, which in turn caused the destruction of the impression already formed. In this manner, by exposure to light in the camera or under a transparency, the exposed portions became bleached, and so a positive image was formed.

But when we come to deal with an ordinary photographic film as distinguished from the theoretically pure layer of silver bromide, we encounter complicating circumstances that interfere materially with the practical application of the principle; hence, without doubt, the fact that the direct positive process never came into use. It is not only that the silver salts probably form compounds with the organic matter forming their support, whether it be paper, collodion, or gelatine, but the action of the oxidising or other agents upon those substances limits the capability of their application.

A very wide difference also exists between the action, respectively, of what are called physical and chemical developers; in other words, between those which form the image by depositing silver upon the impressed film and those which reduce the metal contained *in* the film. Thus if we take, for instance, a wet collodion plate developed with iron and, without fixing it, treat it with moderately strong nitric acid, the metallic image will be entirely dissolved, and the plate restored to its original appearance before exposure; for the most careful examination fails to detect the faintest remnant of any image. After such drastic treatment, if carried out in the dark room, it might reasonably be imagined that not only had the visible image been removed, but that all previous effect of light had been destroyed. If, however, after careful washing we re-apply the ron developing solution with a few drops of silver added, the image will reappear in its original vigour, and this may be repeated over and over again.

But if after the removal of the first image by means of nitric acid the plate be thoroughly washed and treated with alkaline pyro, hydroquinone, or eikonogen, or with ferrous oxalate, we find no such reproduction of the first image, showing that the action, in this respect at least, of the two classes of developers is entirely different. The difference may be well shown in the familiar method of reproducing negatives by what is known as the nitric acid process. This, as our readers are aware, consists in printing a *positive* from the negative to be duplicated upon a bromised collodion plate, and developing it rather fully by means of any of the "chemical" forms of developer. Without fixing, the positive image is dissolved away by means of nitric acid or other suitable agent, and a negative impression is left in which the lights are formed of unaltered silver bromide, and the shadows represent more or less transparent glass when the metal forming the original image has been removed. If this plate be now well washed and treated this time with an iron and silver developer, the positive image will reappear as before, and may be removed a second time. If the plate be exposed for a brief period to light before the second exposure, the whole surface will be blackened by the second application; but upon repeating the treatment with nitric acid, the negative image in bromide of silver will be restored in all its beauty, and a third application of a *chemical* developer will reduce the metal and form a negative suitable for printing purposes.

In considering the possible means, then, of counteracting the effects of accidental exposure to light, we must, therefore, take into consideration this difference in the respective actions of the two kinds of developer as well as the chances of any possible injury to the films themselves by the agents employed. With collodion films the latter danger is far less than with gelatine, on account of the difference in their physical characters. For instance, while collodion will stand with impunity the action of tolerably strong nitric acid, gelatine would be entirely decomposed by the same means. We may therefore look for greater difficulties in connexion with gelatine plates than with collodion.

Abney's experiments of twelve years ago were made with collodion films, and, if we remember rightly, were wholly confined to the action of chemical developers. But of the agents he employed, even under these circumstances, it was found that nitric acid was the only one that effectually prevented the development of the image, even after very protracted application; and it was doubtful whether, with sufficiently prolonged application, the developer would not have eventually proved victor in that case also. Since then chromic acid has been found to be a still more powerful destroyer of the latent image, and, employed in conjunction with one of the halogens or a haloid salt, may be said to entirely undo the action of light, so far, at any rate, as the chemical methods of development are concerned. It has even been suspected that this powerful treatment proves effective in preventing the action of the physical developer, but on this point it cannot be decidedly said that the fact is proved. However, as for practical purposes with gelatine negatives that form of development is never used, and even for intensifying it is seldom resorted to, we may leave the further discussion of the point.

In the practical application of this mode of recovering fogged plates, the capabilities of the agent as a light destroyer are, as has been hinted, limited by its action upon the organic film. Thus in using chromic acid *per se* we dare not employ it of

such strength as to act speedily and thoroughly, for fear that it will raise the film from the glass. It is necessary, therefore, to apply it in a very dilute state, and to allow sufficient time for it to act thoroughly. The desired effect is considerably increased, as has been already said, by the addition of hydrobromic acid or a soluble bromide, and the following formula will be found to provide a safe and efficient solution.

Chromic acid	30 grains.
Bromide of potassium	60 ,,
Water	10 ounces.

The plates to be treated are immersed for five minutes in this solution and subsequently very thoroughly washed before being reared up to dry.

Perhaps a more generally useful solution, because safer as well as easier to compound, is one in which bichromate of potash and hydrobromic acid are combined. If hydrobromic acid is not obtainable, hydrochloric acid or a soluble bromide may be used; in the last case a few drops of sulphuric acid being added to the solution.

Bichromate of potash	1 ounce.
Hydrobromic acid (sp. gr. 1400)	2 drachms.
Water	10 ounces.

Apply this in the same way as the foregoing.

It is needless to say that plates submitted to this treatment are far less sensitive than they were originally, the difference being proportionately greater with the more rapid kinds. But if after thoroughly removing all traces of the chromic solution the films be bathed in one of the numerous alkaline orthochromatising solutions, the sensitiveness will be greatly enhanced. Even a plain alkaline solution not too strong will have a beneficial effect in this direction.

In the case of plates that have received camera exposures, either of the formulæ given above may be used unaltered and allowed to act for a considerable time. No substitution of hydrochloric acid for the hydrobromic is then permissible.

A NEW PHASE OF PHOTOGRAPHY AND ART.

We heard the remark a short time back of a well-known painter to the effect that "amateur photographers are the best friends the artist has." This is complimentary to the amateur as distinguished from the professional photographer, or, at least, would seem so at first sight; but in giving his reasons for his opinion the speaker rather discounted the value of the praise. "They rarely know what they are doing, and their pictures are almost invariably over or under-exposed, producing effects of atmosphere, and of light and shade, that *the painter can obtain nowhere else.*" Such was the explanation given of this sudden appreciation of the amateur photographer on the part of the disciple of the brush, and possibly it may cause some of the more thoughtful of the "camera men" to meditate.

That many painters, both of figure and landscape subjects, now utilise photography very largely without, as formerly, endeavouring to hide the fact is well known, and we may therefore assume that the art, if not its practitioners, is a real help. But it is a somewhat dubious expression of opinion to assert that the photographer himself is only useful when he fails to use his tools properly. The artist referred to must surely have met and mixed with, and had the assistance of, a rather bad example of the amateur photographer, if his experience with regard to under and over-exposure be correctly stated; or, perhaps, his own judgment in attributing the effects he admires to the causes given may be at fault. Certainly some of the finest atmospheric effects produced by modern painters, notably those of Vicat Cole, remind one irresistibly of a photograph in their delicacy and truth to nature, but it is scarcely to a bad photograph that a practical man would look for the best rendering of nature. Happy results, it is true, are occasionally secured by curious means or by accident, as in the case of Mr. McLeish's medal picture of some years back, *A Misty Morning on the Wear*, in which the mist was really caused by the strong glare of the mid-day sun. The effect, however, was perfect, though, perhaps, it would not have been easy to repeat it under similar conditions.

There are careless ones amongst our amateur ranks, just as there are "daubers" amongst the painters, but we think the general body of them deserve a better character than our artist would grant them. The thoughtful amateur photographer on his side may, perhaps, deem that the art (!) of the painter who has to resort to bad photographs for effects that he "cannot obtain anywhere else" must be of a rather degraded kind, and that the patronage and good opinion of such an artist is scarcely worth the having.

STUDIO ACCESSORIES.

A FAMILY portrait album, besides conveying, as it has been cynically observed, so many object lessons in human vanity, has other and pleasanter uses at which it would be dangerous to carp without exposing one's self to different varieties of unfavourable retort. We were recently glancing through such a collection of photographic portraits which extended over three generations, and, as most of our readers would no doubt have been, were highly interested in remarking the changes of costume, modes of dressing the hair, articles of personal adornment, &c., which had taken place during the time covered. It is only on occasions like this that one acquires more than a glimmering notion of the immense utility which photography will have for those who will one day write the history of the men, modes, and manners of the second half of this century.

Independently of these and kindred considerations, however, such a collection of portraits could not easily fail to be of more than passing interest from several purely photographic points of view: the sizes and styles of the pictures, the skilful posing of the sitters, or, maybe, the lack of it—one or other of which every portrait unerringly proclaims to us—the degree of fugacity betrayed by various examples of silver printing, the remarkable permanency of others, the quality of the retouching; these and many more questions would, under such circumstances, inevitably present themselves to an observant mind. The most prominent matter, nevertheless, that came before us on the occasion alluded to was one which it is safe to assume usually escapes the notice even of many photographers themselves—we mean the accessories appearing in the pictures.

Before now we have heard photographers, as a class, called conservative, and we are disposed to own that the accusation has some force. For more than a quarter of a century the studio accessories they employed seemed, from the photographed specimens before us, to have retained a perfect similarity of style, thus driving one to the conclusion that they originated from a common source, and were designed by the same person. Who cannot promptly call to mind the appearance of those balustrades, pedestals, chairs, tables, couches, &c., in all the glory of bold carving, luxurious plush, elaborate tassels, the

like of which were never seen outside the photographer's studio? Were they not among the most florid productions of the upholsterer's craft, which, when once seen and marked, were indelibly impressed on the tablets of the mind?

When we come to reflect upon the myriads of pictures in which these same ornate and garish accessories figure, there is every excuse for a shudder. They defy description or classification, for unlike Sheraton or Chippendale furniture, they cannot refer their existence to the initiative canons of any particular school of design; they are simply lamentable survivals of the artistic deluge which swept over the land just subsequent to the Great Exhibition, and dissolved numerous false and clumsy ideas out of the brains of those who catered for the adornment of the dwelling house.

As a broad principle, we believe it resists denial that if it is necessary or expedient to introduce domestic accessories into a photographic picture they should approximate with tolerable fidelity to such items of furniture as one sees in use among refined and educated people. But is this generally so? We are afraid not. In expressing that opinion we exclude from censure many of what we shall term the upper strata of photographers, those with well-won reputations and wealthy patronage, with whose work the cosmopolitan and the *flaneur* are acquainted, while we single out that thick seam of the profession whom the most numerous section of the community—the lower middle class—patronises and supports. These are the greatest sinners in respect of ugly, nondescript accessories, and it is with such that old usage and tradition dies so hard a death. In many studios we regret to notice that the accessories show little or no sign of progression towards good taste, and, as a consequence, the trained and educated eye is still offended by solecisms, which also mar what otherwise might be good and effective pictures. We advise photographers to renounce once and for all these effete "photographic" accessories, and replace them by articles which have a practical value of their own outside the picture. Their work, we are confident, will thereby gain in tone and character. Much of the success achieved by Mr. Byrne and others who produce at-home pictures may probably be charged to the fact that their sitters have natural, or rather home-like, surroundings; the furniture, the *bric-à-brac*, the decorations, and so forth, are in undeniable taste, and consequently will always bear scrutiny in the pictures, no matter how far æsthetics may undergo modification. Can we say as much of those portraits in which the "photographic" accessory is seen so frequently? Alas! no; for the furniture of this extraordinary school carries a lasting condemnation with it, since it succeeds in nothing but looking tawdry and theatrical.

The human being who goes to be photographed is largely at the mercy of his environments in this way. Place him in an impossible chair by the side of such a table as he never has in his own house or sees in anybody else's, or stand him near an Ionic pedestal with one hand on a mysterious volume which has tickled his curiosity, and the result defies conjecture; but, on the other hand, let him feel that his surroundings are neither grotesque nor startling, and the chances of an awkward attitude and an unhappy expression are reduced. We trust that the "photographic" accessory will soon be entirely a thing of the past. True, the styles and sizes of the pictures now chiefly in vogue usually obviate the employment of any kind of accessories, but this only serves to direct closer attention to them when they do appear in a photograph, which, as we before hinted, is all too frequent in non-publication work.

Still, the "thick seam" we have spoken of sometimes transgresses in good company. We were looking the other day at the portrait of a "celebrity," who, poor man, was taken straddle-legged on a tall "photographic" chair with his arms folded and resting on the back of it. Nothing could have been in worse taste, although the photographer in question is considered to be one of the heads of his profession. The accessory was as ugly as the pose was vulgar, and both would reflect discredit on any operator, however humble.

CERAMIC PHOTOGRAPHY.

One of the questions that frequently arises in the minds of those who have noted the rise and progress of the photographic art, in its different phases, is why ceramic photography is so much neglected. Most good processes, and this is certainly one, advance with time, though with this particular one it may be said that it is less practised now than it was formerly. Yet there are many directions in which its use might be extended, and very profitably too. Hitherto, ceramic photography has, for the most part, been associated with portraiture. As early as the fifties, M. Lafon de Camarsac was in the field with burnt-in portraits on enamel; a very little later, Mr. Joubert showed excellent work of a similar character, as well as some capital photographs vitrified on glass as transparencies. And, it must be confessed, the work done at this early date has not yet been surpassed.

Ceramic photography is not difficult, neither is it expensive, nor does its practice entail any expensive outlay for plant. With the exception of a muffle furnace, no other apparatus is necessary beyond what is found in every photographic establishment. A gas muffle, even for large sizes, is by no means an expensive affair. As we have just remarked, those who have given attention to vitreous photography have confined their labours chiefly to portraits, and those principally of small dimensions, such as miniatures on enamel for brooches, lockets, &c. However, much larger work, and very good too, has been produced on *plaques* and tiles up to twelve inches or more. It would appear that ceramic photography is more extensively worked on the Continent than it is here, if we may judge from the fact that many photographers who supply burnt-in photographs send the negatives abroad, and have the work executed there by those who work for the trade.

Portraiture would, however, probably be but a minor application of burnt-in photography if it were introduced with vigour in several other directions. Amongst others may be mentioned art decorative purposes. Vitrified copies of paintings on *plaques* and tiles would, no doubt, be extensively used in decorating where tiles of a more or less common description are now used, if they were forthcoming. Photographs might, also, be largely utilised in the embellishment of articles in every-day use. What would be more *recherché* than, say, a dinner, dessert, or tea service ornamented with artistic views, or with copies of well-known works of art. With copies of paintings the precise touch of the different artists would be preserved, which is not possible with any other method of reproduction; while, with photographs from nature, the finest possible detail would be secured, a quality sadly wanting in the views generally seen on pottery.

It is often asserted that the general public have no taste for copies of paintings, but this, we think, is totally disproved by the large sale cheap copies of them, on opal glass, have had during the last year or two. By the way, if these pictures had

been vitrified into the glass, the majority of them would now be in a far different condition from what they are.

Ceramic photography ought to find extensive employment for window decoration. Just now there is quite a rage for ornamental windows made up of small panes of stained glass. Why should not, in place of some of these, photographs—which it is needless to say can be produced in any colour—be introduced? Of the effect there is no question, and there is little doubt that if once introduced commercially a good demand would soon be created.

With regard to the methods of production there are several available, each of which is capable of yielding equally good results. There is the substitution process, though with this variation in colour is somewhat limited. There is the dusting-on, or powder process, by which any desired colour can be obtained; indeed, with it several colours—if of the same fusibility—may be employed in the one picture by applying them singly to the parts required while carefully protecting others. Then there is the "carbon" process, in which vitreous pigments are used in place of the ordinary ones. Photo-mechanical processes may also be utilised in ceramic photography. A collotype print in vitreous colour can be transferred to the ware, and its strength reinforced by dusting on more colour, which will adhere to the ink while it is moist. A large proportion of the designs on china and earthenware are printed from copper plates on to a gelatine surface and then transferred: and there is no reason why photographically engraved plates should not, for the best work, take the place of hand-engraved ones.

Without doubt there is a good future for ceramic photography in directions in which it, as yet, has not been turned to any real practical account. But who will take the initiative? Will it be photographers, or the potters and glass stainers?

The *Standard* of Tuesday last contains an account of a new submarine vessel whose powers are as marvellous as its shape is unusual. This *palla nautica* is spherical in shape, and is, of course, going to revolutionise all matters aquatic. After describing such trifles as the *palla nautica* sinking itself and thus passing underneath the hull of a vessel, coming below a plank thrown overboard and smashing it with a torpedo, diving and bringing up objects thrown into the water, and generally upsetting the usual order of things, the writer goes on to say—"Another most important matter that this submarine ball has solved is the taking of submarine photographs." We shall be interested to learn a little more of its powers in this direction, for assuredly the production of submarine photographs had not waited for the advent of the *palla nautica*, as most of our readers are aware.

Some time ago much interest was created by the statement that a plate taken out of a developing solution gave distinct flashes of light, phosphorescent in character. The cause was never explained, and the occurrence of the phenomenon itself was doubted. It may possibly, however, in its origin be allied to a somewhat similar effect described by Ernst Fahrig in the *Chemical News* of the 25th ult. This gentleman describes how, in shaking a bottle about three-quarters full of a preparation of ozone, he instantly saw, for a moment only, a soft phosphorescent glow of light floating above the surface of the liquid. He tried experiments with other substances—chlorine, &c.—in lieu of ozone, but could get no similar effect. After describing the theories to account for the light, and similar investigations made by other workers, he concludes by giving a theory which would be equally applicable to the development luminosity we refer to. "I may throw out a suggestion that the luminosity in the first case is due to a release of the energy stored up in the ozone at its creation; but I will say nothing as to its plausibility, or as to how it appears to meet the case."

In the same journal will be found a very full description of a new method for satisfactorily and easily electro-plating with platinum, the writer also stating that Professor Dudley, of the Vanderbilt University, Nashville, had devised independently a similar method for iridium plating. Unfortunately, platinum is so much dearer than it was a few months ago, its price being fast approaching that of gold, that the suggestion that it should be utilised for the plating of lens mounts and other photographic instruments will be of less value than it might have been. There is, however, no doubt that such platinum coatings would be most valuable from their unalterability in air.

A new method of measuring the intensity of light has been devised by M. Lion, who exhibited, at the French National Society for the Encouragement of Industry, what he termed a *photometric balance*, which depended upon the destructive action exerted by light upon nitrogen iodide. Our readers may remember our description some time ago of the discovery that the "spontaneous explosion of nitrogen chloride, the most violent explosive known, was seen to be caused by the action of light upon it. The present substance, the iodide, is also a most powerful explosive, but if it be made by the action of ammonia solution at 22° upon iodine, the product being kept in the liquid, there is not the slightest danger in its use. When light acts upon the substance, nitrogen is at once liberated, the intensity of the light being measured by the nitrogen set free. It it is stated that the evolution of the gas ceases instantly upon the withdrawal of the source of light."

There are many minor uses to which electricity is applied in studio work quite apart from its employment as an illuminant—from the ringing of bells to signal from one part of the premises to another to the exposing the plate in the camera; and the most handy battery for employment for these purposes is usually considered to be the familiar Leclanché. Those unaccustomed to electrical work should always purchase these batteries ready "sealed." They are but little more costly, and save a great deal of trouble, the open batteries sometimes sold being liable to a "creeping" of the solution over the rim of the jar, not to speak of evaporation of the water. Our present reason for referring to the subject, however, is to draw the attention of those interested to the "Gassner" cell. These contain no liquid at all, work quite as well as the Leclanche's and for as long a time, and are generally most handy. It has recently been stated that they can practically be used like an accumulator. The positive pole of a two-celled Bunsen is connected with the negative element of the Gassner cell, and a current sent from the carbon through the charge to the zinc for a few hours: the cell is then thoroughly renewed. It is evident that if this method answers satisfactorily the usefulness of the Gassner cells will be still further increased, and tend to put Leclanché's quite in the shade.

THE SOFTENING OF GELATINE POSITIVE PAPER FILMS.

A few days ago I happened to find some pieces of gelatino-bromide positive paper which must have been in my possession for more than four, possibly over five years, and which I remember were put on one side on account of the extreme softness of the gelatine film and its persistent tendency to dissolve or suffer abrasion during development and washing. Having in mind the question recently asked on a similar subject at a meeting of the London and Provincial Photographic Association, and a subsequent letter at page 495 of the Journal, I thought it might be interesting to once more try the paper to see if it had lost its objectionable character with time, or whether modern developers affected it in the same manner as the pyro and soda solution I had previously used with it. It has been stated that gelatine films on glass or paper which, when freshly prepared, exhibit a tendency to frilling and kindred faults become harder and lose those original characteristics if kept under suitable

conditions for any length of time. Whether such effect when observed is really due merely to the lapse of time, or to gradual alteration in the mode of development, is not quite certain, so I resolved to test my old films in a variety of ways.

At the time this particular paper came into my hands the almost universally employed alkaline form of development for positives consisted of pyro with carbonate of soda, and this I frequently, though not invariably, used. I have no recollection at the present time of the precise formula I used, if I ever strictly adhered to any definite combination of pyro and alkali, nor can I say really that the softening occurred at all with carbonate of soda. From the recent experiments it seems possible that the result may not have been produced at all with soda, for I cannot now reproduce it by that means, though easily with other developers.

I may say that in the experiments I made, the quantity of material available being small, I had to divide the paper into very small fragments, scarcely *carte-de-visite* size, and in order to test the effect of the largest number of developers, whether suitable or not for positive purposes, I confined myself almost wholly to the physical action of each solution, ignoring almost entirely in many cases the quality of picture produced. For instance, though I included in my tests various combinations in which caustic alkalies figured, I should scarcely care to employ such for actual working purposes where picture making was the aim. The exposures were all made by contact and under the same negative.

Commencing with pyro and carbonate of soda (with, of course, sulphite and bromide), the proportions of alkali were varied from five to thirty grains of the crystallised salt to the ounce of mixed developer, but in no instance was the old softening action reproduced. Even with thirty grains of carbonate of soda to the ounce and a sufficient quantity of restraining bromide to make the development slow and regular, no inconvenient results were obtained, although the weather at the time was sufficiently warm to have favoured the softening of the gelatine. Ammonia was substituted for the soda, but here, again, though employed in the caustic state and in varying proportions, the films gave no trouble at all. Next, carbonate of potash—an old favourite of mine—was used, and now the softening of the gelatine reappeared in varying degrees of intensity according to the strength of alkali employed. With five grains to the ounce the solution exerted no injurious action, but with ten grains it began to be apparent, and with twenty grains to the ounce it required the greatest care to get the print sufficiently developed and transferred to clean water.

The effect was entirely different from the swelling and wrinkling of the film that takes place with gelatine on glass, and which is commonly known as "frilling." It partook rather of a generally "rotting" or softening of the film in such a way that if touched with the finger, or if two prints were allowed to rub together, the picture was wiped away, leaving the paper perfectly clean; and in bad cases, or when the larger proportions of alkali were in use, the gelatinous surface became soft enough to run, especially from the corners where the warmth of the fingers affected it in handling the prints.

But the curious part of the behaviour resembles that mentioned by Mr. Teape in his inquiry at the London and Provincial. While in the developer the surface of the print had a soft, greasy, or slimy feel, but when removed to clean *cold* water and allowed to remain about a minute the surface became once more tough and leathery, and might be handled with impunity. On removal to the fixing bath without previous treatment with alum, the "sliminess" partly returned, though not to a sufficient extent to endanger the films if they came in contact with one another. After fixing, the greasy, slippery feel of the prints again disappeared to a great extent in washing, and entirely on the application of alum; or alum applied before fixing prevented the recurrence of the softening.

With caustic potash and caustic soda precisely similar physical results were obtained in conjunction with pyro, but the photographic results were simply valueless. With the caustic alkalies, however, the softening was persistent throughout both washing and fixing.

When hydroquinone was used instead of pyro, no softening whatever occurred with carbonate of soda, carbonate of potash, or ammonia, and with caustic soda or potash only to a slight extent, not sufficient to cause any great amount of trouble. With eikonogen the three last alkalies caused a little softening—more than with hydroquinone, though less than with pyro. From this I judge that either of the newer developing agents, especially hydroquinone, is superior to pyro for use with films possessing a tendency to softening, though I must confess that so far as positives are concerned I am not greatly enamoured of the behaviour of hydroquinone photographically.

Though most of the modern papers, whether for positive or negative purposes, are free from this defect, it is undoubtedly a fact that in hot weather the trouble of softening may arise suddenly and unexpectedly, and prove a source of great annoyance. Where this occurs, the use of alum, unfortunately, seems to have little effect, probably because having been used in hardening the films during the process of manufacture it has lost its efficacy. Under such circumstances a method of treatment that will succeed where alum fails must prove of value.

The employment of such substances as tannin and gallic acid will sometimes exercise a beneficial action by "tanning" or hardening the the gelatine film, but the former is very liable to produce a yellow stain, and if used too strong a fine grain or reticulation of the surface, which is not a desirable addition to the print under all circumstances. Gallic acid is comparatively free from these defects, but is not otherwish so efficacious in its action. For small prints I have tried a six-grain plain solution of hydroquinone with apparently good effect as the hardening agent, but whether from an economical point of view this will prove a practical remedy I cannot say. If the prints are fairly well washed after issuing from the developer, the hydroquinone solution will be capable of use for many repeated applications, and its cost would not then be great.

A very good plan to adopt where softening of the film suddenly occurs, and especially in bad cases, is to plunge the print, after as complete a washing as it will bear, into equal parts of methylated spirit and water. This will contract and harden the gelatine sufficiently to enable it to be subsequently more carefully washed, if, indeed, it do not altogether arrest the evil. In specially hot weather, and when the trouble has already developed itself, its further annoyance may be avoided by adding a suitable proportion of methylated spirit directly to the developer. By this mode of treatment development will be slightly retarded, but the softening and rotting will be entirely prevented; and should it arise in the subsequent washing—which is seldom the case—the addition of spirit as already recommended will prevent or arrest it.

A word of warning may be given in case the spirit treatment be applied immediately after fixing, or after only slight washing. Under such circumstances the effect of the spirit, in addition to its action on the gelatine, will be to throw down on the film the double hyposulphite of soda and of silver resulting from the fixing. If this salt is not thoroughly removed by careful subsequent washing, it is needless to say the print will scarcely possess any considerable chance of stability.

I would suggest a final plan for use when the paper shows any tendency to soften or dissolve in the fixing bath itself, though my trials of it are not as yet sufficiently extended to enable me to speak definitely of its value, or to give very specific directions for its use. It would seem to be equally applicable for hardening the film that has become soft in development. The method consists in adding to the fixing bath a suitable quantity of sulphate of iron, as recommended by Mr. Kennett years ago for negatives. The purpose originally intended was the clearing and intensification of the image, but for our purpose it would be the hardening action of the iron salt we should utilise, and if the alteration of colour be not objectionable in the print, it is possible a double advantage might be gained.

Before closing this article I may briefly mention gelatino-chloride paper for "printing-out," which is even more trying to use during hot weather than the ordinary developing papers, owing to the greater solubility of its layer of gelatine. Here methylated spirit is invaluable, as it may be applied with safety at any stage of the manipulations, which cannot be said of alum, or it can be added directly to the wash waters, the toning or fixing solutions. The quantity that suffices to check the softening of the gelatine is very small, and in view of the cheapness of the article it is surprising it is not more generally employed.

W. B. Bolton.

ON THE NATURE OF THE INVISIBLE IMAGE.*

Here are Scheele's own words describing the experiment, by which he proved that in the darkening of chloride of silver (=*luna cornua* = horn silver) chlorine is liberated:—

"I mixed so much of distilled water with well edulcorated horn silver as would just cover this powder. The half of this mixture I poured into a white crystal phial, exposed it to the beams of the sun, and shook it several times each day: the other half I set by in a dark place. After having exposed the one mixture during the space of two weeks, I filtered the water standing over the *luna cornua*, grown already black: I let some of this water fall by drops in a solution of silver, which was immediately precipitated into horn silver."

But his conclusions went farther than this, for "I precipitated a solution of silver by sal-ammoniac, then I edulcorated and dried the precipitate, and exposed it to the beams of the sun for the space of two weeks, when the surface of the white paper grew black, after which I stirred the powder and repeated the same several times. Hereupon I poured some caustic spirit of sal-ammoniac on this, in all appearance, black powder, and set it by for digestion. This menstruum dissolved a quantity of *luna cornua*, though some black powder remained undissolved. The powder having been washed was for the greater part dissolved by a pure acid of nitre, which by the operation acquired volatility. This solution I precipitated again by means of sal-ammoniac into horn silver. Hence it follows that the blackness which the *luna cornua* acquires from the sun's light *is silver by reduction*."

We have now either to accept Scheele's inferences or to show their fallacy, for the *onus probandi* lies with us. We must either grant that the visible change is chemical, and that the action is one of complete reduction, or affirm the major while denying the minor premise, or deny both. These, in fact, are exactly the three courses pursued by the two "chemical" and the one "molecular" explanatory hypotheses.

All to-day are agreed that the second stage of the action of light is "chemical," but there are those who maintain that the first stage and the second differ only in degree of visibility, and that the product varies in its reaction to chemical tests, simply because it cannot be isolated with sufficient constancy, or because it is constantly accompanied by more or less of undecomposed salt, which veils or modifies the true action. These are respectively the disciples of the "metallic" and "sub-salt" theories.

There are, however, and among them Frankland, Claudet, Hunt, and Hardwich, who insist that the stages are distinct, and that the first or initial stage is molecular, that the elements are not separated, but simply have their bonds loosened.

Frankland's great objection, to which allusion has already been made, is practically met by Draper. Hunt (*Journal of Photographic Society*, 1856, p. 82) thus refers to the matter:—"There has been a series of experiments by Dr. Draper, showing that when iodide of silver upon a Daguerreotype plate undergoes decomposition and forms the Daguerreotype image, upon that plate may be poured gelatine and the image be stripped off. Then there is a film of iodide of silver remaining sensitive to the action of light. This may be repeated again and again. Here the iodine which is liberated does not escape from the plate, but attacks the under surface of the silver and renders it sensitive at the same time that the decomposition is going on upon the upper surface. I have tried the same experiment with chloride of silver by exposing the silver plate to the action of chlorine, with the same result which Dr. Draper obtained with iodine."

We thus see that the halogen does not, altogether at least, "evaporate into the surrounding atmosphere:" and as here there is no organic matter to hold it, the objection, "in either case it would be obviously impossible to recombine these elements with the silver," now falls to the ground, if—and "there is much virtue in your 'if'"—"the difference between the formation of a visible image and a latent image is in fact, as our President, Captain Abney, has always insisted, a difference in degree and not in kind." But Frankland's position was this: "Every sensitive surface appears then to undergo two distinct changes when exposed to light, or there are, perhaps, two distinct stages in the change. The first stage appears to be entirely a molecular one, and the second only is chemical." Supposing Draper's experiment to apply only to the second stage, and that sub-salt in place of the metal he himself inferred were produced, and supposing also that there were no loss through dissipation, how often could the experiment be repeated without resensitising the plate? Hunt says, "this may be repeated again and again." Does this mean literally three times or frequently?

$$8\,AgCl = 4\,Ag_2Cl + 4\,Cl$$
$$4\,AgCl = 2\,Ag_2Cl + 2\,Cl$$
$$2\,AgCl = Ag_2Cl + Cl$$

* Continued from page 483.

Therefore, the second time the experiment was repeated, the surface of silver originally sensitised with eight parts of chlorine would only get one part.

It may parenthetically be remarked here that the statement that "substances which dissolve the normal salt split up the sub-salt into normal salt, which dissolves, and metallic silver, which remains," is, until the existence of a sub-haloid salt of silver has been proved, and its connexion with the visible image established, purely and simply a gratuitous begging of the whole question.

Claudet discovered "that the decomposition of the chemical surface of the Daguerreotype plate, by the action of certain rays of light, produced on that surface a white precipitate insoluble in the hyposulphite of soda, which, when examined by the microscope, had the appearance of crystals reflecting light, and which, when seen by the naked eye, were the cause of a positive Daguerreotype image. This fact had not been observed before. The opinion of Daguerre himself and other writers was that the action of light on the iodide of silver had only the effect of darkening the surface, and consequently of producing a negative image. But it escaped them that under the darkened iodide of silver another action could take place after a continued exposure to light, and that the hyposulphite of soda washing could disclose a positive image."

Claudet's further researches must be touched upon later on, but meanwhile too much stress can hardly be laid on the following facts:—That Ag I darkened where struck by light; that at a stage prior to the visible darkening the same portions of the plate were rendered capable of forming an amalgam with mercury, and that this amalgam formed the high lights after the unaltered iodide had been removed by the thiosulphate, which laid bare the *black* surface of the silver plate where the light had failed to affect the film. The parts which would have darkened had the action of light been greatly prolonged, and would have given a "negative" image, are also the parts upon which, when the exposure has been comparatively short, the mercury is deposited.

This "white precipitate," insoluble in $Na_2S_2O_3$, and not possessed of "highly colorific properties," was the original "sub-iodide," and was situated "under the darkened iodide," or mixture of Ag and Ag I. It must not be forgotten, however, that this was the *French* "sous-iodure!" The German one also is evidently distinct, being heavier, with none of the scintillating sparkle characteristic of the English variety.

In a most interesting, dispassionate, and impartial article (The British Journal of Photography, 1889, p. 445), Carey Lea gives a brief historical *résumé* of the evidence for and against a belief in the (chemical or photographic) sub-salts generally, which may fairly be summarised thus:—

Faraday's sub-salt "has been proved to be a mixture." If Wöhler succeeded in obtaining "a true citrate of hemi-oxide, no chemist since his time seems to have done so."

Von Bibra, "whilst affirming that he obtained a similar citrate, found an entirely different constitution for the corresponding chloride. . . . . A citrate to yield such a chloride (if such a chloride exists), could scarcely have the constitution assigned to it both by Wöhler and Von Bibra."

In 1882 Pillitz disputed the probability of the existence of Ag_4O, on grounds of valency. He carefully examined the so-called hemi-oxide precipitated by alkaline solutions of antimony and tin, and could find no trace of Ag_4O in any of them." Reasoning on valency "would make Ag_2Cl impossible, which substance undoubtedly exists" (?), "and it would also deny the existence of K_2Cl, which stands upon such authority as that of Rose, Kirchoff, and Bunsen."

Dr. Spencer Newbury categorically denies the existence of Wöhler's series of hemi-oxide compounds, and "describes a repetition of Wöhler's methods, and declares it to be impossible to obtain products of constant composition." The red solution taken by Wöhler to be argentous citrate, Dr. Newbury concludes to be a suspension of finely divided silver.

Muthmann concludes that Rautenberg was "wholly in error in asserting the formation of compounds of chromic, molybdic, and tungstic acids with silver hemi-oxide." Studying the red liquid obtained by Wöhler's process, he "comes to the same conclusion as Newbury, that it consists of finely divided silver suspended in water."

"Wöhler's process was next repeated by G. H. Bailey and G. J. Foster, who came to the conclusion that no citrate of hemi-oxide was formed, and that Wöhler's results must be neglected." In his last paper Von der Pfordten "abandons his views as to the existence of silver hemi-oxide, so that at present the formation of Ag_4O, by Wöhler's method, or by any other known method, is admitted by no one." Hence "it follows that what has taken place in text-books is wholly incorrect." (*Ibid.*)

It is entirely beyond the province of the present paper to trace the origin and rise in the belief in the sub-salt hypotheses; to point out the successive and all too facile applications of the terms sub-iodide, sub-bromide, and sub-chloride to many compounds of doubtful individuality, which have never successfully undergone the test of analysis; to extenuate the superficiality of the line of argument in reasoning from the unknown to the unknown; to plead for the plausibility of such a course; or to apologise for the complicated patchwork of fact, fancy, and fiction which, at the present time, is the most generally acceptable, if least generally applicable, "chemical theory."

Carey Lea says Ag_2Cl "undoubtedly exists." But in 1885 S. B. Newbury (*American Chemical Society*, vi., p. 409–411; *Journal of the Chemical Society*, p. 956) describes a series of experiments on the action of light on silver chloride, and found that "all attempts to isolate a sub-chloride from the blackened silver chloride proved unavailing. . . . The author also endeavoured to prepare silver sub-chloride by Von Bibra's method of reducing silver citrate in hydrogen, and treating the residue with hydrochloric acid, but the resultant compound, when treated with a dilute solution of sodium chloride, only yielded metallic silver. The author considers that these results support the view of the non-existence of the sub-chloride, as otherwise it must be assumed that this sub-chloride is decomposed into silver and silver chloride by the action of a cold dilute solution of sodium chloride, which is highly improbable."

Schnauss (*Photographic Notes*, 1862, p. 166, *et seq.*) says:—"In chemical treatises we find it stated ordinarily that chloride of silver becomes blackened in solar light, meanwhile, chlorine being liberated, it forms some sub-chloride of silver in a humid state. These treatises say that hydrochloric acid is formed with disengagement of oxygen gas. As regards the products of decomposition, this latter is correct, but the state in which the reduced chloride of silver exists depends solely on the intensity of the light. The chemist operates upon compact masses of chloride of silver, and if they be divided ever so much, and if they be suspended and diffused in water, this does not suffice for their complete reduction by light, as the thinnest layer of blackened chloride of silver completely protects the parts it covers from the action of light. . . . . The decomposition of this body is much more complete in photographic processes.

"If we float a piece of paper upon a dilute solution of chloride of sodium, and afterwards upon a solution of nitrate of silver, also diluted, this paper presents, in comparison with the extent of surface, only a very minute quantity of chloride of silver; and this latter is not only reduced in the state of sub-chloride, but it is perfectly reduced as *metallic silver*, as my experiments abundantly prove.". . . . "Only the *metallic* silver may, through the effects of affinity, separate the gold from these solutions; no chloride of silver can do that. A polished silver wire immersed in an alkaline gold bath . . . . will be covered with a thin film of metallic gold in fifteen to twenty minutes." . . . . "Metallic silver, in a finely divided state (such as the precipitate formed by adding sulphate of iron to a solution of nitrate of silver), decomposes the alkaline gold bath rapidly; a corresponding quantity of chloride of silver is formed, and silver containing gold in mixture. The gold may be readily found by treating the precipitate with ammonia to dissolve the chloride of silver, washing it, and dissolving the metallic silver in nitric acid; a brown residue remains, which dissolves in *aqua regia* and gives the reactions of gold.". . . . "The *presence of gold* in the toned and fixed positive paper also surely proves the *absence of silver*."

That we have only a choice between three already existing theories, and that of the two "chemical" hypotheses one will not hold water, it is partly the object of the present article to suggest. As it is with the invisible image that we are concerned, we have now to see what "development," "persistent images," and "reversals" have to tell us as to the identity or separate individuality of the printed-out image and the developable entity. HUGH BREBNER.

(To be continued.)

EIKONOGEN FORMULÆ RECOMMENDED BY THE LEADING DRY PLATE COMPANIES.

Extract from Formula for M. A. Seed Co.'s Dry Plates.

Having thoroughly tested eikonogen as a developing agent, we take pleasure in stating that the results have been very satisfactory, even more so than hydroquinone, giving clearer shadows, and being more energetic in its action, without the amount of alkali being necessary, consequently, a safer developer for summer use, or in hot climates. It is also superior for developing Seed's positive films.

No. 1.—Sulphite of soda (crystals)		6 ounces.
(If granular sulphate of soda is used take only three ounces.)		
Water (ice or distilled)		45 „
First dissolve the above and then add:		
Eikonogen		1 ounce.
No. 2.—Carbonate of potash		1½ „
Water (ice or distilled)		15 ounces.

To develop, take of No. 1 three ounces, and of No. 2 one ounce.

If more contrast is required use more of No. 1; if less, more of No. 2.

The developer can be used repeatedly by adding each time a little of each of fresh solutions, Nos. 1 and 2.

Notice the temperature of the room, as a slight variation in this respect causes a difference in the time it takes to develop. Temperature should be from 70 to 75 degrees, Fahr.

The developer may be used repeatedly, but will work slower when old (where no addition of fresh has been made). Fresh developer is better for short exposure, and the old if the plate has been fully timed.

The quantity of eikonogen (No. 1) must be according to the density of the negative wanted.

If the negative is too strong, use less. If not strong enough, more.

Fixing Bath.

Alum	½ ounce.
Hyposulphite	5 ounces.
Water	1 pint.

Filter.

Leave the negatives a few minutes longer in the bath than they require for fixing. This is important, as the permanency of the negative depends upon it. Don't use a flat tray to fix in, it causes spots and dirt; use a grooved box.

Extract from Formula for Cramer's Dry Plates.

No. 1.—Distilled water		30 ounces.
Sulphite soda		2 „
Eikonogen		¾ ounce.
No. 2.—Water		10 ounces.
Carbonate of potash		1 ounce.
No. 3.—Water		10 ounces.
Bromide of potash		1 ounce.

Developer:—3 ounces No. 1, 1 ounce No. 2, 6 to 10 minims or drops No. 3.

When the developer is quite new, the addition of a little bromide solution (No. 3) is necessary to keep the shadows clear.

If old developer is on hand, mix it with solutions Nos. 1 and 2, omitting the bromide, as the old developer has the same effect to make the developer work clear.

The developer produces plenty of intensity, but any degree of softness can be obtained by diluting with more or less water.

Over-exposed plates restrain by adding more of solution No. 3; for under-exposed plates use the developer more diluted.

Extract from Formulæ for Wuestner's New Eagle Lightning Dry Plate.

For portraits and landscapes:—

No. 1.—Dissolve in 32 ounces distilled or ice water, 1 ounce sulphite of soda, C. P. (crystals), half-ounce eikonogen.

No. 2.—Dissolve in 32 ounces distilled or ice water, 3 ounces carbonate of potash.

Developer.—Take equal parts of No. 1 and No. 2.

This developer may be used repeatedly, and will keep for months if preserved in tightly closed bottles.

It is of great importance to use only chemically pure sulphite of soda (crystals).

In order to dissolve the eikonogen quickly it is advisable to pulverise the same in a porcelain mortar.

For instantaneous exposures:—

Dissolve in 300 c.c. (or 10 ounces) distilled or ice water, 20 grammes (or two-thirds of an ounce) sulphite of soda crystals, C. P., 10 grammes (or one-third of an ounce) carbonate of potash, and then add 10 grammes (or one-third of an ounce) eikonogen.

With this developer you are able to bring out negatives which you cannot produce with any other developer.

The best bath for clearing and reducing.

Take of a saturated solution of white alum	32 ounces.
And add sulphuric acid, C. P.	½ ounce.

After a negative has been perfectly fixed, wash thoroughly, and then place in above solution for one minute and rock gently. Then take out and wash again, and you will have a negative of the same

appearance as a collodion plate, which will print after above treatment twice as rapid as it would otherwise.

For reducing, use one ounce sulphuric acid instead of one-half, and leave the negative in the bath not less than five minutes.

There is no danger of blistering or frilling.

EXTRACT FROM FORMULA FOR HARVARD DRY PLATES.

Sulphite soda	1 ounce.
Carbonate potash	1 „
Eikonogen	½ „
Water	40 ounces.

Use repeatedly, adding new as required.

For under-exposed negatives, dilute and keep separate.

After development, and before fixing, it is as well to flow the negative with a saturated solution of alum. Rinse and fix in the following solution:—

Hyposulphite of soda	1 pound.
Water	2 quarts.

Many prefer to add alum to the fixing solution (about 1 ounce to the above), to which there is no serious objection, provided always it is filtered occasionally.

EXTRACT FROM FORMULA OF ALLEN & ROWELL CO.'S DRY PLATES AND NEGATIVE FILMS.

No. 1.—Sulphite soda	2 ounces.
Distilled water	40 „
Eikonogen	1 ounce.
No. 2.—Sulphite soda	2 ounces.
Carbonate potash	2 „
Distilled water	40 „

To develop, use half of each, Nos. 1 and 2.

The selection of pure crystals of sulphite and carbonate, a strict regard for cleanliness of hands and dishes, and keeping developer tightly corked when not in use, will ensure fine results and greatest economy yet attained.

For instantaneous or very short exposures, and for reviving the strength of above developer by frequent additions, use the following:—

FORMULA NO. 2.

No. 1.—Sulphite of soda	2 ounces.
Eikonogen	1 ounce.
Distilled water	20 ounces.
No. 2.—Sulphite of soda	2 ounces.
Carbonate of potash	2 „
Distilled water	20 „

Use equal parts 1 and 2.

These developers will keep well in one solution, but it is better to compound as above, and mix as wanted. If tightly corked, and distilled water and pure chemicals used, one solution eikonogen will keep for a month at least, which is a great convenience for tourists.

Formula for Allen & Rowell's bromide paper:—

A.—Distilled water	64 ounces.
Sulphite of soda	3 „
Eikonogen	1 ounce.
Glycerine	1 „
B.—Distilled water	64 ounces.
Carbonate potash	2 „
(Or 4 ounces carbonate of soda).	

Use equal parts A and B.

Formula for lantern slides and positive films:—

A.—Distilled water	64 ounces.
Sulphite of soda	5 „
Eikonogen	1 ounce.
Glycerine	1 „
B.—Distilled water	64 ounces.
Carbonate of potash	1 ounce.
Carbonate of soda	1 „
Yellow prussiate potash	½ „

Use equal parts of A and B.

Fixing bath for plates and films:—One gallon of water, three pounds hyposulphite soda, one-half pound sulphite soda, two ounces tartaric acid.

This bath will do very well for bromide paper, but one-half strength (2 gallons water) and longer time fixing will be preferable. This bath will remain clear for a long time, after which it should be discarded. The advantages of this fixing bath are that it remains water-white after frequent using. The negatives are perfect in tone, which enables fast printing, and the use of alum will not be found necessary.

HINTS.

No. 1.—Over-exposure is corrected by transferring the plate quickly to a tray containing the following solution:—4 grs. bromide potash, 1 drachm glycerine, 10 ounces distilled water.

After two or three minutes continue development as before.

No. 2.—For under-exposure add to normal developer two or three drops of the solution, 10 grains caustic soda in one ounce of water, or, if preferred, apply formula No. 2.

No. 3.—Failures are often due to impure sulphite of soda.

No. 4.—Distilled water may be replaced with tap water, purified by the addition of half-ounce of carbonate of soda to one gallon of water. Let stand till thoroughly settled, and decant for use.

—*St. Louis and Canadian Photographer.*

THE DAGUERRE MEMORIAL.

THE Photographers' Association of America are making preparations to celebrate the first half century of their art in an unusual manner.

Truly this is an age of innovations. But as John Randolph, of Roanoke, once said: "Change is not always reform." These photographers, as it appears, have decided to depart from the old and time-honoured custom of giving "honour to whom honour is due," and to confer the title of Father of photography upon one who had nothing to do with the discovery or invention of art which they propose to commemorate. This event, we are informed, is to be consummated on the 15th of the present month, by unveiling in the national Capital, in front of the Smithsonian Institute, an imposing monument in granite and bronze to Daguerre, intended without doubt to transmit his name to future ages so associated with this art that there shall be no question as to its real founder.

In the appeals made to the photographers of America, Daguerre is called the Father of photography. The President of the Memorial Committee says in his circular or open letter, "He was the author who we all know fixed the visible image on a given surface," a remark which savours more of pedantry than of perspicuity, but which is probably intended to mean that he solved the problem which gave photography to the world, "or words to that effect." The President of the Photographers' Association of America speaks of the monument as "a tribute of respect from American photographers to the Frenchman who originated our beautiful art."

Now, with all due respect to such high authorities, I beg to inquire what has been handed down to us photographers of the year of grace 1890 by Daguerre? In other words, what process or appliance have we in use to-day that is directly or indirectly due to anything he did or suggested?

Did he hand down to us the developed negative? No.

Did he hand down to us the positive print on paper? No.

Did he hand down to us the autotype, the phototype, the photogravure, the photo-lithograph, the photo-zinc etching, the photo-engraving, or any other process now in use in the vast field of photography which, in fact, encircles the earth? No, not one.

What might have been handed down to us from Daguerre, if it had been furnished by its creator with sufficient vitality to survive half a century, was dead and buried before most of the photographers now living were born. The sole invention of Daguerre belongs to a past generation. It is a lost art. Although the Daguerreotype *was* a species of photograph, it is now an extinct species, of which nothing exists but its fossil remains.

In speaking of "the originator of our beautiful art," it must not be forgotten that it is, and always was, distinct and independent, both in origin and growth, from the art which Daguerre gave to the world. The one did not grow out of the other in any sense. They were two streams, each issuing from a different source unknown to each other, which flowed near each other for a time, until one sank into the earth never to reappear on the surface, while the other flowed on ever widening and deepening until now nothing can stop its course. Photography has become one of the great factors of civilisation and progress. It lends its aid to all the arts and sciences. Through its agency nature copies itself. It reproduces painting, sculpture, architecture, as the printing-press reproduces literature. It even reproduces books more cheaply than printers' types. It is fast monopolising the engravers' domain, and is well-nigh as indispensable as the art of printing. Great as are its achievements now, what will it have accomplished at the end of another half century?

It is a proud distinction to be justly called the Father of photography, a distinction which ought to be conferred only upon the man to whom it

belongs. It is an unprecedented, unheard-of thing to glorify the hero of a failure as the champion in the strife which ended in that failure.

It is disheartening to think that the followers of "this beautiful art" should, on the occasion of their first jubilee, turn their backs upon its originator and ignore the very existence of his name in history. In all the literature of the "Memorial," in all the appeals for aid, in all the exhortations to loyalty, the name of the author and founder of the living and growing photography of to-day has not been so much as once mentioned. I will take the liberty to mention a few facts and challenge their contradiction.

In 1835, Henry Fox Talbot, an able scientist of England, had succeeded in obtaining and fixing prints on salted and silvered paper of images of external objects formed in the camera. This was prior to the discovery of Daguerre. His process was published in January, 1839, more than six months before the secret of the other was divulged to the world. Continuing his researches in the same direction, he succeeded in obtaining developed negatives on paper in 1840, and was the first to make known to the world the process by which that object was accomplished.

It was then and there that the great problem was solved. The negative and non-reversed positive were found. Sir John Herschel stood godfather at the christening, and presented the newborn invention with its first hypo bath, which has been used by its descendants to the present day with great regularity.

Such was the origin of the photography that survives and will survive until the end of the present order of things. The latest improvement in film negatives is only a natural outgrowth of Talbot's first paper negative, and every silver print ever made has been closely and unmistakably related to the first print made by him on paper prepared with chloride of silver.

Meanwhile, Daguerre's process was patented in England, where it was represented by a skilful operator and artist, Claudet, and where it came into immediate contact with that of Talbot. It appears there was no claim of interference on either side, in fact there was no point of contact between them. They were like two lines which were never to meet, only one had no future before it, the other had before it immortality.

This last was the process of Talbot. It is to him alone to whom belongs the unique right to be named the Father of photography.

Daguerre was the father of an only child. This child was *a* photograph, but it was not *photography*. When Daguerre's little silver plate went over to England, it found photography already there before it. But the sprightly little French cousin was not charmed with the coarse features and unpolished style of its older relation, and whatever may have been the views of the latter respecting a matrimonial alliance, such a thing was never brought about, and so it was that Daguerre did not become even the father-in-law of the English heir. Both the Frenchman and his pretty child died about the same time, the latter of a broken heart. *Requiescat in pace.*

Before this will be read in print the memorial will have been dedicated. I have chosen not to oppose those who were working for it, but now desire to enter my protest against the claim which it is intended to perpetuate. I call on all photographers who "know the right and dare maintain it," to disavow the right of Daguerre to the title which incontestably belongs to his English contemporary. Our art needs no myth to decorate its early history. The simple truth is wonderful enough without any mirage of fiction. It is glory enough for Daguerre that he discovered his own beautiful art, and although it fell before its more powerful rival, both he and it will always hold an honoured page in history. None the less must Talbot be awarded his just share of fame. When that is done his name will lead all the rest. W. H. SHERMAN.

—*Photographic Times.*

COMPARISON OF THE MOST USEFUL DEVELOPERS.

[A Communication to the Berlin Society of Practical Photographers.]

EXPERIMENTS for the purpose of comparing developers or emulsions can only be carried out by means of the sensitometer and a constant source of light, as exposures with the camera in the studio are liable to be affected by such a variety of circumstances that it is useless to expect a reliable result; in addition, photographs of objects or persons are not capable of expressing gradations of tone with such mathematical precision as to prevent the possibility of disputes taking place.

It was on this account that recourse was had to the sensitometer in order to ascertain the advantages and disadvantages of the developers most in use, viz., iron oxalate, pyro, hydroquinone, and eikonogen. Three different series of experiments were carried out. The first consisted of a series of insufficient exposures, one-fifth of the normal exposure being employed; the second series was fully exposed, and the third over-exposed.

Each series and each developer were treated in such a way as to give the most favourable results in each case; thus two drops of the forces recommended by the author were added to the oxalate; four drops of forty per cent. potash solution to the hydroquinone; and to the eikonogen an addition of potash, employing at the same time a preliminary bath of fixing soda and chloride of mercury.

The development was continued until a suggestion of fog made its appearance, and each experiment was repeated four times, so as to eliminate accidental variation.

The plate employed was a "chromo" of the author's own manufacture, and all the plates used were from the same "pouring." The squares of the sensitometer were covered with from one to sixteen sheets of paper.

The source of light consisted of a gas fish-tail burner turned down till it no longer hissed.

The results of the experiments are given in the following table:—

A. *Under-exposed plates. Exposure, 1 second by gaslight, 72 c.c. from the flame, i.e., one-fifth of normal exposure.*

No.	Developer Employed.	Image appeared in.	Time of Development.	Last Legible Number.	Character of Image—Remarks.
		Secs.	Mins.		
1	Iron oxalate, with additions.	9	5	14	Yellow fog; 1 and 2 differ but slightly.
2	Pyro potash	12	3	14	Red fog.
3	Hydroquinone with potash.	20	3	15	Clear.
4	Eikonogen - potash with preliminary bath.				

B. *Fully-exposed plates. Exposure, 1 second by gaslight, 32 c.c. from the flame.*

5	Iron oxalate, alone .	12	3	16	The negatives were all good. The pyro negative was brown-black in transmitted light, the others blue-black. The iron negative was the least transparent.
6	Pyro potash	8	2¾	16	
7	Hydroquinone	25	3½	16	
8	Eikonogen-soda.....	12	3	16	

C. *Over-exposed plates. Exposure, 4 seconds by gaslight, 32 c.c. from flame.*

9	Iron oxalate, with 4 drops K Br, 1 : 10.	18	3½	16	1 to 8 little gradation; indistinct and useless.
10	Pyro-potash	20	2½	16	Gradation better than No. 9; rather too hard, but usable.
11	Hydroquinone, only old developer, 8 drops, K Br.	60	5	16	Normal negative; best of the series.
12	Eikonogen - soda, 8 drops K Br.	30	3½	16	Indistinct and useless.

Forty c.c. of solution were employed in each case, and all the developers were allowed to stand twenty-four hours before being used, in consequence of the fact that pyro acts so much more energetically when first dissolved.

In the case of the iron developer, 2 drops of a solution of 1 gramme fixing soda, × 6 grammes K Br in 60 grammes of water were added in the case of under-exposed plates; 4 drops of bromide solution, 1 : 10, in the case of over-exposed plates; and nothing at all when the exposure was normal.

In the case of hydroquinone, 20 c.c. of old and 20 c.c. of fresh developer, with 4 drops of potash solution (40 per cent.), were employed for under-exposed plates; two-thirds old and one-third fresh, with 4 drops of potash solution for normal exposures; and 40 c.c. old hydroquinone, with 8 drops bromide solution (1 : 10), for over-exposed plates.

The result of these experiments goes to show that when the exposure is normal good results may be obtained with all the developers. It is not too much to say, however, that normal exposures form the exception, and that a great number being either somewhat over or under-exposed, the deficiency must be made good by the developer.

In the case of under-exposures the sensitometer numbers enable us to judge which developer brings out the most. As iron, pyro, and eikonogen only rendered No. 14 visible, it is quite plain that eikonogen does not bring out more than iron or pyro. As hydroquinone, however, rendered No. 15 visible, and did not produce the yellow or red fog due to tedious development, it follows that hydroquinone is the most suitable developer for instantaneous exposures, especially when equal parts of old and fresh

solution are employed, with 1 drop 40 per cent. solution to every 10 c.c of developer.

As good results may be obtained in the case of normal exposures with all the developers, other considerations must decide the question as to which preference is to be given. Such considerations give the preference to hydroquinone on account of the ease with which it is prepared, its capacity for keeping, and its cheapness—two-thirds of old and one-third of fresh developer always sufficing. The experience we as yet possess shows that eikonogen does not keep as well as hydroquinone, and after a few days a tendency to produce fog sets in. Pyro is less valuable, as it keeps for such a short time.

For plates that are very much over-exposed, as often occurs with landscapes, both pyro and hydroquinone may be employed; the latter is, however, preferable.

The case often occurs in which a negative of unknown exposure has to be developed, and then the most reliable results are certainly to be obtained with hydroquinone. Old and fresh developer should be poured into different vessels. The old solution is first poured over the plate and the time noted. If after one minute no image appears, the fresh solution should be carefully added, when one may be sure of obtaining a satisfactory result.

Hydroquinone has but one disadvantage, namely, that it requires a medium temperature to produce a satisfactory result.

To sum up, hydroquinone is in every respect preferable to all other developers.

J. GAEDICKE.

A FORTNIGHT WITH THE CAMERA IN PICTURESQUE SCOTLAND.

What route in Bonnie Scotia can be more choice to the photographic enthusiast than that from Stirling to Oban? I have been through every county in Scotland, and know of no district which can offer such a variety of artistic camera pictures.

We open our campaign at Stirling. A week might profitably be spent within a short radius of the City of the Rock; but as time is limited, we shall restrict ourselves to two days in securing the prominent features of the route from Stirling to Doune, a distance of eight miles by rail.

Stirling Castle may be taken from three different points. Firstly, from the Back Walk, above a small gate. (The Back Walk is a footway passing round the Rock of Stirling, gaining a great height as it circles the base of the castle wall.) The castle here towers to an immense height, its lines appearing most artistically against the sky. The picture is full of interest, being composed of the weather-beaten castle walls, the rent rock, here and there relieved by ivy, moss, or a small tree jutting out from its rocky support, and as a foreground we have the path adorned with wild flowers, and an occasional boulder on the one side, and trees on the other, broken up by the gateway, all blending in harmony with the receding castle rocks, which give an ideal perspective. Secondly, from the Lady Rock in the cemetery. This view is perhaps not so artistic as the first, but with a good light is fairly effective, and full of topographical interest, as it comprises the most complete view to be obtained of the castle. The lighting of these two views is best in the morning or early forenoon. The other view may be taken from the plain below, but from what point depends greatly as to where a suitable foreground may be found. The best picture I got was one in which I had a bit of wall for the foreground, to which the hazy castle, rock, tower of church, and trees formed an effective background.

Within the castle there are the Palace, Douglas Hall, &c., and outside the castle gate the statue of Bruce, which are worthy of our attention. In an old graveyard near the castle is a little pool of water, which might be worth a plate if the water lilies are in good form. Crossing over into the new cemetery, we have a beautiful white marble statue of two ladies, "The Solway Martyrs." This has, unhappily for the photographer, been of recent years enclosed in a glass case, but still is worthy of a shot. The light, if I remember rightly, is most suitable in the morning. We are now at the interesting Old Greyfriars Church, whose walls and towers still bear the marks of the bullets of the Royalists while defending the castle against General Monk's troops. Both exterior and interior views may be taken. Close by are the old Guildry Hall, the ruins of the Earl of Mar's unfinished work, Argyle's Lodging, and other quaint buildings, all in the upper part of the town, from which the knight of the camera can choose to suit his own particular taste.

We now proceed to the quaint old Stirling Bridge. The best view of this is from the right bank looking up the river, not neglecting to take in what is called the castle, a building at one end of the bridge. Crossing the Forth by the new bridge and taking the tramcar, a little over a mile out, brings us to the village of Causewayhead, nestling at the foot of the Abbey Craig, which is surmounted by the national Wallace monument, a high tower of rough masonry in the Scottish baronial style, terminating in a massive sculptured crown. From the top of the monument a magnificent view is obtained for many miles around. Beneath are the winding "Links of Forth," Arthur's Carse, Loch, and beautiful grounds, presided over by the lofty Ben Dempst, the monarch of the Ochil Hills, whose base to the west, far up the diversified valley of the Devon, formerly the resounding brig and cascades. On the other hand, we have the Bridge of Allan and the Grampian Mountains, terminated by the lofty Ben Lomond far in the west. The monument can be taken from the far side of a water-hole near, but requires a very wide-angle lens. Getting down the craig from the opposite side, we cross the railway, and along a road through the fields to Cambuskenneth Abbey. This does not make an imposing picture, and is only worth a plate on account of its antiquity. Here the river is crossed by ferry, and going up stream some distance, a very effective picture may be had of the rough, precipitous side of the Abbey Craig, surmounted by the Wallace monument.

The next move will be to Dunblane, with its venerable cathedral, now, unfortunately for the photographer, undergoing the process of restoration. We have passed the Bridge of Allan, although very many pretty bits are to be got on the Allan Water if time will permit. At Dunblane the line branches off the main line for Doune, Callender, and Oban. Doune should not be overlooked, as it possesses one of the most complete specimens of a feudal castle in Scotland, in a splendid state of preservation, and artistic views of it may be obtained from many points. I prefer taking it with part of the River Teith as a foreground. Near by are the fine old Doune mills, shewing an open water wheel, which always adds so much life and character to a landscape.

Callender is the next centre to work from, eight miles from Doune by either road or rail, the former being preferable, as two or three plates may be exposed on the Teith, which flows near the road all the way. Callender is undoubtedly the key to the west highlands, as Stirling is the key to the north. It is an ancient highland clachan, now becoming modernised by beautiful mansions used as summer resorts. We may profitably make this our headquarters for two days. Many coaches run daily from here to Loch Katrine, a distance of ten miles, in connexion with the steamer. The best plan is to take the coach to Loch Katrine side, and to walk back to Callender, having on the outward route noticed several pretty bits which may be secured on our return journey.

On leaving Callender, Ben Ledi, a beautifully formed mountain, which is sure to appear in the background of several of our pictures of the district, is before us. When somewhat over a mile out our driver brings his horses round to the left, over the River Leny, and circling the base of Ben Ledi. We are at Loch Vennacher, which is not a paradise to the photographer, being too uniformly square, and lacking in interest, but offering many chances of a study of Highland cattle which are here, both finer animals and less shy than those usually met with. They appear to be accustomed to the continuous tourist traffic of this road, and are quite composed, giving the operator a fair chance of a shot, if the flies are not too troublesome. I may add that the farmer, if at home, is most courteous in aiding you to secure pictures of his stock; but, remember, praise the beasties—that's the price.

Onward we go, leaving Lock Vennacher behind, and coming to the Brig of Turk, consisting of a number of thatched cottages or huts scattered in a small glen. A few capital little bits may be had here. The Brig itself might be fancied by some as food for the camera. Proceeding on our way, at the top of the hill Loch Achray bursts into view—a pretty little lake about a mile long, at the further end of which is the imposing Trosachs Hotel, built of roughly dressed stone, which suits its romantic surroundings. Now we enter the far-famed Trosachs glen, at one time so rugged that only those acquainted with its paths could penetrate it with safety, now traversed by a winding coach road, which seems in no way to have diminished its beauty. The pass is beautifully wooded, and rich in bracken, fern, and brushwood. Among the trees are some silver birches, which make a fine photographic study.

One mile through the Trosachs brings us to Lock Katrine. Where can one more lovely be found, with its mountain guardians Ben Aan and Ben Venue reflected on its mirrored bosom? I prefer to photograph here on a still day, in the afternoon, when the sun begins to lower, casting its long, pencil-like lights along the surface of the placid water, giving relief to the reflections and shadows of the hills and wooded isles. The pictures to be procured here are very numerous, amongst which being Ellen's Isle, the Silver Strand, and the entrance to the Trosachs, with the rustic pier. (The small steamer at the pier will ever add to the value of this last picture.)

About one and a half miles on the hills above Callender are the Falls of Bracklinn, where the Keltic forms a series of fine cascades, overhung by a rustic bridge. Several plates may be well exposed here. Leaving Callender, after ferreting out other bits here and there, we start by road for Strathyre. Branching off the Trosachs road over a mile out, we strike through the narrow Pass of Leny, through which rushes in mad career over its rocky bed the River Leny. Here some desirable pictures can be had, as also at Loch Lubnaig, a long, narrow lake, commencing just as we make our exit from Leny Pass. Reaching Strathyre Station after an interesting walk, we take train for Killin.

On our journey we pass on the left the Braes of Balquiddar—

> "Where the blaeberries grow
> 'Mang the bonnie, bloomin' heather."

If careful, a glimpse of Loch Voil may be gained, at the end of which lies all that is mortal of the famous outlawed Highland chief, Rob Roy. Further on to the right, far beneath, lies Loch Earn. We are now at Killin Junction, having passed through Glen Ogle, undoubtedly the most rugged pass traversed by railroad in this country. Here the speed of the train is restricted for safety, as it traverses a narrow ledge far up the mountain side. Killin, near the south end of Lock Tay, is reached by a short branch line. It has always been a favourite resort for artists (many of repute). A day may be well spent almost within a mile of the village.

The Falls of the Dochart, the dark burial place of the Clan McNab, and Finlaric Castle are among the various places of photographic interest.

An additional day might be utilised in sailing up Loch Tay, at the end of which is the Duke of Breadalbane's model village of Kenmore and Taymouth Castle, his princely residence, and farther on Aberfeldy, with its birks and falls.

"The birks ascend like loftly wa's,
The roaring stream deep roaring fa's,
O'erhung wi' fragrant spreading shaws,
The birks of Aberfeldy."

Leaving Killing, the train comes through Glen Dochart, one of Scotland's grandest glens, in its bed flowing the River Dochart, and passing Lochs Tubhair and Dochart, the latter with its curiosity in the form of a floating islet, driven slowly about the loch, under the influence of the wind. Here also are the ruins of an ancient stronghold of the Macgregors, on a finely wooded island. These make pleasing pictures from various points, as also do parts of Loch Tubhair. Both these lakes lie at the foot of the mighty Ben More, and should be travelled to by road from the Crianlarich Hotel as a centre. Glen Falloch, between Crianlarich and Ardlui, at the head of Loch Lomond, is also very fine, and should be penetrated a short distance with the camera to make a day's work along with Lochs Tubhair and Dochart.

Again we are driven along by the iron horse. Passing Tyndrum, where a coach starts for Ballachulish, through the extensive deer forests of the Black Mount and the gloomy Glen Coe, and Dalmally, where passengers leave us for the Inverary coach route. At Loch Awe Station we get out and find a splendid hotel, although rather expensive, but there is no alternative, as it is the only one in the district. From here one day is spent in sailing up the magnificent Loch Awe, studded with its many beautifully wooded islands, and full of photographic interest.

The next day we secure Kilchurn Castle, not far from the hotel. This makes one of the finest pictures conceivable. Ruins among fine trees near the edge of the lake as a middle distance, shapely hills as a good background, and a foreground rich in the form of stones and long grass and reeds to the water's edge, all combining to form a perfect picture. I think it is at its best when the water is as a sheet of glass and the reflections are unbroken. Kilchurn Castle has formed the subject of many Academy pictures. The Falls of Cruachan are also worthy of attention, so is the sublime Pass of Brander, which is reached by road or steamer from the hotel pier. Here the loch narrows into the River Awe, and the hill on the opposite side descends almost perpendicularly into the deep, dark water, and looks awe-inspiring to the sightseer. We can now either return to Loch Awe Station and take train, or walk on to Taynuilt Station, which is preferable, the road skirting the banks of the rapid River Awe as it rushes headlong to the sea over its rocky bed, forming here and there some splendid salmon pools.

From Taynuilt we may now proceed direct to Oban, the Charing Cross of the Highlands. In the vicinity of Oban it is hardly necessary for me to enumerate the various pictures which abound. Dunolly Castle, at the entrance of the bay, and the historical ruins of Dunstaffnage Castle, four miles to the north-east, will afford several, and a day by coach to the picturesque Pass of Melfort will add a few more to our already numerous stock of exposed plates. Our journey up to now has occupied eleven days, leaving one day to return either by the same way, picking up any choice piece unprocurable in coming, or by the steamers *Iona* and *Columba*, *viâ* the Crinan Canal, direct to Glasgow.

Probably some readers would like to have some idea of my outfit, &c., which consists of a whole-plate Hare camera with Dallmeyer's eleven-inch focus R. R. lens, and a Thornton-Pickard time-shutter, using Ilford ordinary plates, even for instantaneous shots, unless the day is dull, or subject dark or near, when I fall back on Ilford red labels, which I find prove extremely fast, and give splendid density, only care must be taken not to over-expose. I charge my slides in my room after dark (with the light of a small folding cherry-fabric lantern) with four ordinary and two special rapidity plates, carrying another half-dozen ordinaries with me, which I change outside when those in my slides have been exposed. My changing bag is made of good black sateen, lined with Turkey twill, with sleeves having elastic at elbows, and loose rubber bands at wrists. One of the sleeves I have sufficiently wide to admit of slide and box of whole-plates. I have used the same bag for over six years, and cannot recollect ever fogging a plate in it, although I have many times used it in strong sunlight. I am accustomed to get the film side by feeling near the edge of the plate; but to those inexperienced to this mode I should advise, before leaving home, to fasten a number of plates back to back, with a suitable thickness of blackened cardboard between, bound by strips of gum-paper, so that it is impossible to make an error in filling the slides, and the task is much easier.

While travelling by road I send on my luggage from station to station before me. The weight of this has, during the present season, been somewhat lessened by the use of the "thin" glass plates now issued for tourists by the Ilford Company.

I develop none of my plates until I reach home, and then I use the pyro-ammonia formula given on the Ilford plate boxes, with the one modification that I begin with about two-thirds the amount of accelerator in cases where I have reason to suspect over-exposure. A test exposure might be developed by one of the Stirling photographers at the start of the journey as a guide for future exposures. ALEX. J. AGNEW.

NOTES FROM NEWCASTLE.

ALTHOUGH we have had a change of weather, or rather I should say *several* changes, wind has interfered far too much with landscape work. During a short cycling and photographic trip through Gilsland and Carlisle I met with numerous subjects, but with the exception of about two hours the atmospheric conditions were distinctly unfavourable, though fine enough for the ordinary tourist.

Considering the beautiful scenery round about Carlisle, Brampton, Wetherall, and the River Eden, I am surprised we do not hear and *see* more of the work done by the Carlisle Society; a month in this district, with skill and fair luck, would go far to make a man's reputation. Between Hexham and Carlisle is a perfect paradise for the photographer.

The advertised outdoor meeting of the local Society for the 14th inst. did not take place, postponed unfortunately as it turned out, for the weather, Mr. Auty tells me, was very favourable for photography, *sic vita*.

I am sorry to hear we are losing an able, well-informed, and very pleasant member of the craft here, in the person of Mr. Thomas M. Laws, of the firm P. M. Laws & Son. Mr. T. M. Laws has, I am informed, purchased a business in Wolverhampton. Every one will wish him success in his new venture.

I notice that certain compilations have been made *re* exhibitions, medals, awards, and so forth. An exhibition held recently at Tynemouth will, I expect, rather upset the calculations. The show of photographs, such as it was, was in connexion with a Polytechnical Exhibition, which was interesting enough generally. The photographic department panned out *two* exhibitors, *two* medals!

A friend of mine was engaged in taking a group recently in a colliery district, when he was rather disconcerted by the audible remarks of a miner to his "marra" standing by. "Dis thoo see that fellar taakin that portrait, man? It's aboot the easiest wey of gettin a livin au knaas of. Tha glasses only costs him twopence farthing a-piece, he buys the peypor ready meyd, and ef ye wants a dozen he cuts the peypor for the size, puts all thegithor at the back of the glass and strikes them right throo. Thet's hoo it is there's some dark and some light." My friend said, "I wish I knew that process." The miner replied, "Thoo knaas aal aboot it, ye b'ggor, but thoo keeps us poor b'ggors in the dark." For the benefit of such of your readers who may happen to be photographing in this district I may say that they need not be offended if they hear themselves called "b'ggors," the word being used in these parts more as a term of endearment than otherwise. D. D.

ROYAL CORNWALL POLYTECHNIC SOCIETY.

LIST OF AWARDS.—PHOTOGRAPHIC DEPARTMENT.

Professional.—1st silver medal.—L. Sawyer, R. H. Lord, and W. W. Winter. 2nd silver medal.—W. J. Byrne. 1st bronze medal.—T. Protheroe, T. G. Whaite, H. W. Reeves, R. Keene, T. Whalley, and R. W. Robinson.

Amateur.—1st bronze medal.—W. W. Fry, A. G. Taglioferro, Rev. H. B. Hare, A. K. Dresser, T. W. Charlesworth, and H. D. Arnott.

Honourable mention.—R. W. Robinson, York & Sons, and S. W. Bhedwar.

Full detailed report next week.

Our Editorial Table.

THE INTERNATIONAL ANNUAL OF ANTHONY'S PHOTOGRAPHIC BULLETIN.

New York: E. & H. T. ANTHONY & Co. London: ILIFFE & SON.

THE third volume, for 1890–91, does credit alike to editors and publishers. It is plethoric, and is well illustrated. Its contributors hail from both sides of the Atlantic, and embrace many of the foremost in both continents. The topics discussed are varied, and the book makes a most pleasant companion for an evening at the fireside. We are pleased to see that Mr. Walmsley has made splendid progress in his photo-micrographic research, as we recognise a great advance on his first productions of this nature. We shall give extracts on an early occasion. Price, in paper covers, 2*s*.

THE MODERN PRACTICE OF RETOUCHING.

New York: THE SCOVILL & ADAMS COMPANY.

THIS is the sixth edition of a very useful volume of *The Scovill Photographic Series*, and contains several additions to what appea ed

in previous editions, notably two papers on the subject which were published in the American annuals for 1888 and 1889, respectively, by Anton Baumgartner and Carl Schiendl. The first portion of the work gives the practice of retouching as enunciated by M. Piquepé. It comprises much information in a condensed form.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 12,955.—"Improvements in Photographic Cameras." L. A. Franks.—*Dated August 20, 1890.*

No. 13,161.—"Improvements in or relating to the 'Dusting-on' Process of Printing Pictures by Photography. Complete specification. G. W. Wood.—*Dated August 22, 1890.*

No. 13,256.—"A New or Improved Brake for Photographic Shutters." M. A. Weir.—*Dated August 22, 1890.*

No. 13,302.—"The Removal of the Action of Light on Untoned Sensitised and Albumenised Photographic Papers and Surfaces." J. C. Osborne.—*Dated August 23, 1890.*

No. 13,324.—"Improvements in Photographic Cameras." M. A. Weir.—*Dated August 23, 1890.*

PATENTS COMPLETED.

An Improved Stand for Use in Enlarging or Copying Photographs and the Like.

No. 3736. James Chapman Shenstone, 13, High-street, Colchester, Essex.—*August 2, 1890.*

The material used from preference is white pine wood. It consists of a rectangular platform, on which to stand the lamp, the height of which can be made such as to bring the lamp to a convenient height, and with a base for a camera adjusted to the front and on the top of, and square with the platform, by studs or wedges if necessary. This base can be made of such a size and height to bring the camera into a convenient position. A horizontal slot in front and back of the platform receives a flat rod of wood of sufficient length gauged to move steadily through the slots of the platform, and always parallel to the axis of the camera. At the distance end of the rod is fixed a bracket to hold a board or plate at right angles to the rod, and parallel to the end of the camera base and platform.

This bracket may be hinged, so that it can be laid flat upon the rod for convenience in putting away when not in use, and can readily be raised and fixed into its proper position by a thumbscrew at the back. The top surface of the rod has a shallow slot along its centre in which is a scale in feet and inches and centimetres whereby to note the focal distance for facility and accuracy in taking duplicate copies or enlargements.

Improvements in Connexion with Photographic Dark Slides for Preventing a Second Exposure by Accident.

No. 15,451.—George Renwick, 29, Station-street, Burton-on-Trent, Staffordshire.—*August 2, 1890.*

This invention consists of the hereto-described improvements in connexion with photographic dark slides by which the operator can tell whether the plate has been exposed or not, and which will prevent the dark slide shutter being accidentally withdrawn to expose the plate a second time.

For the purposes of my invention I provide a lever catch which is pivoted near one end to a base plate fixed to the dark slide frame near the open end of the rebate in which the shutter fits. A suitable spring acts upon this lever catch, and keeps its free end towards the shutter, so that it will engage with a projection on the shutter and thus lock the shutter in its closed position. This projection may be the end of the tongue on the shutter which fits in the rebate. Fixed to the shutter adjacent to the free end of the lever catch is a peg or hook, and on the said lever catch, and preferably at or near the free end thereof, is a projection corresponding with the said pin or hook.

The parts above described operate as follows:—When an unexposed plate is in the dark slide frame, the operator, just before closing the shutter, pushes the lever catch sideways, so that when the slide is pushed home the pin or hook on the shutter will come into contact with the said projection on the lever and present the lever engaging with the shutter, thus leaving the shutter free to be withdrawn to expose the plate. On withdrawing the shutter to expose the plate, the said pin or hook on the shutter being withdrawn from the projection on the lever, allows the lever to spring against the shutter, so that when the plate has been exposed and the shutter again pushed home the said projection on the lever will be free of the pin or hook on the shutter, and the lever catch will engage with and lock the shutter. As the shutter cannot be withdrawn without the operator first pushing the lever catch sideways to unlock it from the shutter, the operator knows that the plate has been exposed, and its accidental exposure a second time is thus prevented.

Improvements in and Connected with Camera Stands.

No. 15,539. R. W. Boyd, H. S. Noblett, and F. T. Cantle.—*August 2, 1890.*

This invention relates to the portable class of camera stands, and is constructed so that, while having the advantages of the ordinary stand, it can be closed up into the form of a walking-stick or staff, and is fitted with special arrangements for facilitating the movement of the camera, also for keeping the stand rigid, and for raising or lowering, and to carry out our invention we make the legs of the stand preferably of a shape so that in section they would fit three legs are made each one-third of a circle, or if four legs are used one-fourth of a circle, so that when closed they appear as one stick. The bottom ends of these legs are provided with spikes to prevent slipping when in use; on the upper part of the fitting of these spikes is a part of a screw thread, which forms a complete thread when the three or four are closed together, and a ferrule is provided to screw over the spikes on to this screw, which protects them, and also keeps the lower ends together when the stand is being carried; a bayonet or other suitable joint may be used in place of this screw. The upper part of each leg is hinged to a top fitting, which carries a screw socket into which a ball is fitted, which ball has a screw projection to screw into a plate, or other fitting, on the bottom of the camera. The screw socket is made for this ball to fit into loosely and screw down over the ball to fix it in any desired position, thus forming an ordinary ball and socket joint.

The periphery of the top fitting is provided with a screw, and a hollow knob is provided to fit over the ball and socket joint and screw to this screw, thus forming, when closed and with bottom ferrule attached, a walking stick; or, instead of a knob, a crooked or other suitable shaped handle may be used to screw on in a similar manner, or a bayonet joint may be used instead of a screw. This stand may be made the length of an ordinary walking-stick, or, if desired longer, can be made of any suitable length and form a staff. If the stand is required to be adjustable in height, we construct the legs so that when closed there is a hollow space down the centre, and in this centre space we fit a tube connected to the top fitting. In this case the ball and socket is attached to a rod which is made to slide down through the top fitting into this centre tube, and this rod may be raised to any desired height and fixed in position by a set screw or other suitable means.

To make the stand more rigid we attach ribs to the inner side of each of the legs, and these ribs are fastened to a collar running on the central tube. One or more of these sets of ribs may be used, preferably two sets are used; one set at or near the bottom to keep the legs extended, and one set at or near the centre made somewhat shorter than the actual distance between the centre tube and the legs, so that they will spring the legs slightly in and thus prevent all vibration. Various modifications may be made, and any suitable materials may be used, always preserving the essential features of our invention, which are a portable camera stand, made and fitted with the supplementary parts, as herein described.

[Those who are, or were, familiar with the camera stand issued with the opera-glass camera (the Jumelle) of Geymet and Alker of a score years ago will be surprised at the similarity of the one now patented with it.—Ed.]

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 2	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle.
,, 2	North London	Wellington Hall, Islington, N.
,, 2	Holmfirth	
,, 2	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 2	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 2	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 3	Coventry and Midland	The Dispensary, Coventry.
,, 3	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 4	Bolton Photographic Society	The Baths, Bridgman-street.
,, 4	Leeds	Leeds Mechanics' Institute.
,, 4	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st.
,, 4	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 5	Sheffield Camera Club	Whiteley's Institute, New Surrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

August 26.—Technical meeting.—Mr. W. England in the chair.

Mr. T. E. Freshwater showed some photographs of sections of chalk and marl-stone which contained specimens of foraminifera. He had used a low-power and long-extending camera, that method giving a flatter field than could be got with high-power. The enlargement was about two hundred and fifty diameters.

A letter was read from Mr. Otto Schulzig accompanying some specimens of photographs printed under green glass, which had the effect, both with albumen and matt-surface paper, of causing a readiness to tone to a black colour; thus with the matt paper constituting, he said, "a perfect substitute for the expensive and troublesome platinum process."

The Chairman inquired whether any of the members present had had any experience with printing under green glass.

Mr. W. E. Debenham had found that green glass gave prints that were themselves grey, and that toned very quickly and readily. He also found that when used of deep colour it reduced the contrasts of the negative, and therefore with a negative that was somewhat too intense, was beneficial by allowing details in the deep shadows to be visible that would otherwise be lost. With thin negatives, on the other hand, the loss of contrast was a disadvantage. On ready-sensitised paper, which was, he believed, generally more difficult to tone than that sensitised at home, the advantage of facility of toning was most manifest; but there might be an objection on the score of the lengthened time of printing required, which with the most effective samples that he had employed had ranged from twelve to thirty times that required when exposed to the open light.

Mr. Scamell had noticed the difficulty of toning ready-sensitised as compared with other paper.

A sample, and circular accompanying it, of a gelatine chloride of silver paper prepared by a Dutch firm was handed round. The print was of a very rich character.

Mr. Chang showed albums containing photographs of the cyclists' camp, and a set taken at the Whit-Monday outing of the Photographic Club.

It was mentioned that the next technical meeting would not be held on the fourth, but on the fifth Tuesday in September.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

AUGUST 21,—Mr. A. Haddon in the chair.

A short discussion on toning baths took place, in the course of which Mr. F. W. PASK said that he had formerly used acetate, but had lately adopted the mixed hypo and gold bath, which toned and fixed the prints simultaneously, as he had been given to understand that *sel d'or* toned prints were more permanent than others.

Mr. W. E. DEBENHAM said that the combined toning and fixing bath was not what was known as the *sel d'or* bath. *Sel d'or* was a compound of gold with a small quantity of hyposulphite, not at all enough to fix the prints. It was formerly sold in small bottles, like chloride of gold, and was prepared by Messrs. Fordos & Gelis. It was used for toning Daguerreotypes, and also for paper pictures, and the results were very different from those obtained with the mixed hypo and gold fixing bath. It was difficult to use with albumen paper, but with plain paper the tones were very good.

Mr. J. S. TEAPE then opened the subject of the evening—*Cloud Negatives*, a number of which he showed, as well as prints from them, both alone and in combination with landscapes. He said that one of the requisites for cloud negatives was a slow plate. With a rapid plate there was considerable difficulty in getting density. The next requisite was an open space, a place where there were no obstacles within a hundred yards. With a clear space any part of the plate could be used without its being disfigured by a roof or other object. The next point was to use a small stop. He generally employed one for this purpose of *f*-50. The exposure would then be quick—about the one-tenth of a second. At times there might be very heavy clouds, but even then he had not required to give long exposure. The operator, too, must be quick in his movements. It was generally only in windy weather that good clouds were to be had, and if there was any delay in arranging the slide they would be off the plate before the exposure took place. The development should be slow; a full proportion of bromide should be used and a very small quantity of ammonia; he generally used half a minim to two ounces of developer as a commencement, and sometimes this sufficed to finish with, although he commonly had to add a little more. His method of working was to have two twenty-ounce bottles, in one was one hundred and sixty grains of bromide of ammonium made up to ten ounces with water, in the other was a like quantity of ammonia, also made up to ten ounces; with these stock solutions he could have any proportion he liked, and the pyro he put in dry, measuring with a spoon which held just one grain. He did not use sulphite. In printing the clouds into the picture he got different effects by shading portions of the negative, so different that in two prints no one would detect that the same negative had been used. Besides natural clouds there were the artificial ones made by applying smoke or colour to the back of the negative. Several examples of these were also shown. Yet another plan was to employ a reducing agent—Farmer's ferricyanide—applying it with a brush, but it was difficult in this case to confine the action to just the place wanted.

Mr. G. W. ATKINS avoided the difficulty of the clouds moving off the plate whilst arranging the dark slide by using a finder.

Mr. T. E. FRESHWATER had failed to get sufficient contrast when photographing white clouds against a blue sky.

The CHAIRMAN inquired whether a yellow screen would not be useful for this purpose.

Mr. ATKINS said that it had been proposed to use a Nicol prism in such a case.

The CHAIRMAN suggested the use of reflected light from optical plane glass; he thought that that method had been used in photographing clouds for scientific purposes.

HOLBORN CAMERA CLUB.

AUGUST 22.—Lantern night.—About thirty members and friends assembled at the Club Room, when slides by Miss Hart, Mrs. Smith, and Messrs. Chang and Bayston were shown on the screen.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE last half-day excursion of the above Society took place on Saturday last to Lichfield, under the leadership of Mr. A. J. Leeson. The light of the afternoon was about perfect for photography, and nearly one hundred and fifty plates were exposed by the party, which was the largest turn-out this season. The interior and exterior of the Cathedral made some charming architectural pictures, while St. Chad's Church and some old picturesque cottages near the reservoir, together with a very fine rainbow, which formed a perfect arc, found sufficient employment till the shades of night came on.

BATH PHOTOGRAPHIC SOCIETY.

LAST Thursday's outing of the members was well attended, notwithstanding the threatening aspect of the sky. The excursion party left the Roman City of the Sun about noon in a four-in-hand brake, by way of the Wells-road, through picturesque Midford to Norton St. Philip. Arrived at Norton, nearly a score of cameras were quickly set in action upon the old "George Inn," an ancient hostelry said to have sheltered Charles one night and Cromwell the next, when on the war path. Having spent a profitable hour, a move was made to Bradford on-Avon, a cloth manufacturing town of 7000 inhabitants on the banks of the Avon. Farleigh Castle, the scene of a former excursion, was passed upon the road. Whilst in this historic neighbourhood a sudden shower rendered it desirable to seek shelter beneath the fine elms which hereabouts adorn the roadside, and, thanks to the liberality and forethought of the Vice-President, the interval was merrily beguiled, aided and abetted by the cheery cup he had provided. The "Swan Hotel," Bradford, was reached in due course, and a move at once made for Kingston House, a splendid mansion erected in the seventeenth century for the Duke of Kingston. Mr. F. Shum, F.S.A., describes the building as of transitional style, between Old Tudor and Palladian. The front facing south at first sight appears a mass of windows, but is really of two storeys with attics in the gables. All the windows are beautifully proportioned with the stone mullions of most excellent design and workmanship. The present owner runs a cloth mill close by. He received the party, and offered every facility for the purpose of photographing within and without the premises. At five p.m. a capital meal was served at the "Swan," and an hour later we drove through Bradford to Belcombe Brook. Here a halt was made, the party and some other subjects photographed, but, owing to the approaching twilight, no work was attempted within these very picturesque grounds. Driving through Turley, Winsley, Limpley Stoke, and Claverton, the city was reached about nine p.m.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

FORTHCOMING VIENNA EXHIBITION.

To the EDITOR.

SIR,—Enclosed we beg to forward to you the programme of our next photographic exhibition, hoping that you will support us in this our good cause. We are anxious only to exhibit the very best in photography, therefore we are appealing to you personally and to such others whose names are well known as artistic workers.

Although we are writing so early, we should be thankful if you could kindly state whether you will be able and willing to join our exhibition. Any suggestions you might wish to make will be thankfully received by the Committee, and if possible carried out.—We are, yours, &c.,

CARL SRNA, *President*.
DR. F. MALLMANN, *Vice-President*.
CARL ULRICH, *Vice-President*.

Wallfischgasse 4, *Vienna*, *August* 25, 1890.

The following is the enclosure referred to:—

The Club of Amateur Photograpers in Vienna intends holding an International Photographic Exhibition at the Imperial and Royal Austrian Museum of Arts and Manufactures, which differs from the foregoing Vienna Exhibition of 1888 by exhibiting only such photographs as have artistic value.

The admission of pictures will be subjected to the decision of a competent jury of artists and photographers, which admission is an honour, and will be certified by special diploma bearing the signature of the patroness of the Exhibition, her Imperial and Royal Highness the Archduchess Maria Theresia.

The jury has the privilege of recommending competitors for special good work for the Vermeil Maria Theresia Medal, which will be awarded by her Imperial and Royal Highness. The number of these medals is not to exceed ten, and must be awarded unanimously.

The approval of two-thirds of the jury is required for admission.

No scientific section can be admitted this time.

For further particulars see the programme (below.)

PROGRAMME.

All photographs of artistic merit will be admitted, including landscapes, studies of flowers and of animals, *genre* pictures, portraits, &c., besides diapositives, lantern slides, and stereoscopes.

Every picture, not smaller than twelve centimetres by nine centimetres, must be mounted on a separate cardboard, with or without a frame. Suitable frames will be supplied by the club free of charge.

The subject and artist's name must be on each picture.

Pictures already exhibited in Vienna, 1888, cannot again be exhibited.

Application must be made not later than the 15th of January, 1891, and exhibitors will kindly forward their photographs before the 1st of April, 1891, to a London address, which will be made known in time, whence they will be forwarded and returned at the expense of the club, and no further charges, as for wall space, &c., will be incurred by exhibitors.

The names of the jury will be published before the 1st of January, 1891.

No exhibits will be allowed to be removed before the close of the exhibition. The jury will decide finally where the pictures are to be fixed.

The Committee reserve the right of issuing further rules if necessary. All communications to be addressed to the President of the Club, Carl Srna, Esq., VII. Stiftgasse 1, Vienna.

"DISCURSIVE NOTES ON LENSES."

To the EDITOR.

SIR,—Your "append" to my letter in your last issue assists me in bringing the discussion we have been engaged upon to an end. I wrote a letter intentionally of popular interest to the *Amateur Photographer*, because the subject of single lenses was attracting some considerable attention among persons interested in such matters. In so doing I pointed out what I considered to be an error of yours in the matter of optics. I subsequently *proved* conclusively that you were incorrect. Failing scientific grounds with which to substantiate your statements, you appear to fall back upon expressions of a personal nature. The care and research in the matter of dates you display in your comments I fully appreciate at their true value. To any scientific man who cares to read Patent No. 2502, 1866, taken out by the late J. H. Dallmeyer, it will be

apparent that the principle involved in the construction of the rapid rectilinear is included in that of the wide-angle rectilinear. Your reference to the nationality of my late father seems somewhat beside the question, and neither strengthens your position nor damages mine. My father was a German, he also was a naturalised Englishman; and neither his native land nor the country of his adoption could be other than proud of a man who gained and merited fame by his work.

It is sufficient for me to know and state that the construction of the rapid rectilinear was an independent research. There is no doubt that my late father thought Steinheil's aplanat an infringement of his work included in the patent referred to. In concluding this discussion I shall endeavour to remove from my mind the thought of any "motif" on your part.—I am, yours, &c.,

THOS. R. DALLMEYER.

[When a controversy on this subject raged some years ago, Mr. J. H. Dallmeyer being then alive and taking part in it, it was shown that his claim to be the first inventor of the lens now so well known as the rapid rectilinear could not be substantiated. It is to his credit that, so far as we are aware, Mr. Dallmeyer did not afterwards make a special claim to have been the first inventor of the lens; and it was presumably owing to his appreciation of the force of such proofs that the threatened law-suit against Steinheil's agent who sold his lenses in this country, or against any London opticians who made lenses on the same principle, never came off. The patent referred to above by Mr. T. R. Dallmeyer (2502, A.D. 1859) is the same one (September 27, 1860) for which a claim was made that the denser elements were placed to the outside; but we have shown last week that Steinheil's adoption of this system dates from January 19, 1865, while it was also included in Grubb's patent of October 8, 1867. But Mr. Dallmeyer's fame as an optician cannot possibly be marred by our having shown that in the introduction of his rapid rectilinear he was two years behind Steinheil. It is a misfortune, but it is not a fault, when an inventor has been anticipated by others.

That Mr. T. R. Dallmeyer (ironically, we suppose) "appreciates at their true value" our care and research in the matter of dates, we must accept with becoming gravity; but facts and dates are stubborn things, and as in ancient times it was said to be "hard to kick against the pricks," so at the present time it is hard to kick against Patent Office facts and dates. In conclusion, although we are at variance with Mr. Dallmeyer on matters involved in this discussion, it is needless to say that this variance does not affect the high opinion we have ever entertained of the great ability, as opticians, of Messrs. Dallmeyer, both father and son.—ED.]

PRINTING UNDER COLOURED MEDIUMS.

To the EDITOR.

SIR,—Mr. Otto Scholzig seems to have curiously misinterpreted the gist of my article, and the inferences to be drawn from the prints sent [illegible]. I showed at the recent meeting of the London and Provincial Photographic Association, at which he was present.

I certainly did not find that there was greater difficulty, when printing in the ordinary way in obtaining black tones on home-prepared than on commercially sensitised paper, but exactly the contrary; and that is, I believe, the general experience. When printing under green glass both papers yielded black tones very readily, but as the ordinary paper would also tone easily under other circumstances, the influence of the coloured medium in this direction was more noticeable with the ready-sensitised paper.

Similarly in the case of quick and slow printing. With the paper I sensitise myself on a sixty grain bath, leaving the excess of silver in the paper, there is commonly no perceptible increase of vigour gained by printing slowly, for the simple reason that the paper is capable of yielding a vigorous print when printed quickly.

The use of green glass has with me the effect of yielding blacker tones, but with less contrast. Possibly the light which passes through it is proportionately more active upon the chloride of silver than upon the organic compound which gives the characteristic richness to an albumen print.—I am, yours, &c.,

W. E. DEBENHAM.

SECURING CELLULOID FILMS IN THE DARK SLIDE.

To the EDITOR.

SIR,—I venture to think that any hint, however insignificant, may, if novel, prove of use to fellow-amateurs, and I therefore trouble you with the description of a little contrivance which I have used with signal success for securing celluloid films in the dark slide. We are generally instructed to lay them in like a glass plate, and to back them with a piece of cardboard. This, however, I have found untrustworthy, the film and backing often slipping back and getting out of register.

The plan I now adopt is simplicity itself, but as I have never noticed it in any journal I venture to describe it.

Get at any photographer's warehouse some dark chocolate-coloured mounting boards, and with strong scissors cut them a sixty-fourth of an inch smaller than the rebate of the dark slide.

Take some strips of the paper margin of ordinary postage stamps and fasten one over each corner of the card, gluing it firmly to the back by the glue which the strip possesses, taking care not to moisten the corner itself. When dry, slip the celluloid films under these corners, and they will be found to lie beautifully flat, and can then be laid in the slide just like a plate. Over them I lay a piece of pretty stout millboard, or what is still better, the board from one of Eastman's film carriers, and close the slide, being careful that the pressure of the spring of the partition is only just sufficient to keep the two films close up to the rebate.

Should the double slide be used only for films, I would remove the partition altogether and substitute a small lump of cotton wadding, the spring of which is quite sufficient to answer the purpose required.

I think any one trying this plan will be pleased with the result, as the extreme thinness of the papers forming the corners precludes all possibility of the film being placed out of register, a fatality which invariably occurs when using either Eastman's carriers or the metal sheaths which are recommended for the purpose. The thickness of the metal in these sheaths may scarcely interfere with definition in the case of a landscape lens, but when using a rapid rectilinear with full opening or a large stop, the effects are very apparent and proportionately distressing. The dark colour of the cardboard back, moreover, prevents halation.—I am, yours, &c.,

ETHEL CONSTANCE MAY.

Darmstadt, August 21, 1890.

PRIZES FOR PLATES.

To the EDITOR.

SIR,—The liberality of plate makers has been of late years much exercised in offering prizes to photographers, though whether the generosity exhibited has been intended to benefit the producer or the user is a question which does not much concern anybody. Prize-giving after this fashion has about had its day; how would it be to try a reversal—the consumers to arrange a competition for the manufacturers? I see no difficulty in promoting such a contest, if suitable judges could be found to accept the responsibility of awarding the prizes—a big *if*, perhaps, but not necessarily insurmountable. Let there be three judges; the competitors selecting one, the subscribers to the prize fund appointing a second, and let the two gentlemen so chosen elect a third. On my word it is a great idea! Let it be taken up, and good for a guinea is—Yours, &c.,

THE ANGLER.

PRE-EXPOSURE OF PRINTS: A CORRECTION.

To the EDITOR.

SIR,—I shall be glad if you will allow me to correct an omission in your report of the meeting of the London and Provincial Photographic Association on the 14th inst. which occurs in your current issue.

In his account of a series of comparative experiments on printing under green glass, Mr. Teape mentioned he had tried pre-exposure which I had recommended at a previous meeting, and found no increase of detail. On making inquiry as to the circumstances under which he worked, I discovered he had not employed the green glass at all in this experiment, owing to a misunderstanding, but had simply exposed the paper under the negative to white light. I said I had found no advantage myself in pre-exposing in such a case, and the Chairman (Mr. Cowan) corroborated me. As I found this portion of the discussion was inadvertently omitted, I feel justified in calling attention to it in order to prevent misconception.

I may perhaps mention that I never claimed that pre-exposure would give increase of detail in a print, but it undoubtedly considerably shortens the time of printing when certain coloured media are employed.—I am, yours, &c.,

H. M. HASTINGS.

West Kensington, August 23, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, a 5D Dallmeyer or Ross 4 Universal for gold Albert and cash.—Address, BANYARD, Photographer, Aldeburgh-on-Sea, Suffolk.

Wanted, half-plate rapid rectilinear lens by good maker; exchange, whole-plate portrait lens.—Address, E. PENROLD, Photographer, Torquay.

Wanted, ferrotype plates, any size, also ferrotype envelopes, cases, mats, preservers, and porcelain bath holders; exchange, good lens, tripod, oil painting, &c.—Address, ARTHUR, 6, Barrack-road, Torquay.

Will exchange Taylor's detective camera and three slides and a magic lantern with four-inch condensers for half-plate outfit or half-plate camera and three slides.—Address, W. R. FAUGET, High-street, Harrold.

Will exchange one linen seascape background (full size), balustrade and pedestal, rock accessory, grass mat, and two plate-glass shelves with brackets, for seven-inch condenser and cabinet lens, three and a quarter inches diameter with rack.—Address, H. M., 20, Arlesford-road, Stockwell, S.W.

I will exchange for a 7×5 rapid Euryscope or half-plate group lens, either Dallmeyer or Ross card, or Grubb 3A card lens, or a 12×10 Horne & Thornthwaite.—Address, J. W. COURT, 145, Durham-street, Hartlepool East.

Shew's quarter-plate hand camera complete, comprising camera, rapid rectilinear lens (Darlot), diaphragmatic shutter, three best double backs, solid leather lock-up case, finder, and exposure meter; exchange, with cash difference, for whole-plate modern camera and slides.—Address, CHARLES J. KIRK, Tunbridge Wells.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

J. A. D. LLOYD.—Received with thanks.

AMATEUR.—To clear the silver printing bath, add some kaolin and place it in the sun.

SINED.—The lens which you desiderate is the rapid aplanat of Suter, sixteen inches in focus.

A. X.—By such tests as we have applied to the silver nitrate it seems in both cases to be practically pure.

J. D. & SONS.—We have written to the enlarger complained of and have entered the case on our register.

T. A. E.—We do not know the terms for lessons in retouching. Write to Mr. Redmond Barrett, 50, Kellett-road, Brixton-hill, S.W.; he will quote you terms.

PUBLICATION.—For the moment we do not know the names of the makers of Woodbury presses. The Woodburytype Company will no doubt supply you with a few.

J. D. ENGLAND.—So far as we can ascertain, no such journal is published on the continent of Europe, and we know that there is none published either in America or in this country.

A PUZZLED PRINTER.—The case is just as you surmise. A short-focus portrait lens has better comparative covering power, with large angular aperture, than one of larger dimensions.

ARTIST NOVICE.—Either platinotype or bromide enlargements on rough paper can be readily finished with chalks or pastels. Carbon is not so easy to work upon with these materials, but it can easily be finished with either water or oil colours.

AN OCCASIONAL VISITOR TO BRIGHTON.—The Brighton Society has fitted up a dark room which they place at the disposal of visitors, who must pay 1*s.* 6*d.* per week for the privilege. Apply by letter to Mr. A. H. C. Corder, 42, Montpelier-road, Brighton.

VERAX.—When the lenses of a rapid doublet are brought closer together the focus of the combination will certainly be shortened, but only to a *very* slight extent. Such alteration will necessitate the employment of a much smaller stop in order to obtain sharpness at the margin of the plate.

J. S. writes: "No. 1 (one man) points out the spots to be photographed and develops and finishes the negative; No. 2 (the other) places the camera and exposes. Which of the two is the 'author,' No. 1 or No. 2, or must both be put down as 'joint authors?'"—Undoubtedly No. 1 is the author of the picture.

J. COHEN.—The ferrotype bath must be kept decidedly acid, preferably with nitric acid. Possibly the fogging is caused by the tent not being light-tight. At some watering places itinerant photographers are not allowed on the beach at all, and at others only by special permission from the local authorities.

REPRODUCTION.—Messrs. Dixon & Son have not published their method of orthochromatic photography. We believe, however, they take ordinary commercial plates and treat them afterwards. We also believe they prepare them specially for the particular purpose for which they are to be employed; that is, according to the character of the pictures to be reproduced.

MACLURE, MACDONALD, & CO. (Glasgow.)—Gelatine plates for stripping are regular articles of commerce in America, also in Germany; but, so far as we know, they are not made here. The most likely firm to supply them is Mawson & Swan. Better write them. If they cannot supply them you had better communicate with some of the American or German manufacturers.

G. H. W. A. complains that, in response to a request, he sent specimens and a photograph of himself to a firm at Brighton, and he cannot obtain their return or any reply to his repeated applications.—As our correspondent at present does not give us permission to append his name to the letter, we do not publish the name of the firm, but we enter their names on our Black Register.

T. H. T.—1. There are no means of removing the stains.—2. The cards have been so short a time in the market that no practical opinion can be expressed as to whether they will prove permanent or not under the conditions referred to.—3. Yes, by employing a reflector placed at an angle of forty-five degrees and placing one or more thicknesses of ground glass a little distance in front of the negative.

A. O. says: "I want to mount some silhouetted photographs (on albumenised paper) upon a canvas stretcher covered with endless cartridge paper; what is the best mountant? I should say gelatine, if there is, as I think, a way of keeping it liquid without heat or loss of sticking properties."—If the prints are very large, starch will probably be best. There is a difficulty in covering a large surface with gelatine without its setting. The best method of doing it is to use a sample which has slow setting properties.

INQUIRER.—We cannot express an opinion as to the cause of the spots without knowing full particulars as to how and under what conditions the prints were produced. The fixing and washing are but minor points. With regard to the mounts causing the spots, this can only be settled by a chemical examination. Send a sample of them to a chemical expert for analysis and exhaustive testing.

EXPERIMENTALIST writes: "Is Goupil's process of photogravure patented in this country; if so, can you tell me the number of the patent and if it is still in force? I wish to make some plates by it, and shall be glad of any information you can give."—Goupil's process is not patented. It is, and always was, worked by them as a secret process. No authentic details of the process have been published or, we presume, are likely to be.

J. DUTTON.—Are you sure that the cheap opal pictures you refer to are not printed in carbon? We have seen carbon prints on opal retailed at less prices than those you quote. Possibly, if the pictures are bromide ones, the producers prepare their own plates; they would then cost less than bought ones. Whichever process be employed, the producers get but little profit on each individual picture, but they are always made in large numbers.

S. TOLMER says: "I have seen it stated that gold size diluted makes an excellent varnish for negatives, and that it is much to be preferred to the ordinary varnish of commerce. Is this correct?"—In the first place, "gold size" is a very indifferent article, and it is rarely that two samples from different makers are alike, and not always even from the same makers. Some gold size when diluted makes a good negative varnish, but some do not. We have had some samples that have taken a week or more to dry.

G. H. A. writes: "I have been trying to take a photograph of the express at full speed, but fail to get a good one. I use a Kershaw's shutter screwed as tight as it will work, with a wide-angle Optimus rapid rectilinear lens, and Mawson's extra rapid plates. If I take the train coming in the distance I get a good sharp negative, but when I try her close to me, say just as she is nearly passing, the engine is always blurred, the carriages being quite sharp. What is the cause of this? Also, should sunlight be used?"—In reply: There is a limit to the rapidity of action of even the most rapid shutter, and in your case that limit has been reached in the attempt to take an engine, side on, when close to the camera. There is nothing for it but increasing still further the rapidity of the shutter by means of a stronger spring, and as the exposure will then be so brief, sunlight will be necessary. The nearer a moving object is to the camera the greater is its angular motion in a given period.

MAWSON & SWAN'S *Photographers' Pocket Diary* for September is received. It is always highly appreciated.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, September 3, *Supplementary Exposures;* September 10, *On Modifying Lenses.*

CORRECTION.—In Mr. Blakeley's toning formula, described on page 539 (last issue), *read* "To tone, use half a pint of the above for three sheets of paper."

DARKEST AFRICA IN THE LANTERN.—Messrs. Newton & Co., 3, Fleet-street, have secured the sole right of reproducing as lantern slides the illustrations in Stanley's new book, *In Darkest Africa.*

MR. WILLIAM F. SLATER, Picture Frame Maker, Southampton-street, Camberwell, has sent us an elegant frame in which he has mounted our Convention Group Supplement. He supplies these at a moderate price.

WE have received from Mr. H. M. Hastings, F.C.S., a charming little group taken by him at Old Moreton Hall during the recent Convention. In addition to several ladies, it contains excellent portraits of Messrs. Bothamley, Pringle, Henderson, Cowan, Werner, Cembrano, Mason, Kidd, Lysaght, and others.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.—Prospective Programme.—Thursday, September, 25, Paper by Mr. W. I. Chadwick, of Manchester, on *Stereoscopic Photography;* Thursday, October 30, Paper and demonstration by the Britannia Works Company on *Alpha Paper;* Thursday, November 27, Annual Meeting.

NORTH LONDON PHOTOGRAPHIC SOCIETY.—This Society resumes its meetings for the ensuing session on Tuesday evening next in Wellington Hall, Upper-street, Islington, at a quarter-past eight, when Mr. Hedley Smith will give a lecture on *Detective Cameras and Film Photography,* which all are invited to attend. A useful and interesting syllabus has been arranged which covers the ground up to Christmas.

EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF INDIA.—We have received the prospectus of the fourth annual international exhibition of the Photographic Society of India. The exhibition will be held in Calcutta during December. Five gold, fifteen silver, and fifteen bronze medals are offered for competition, of which one gold, five silver, and five bronze are offered to amateurs of the world; one gold, two silver, and three bronze to amateurs of India and Burmah; and one gold, two silver, and two bronze to amateur members of the Photographic Society of India. In addition to the above a special medal will be given for the best photograph in the exhibition. Copies of the prospectus and full particulars can be had from Mr. J. S. Gladstone, Woolton Vale, Liverpool.

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TONING BATHS.

It is evident that there is still room for difference of opinion on the subject of the gold-toning bath, long as it has been before the photographic public. There are, however, some points beyond the possibility of discussion which may with advantage be dilated upon in view of the recent discussion at the London and Provincial Photographic Association. A generation of photographers has sprung up since the advent of alkaline gold toning which completely ousted the old combined "toning and fixing" bath. Changes were then rung upon almost every alkaline salt for the purpose of inventing a novelty to which the inventor's name could be tagged. Carbonate and phosphate of soda were the originals. M. L'Abbé Laborde shortly afterwards suggested acetate, but for a long time little attention was paid to it. The so-called "chloride of lime" had a run, and was, when a chloride of calcium bath was described, confused with it by the unlearned and others. Chloride of lime, we need scarcely say, is an unscientific term, an absurdity indeed, and the phrase "bleaching powder" should always be employed when this material is to be designated.

Before further alluding to these various baths, we may say of these two calcium baths that their working differs considerably from the others. It is usually considered that tones nearer approaching to pure black can be obtained with the bleaching-powder formula than with any other. Further, this particular bath would seem to require more experience than the rest, for reports as to its value vary far more than those with regard to all the rest combined. We were told some time ago by the head toner of a large photographic establishment that it took him months to get into the way of using it, but that when he had learnt how to control its apparent vagaries, he preferred it to all others. His chief guide to the condition of the bath was its smell, which should always, he said, "be enough to enable you to smell the chlorine"—that is to say, he meant the characteristic smell of bleaching powder. This bath also tends to give purer whites. It is quite possible that it was originally devised to act as a bleach to the yellowness of the paper produced by too long keeping. The bath would be useless if the solution were strong enough actually to bleach; while if a yellowed piece of silvered paper be placed in a weak solution of the bleaching powder (without gold) it would be seen to be useless, or to produce a peculiar alteration of colour worse than the original yellowness. Hence it is obvious that the tone of colour and the purity of the whites are properties inherent to the mixture and not to its one constituent, the bleaching power.

When we come to the chloride of calcium bath we find the early formulæ and the actual practical working to be entirely different from those usually employed with other baths. Writing from memory—we believe we are correct—the formula first practised was, one grain of chloride of gold, two grains of common chalk, and half a grain of chloride of calcium, put into a pint of water and the mixture frequently shaken during two days, after which it was ready for use. The essential peculiarity of its use was that the prints were only to be very slightly washed before being placed in this toning solution. In actual practice this plan was carried out, and our own experience enables us to say that it was quite effective, and that, moreover, so far from a grain of gold to a pint of water giving a slow bath, the opposite was the case. Very few prints could be put in at once, for the toning took place so rapidly that before each could be handled some were over-toned and spoiled. The bath was marvellously quick and very economical. As to the tones obtained, our opinion, carefully arrived at, was that though there was a complete and utter absence of any mealiness, yet the colour upon critical examination was slightly—very slightly—less brilliant than with other baths. Further, we noted some strange irregularities in its action. Of course, if the prints were much washed the bath was practically useless for toning, but apart from that, there were occasions when the action was much more rapid than others, and as the general tendency of our experiments was to the effect that this happened with a new floating bath, our practice drifted away from this particular solution to others, which we will treat of in our next article on this subject.

ALCOHOL IN THE DEVELOPER.

Although photographers have had little cause to complain of any excessive temperature during the present summer, there have nevertheless been the usual seasonable troubles in the shape of frilling, blistering, and dissolving of films. True, these are not now so common as they were a few years ago, nor are they so serious in character, thanks to the great improvements made in the manufacture of plates, as well as in the methods of using them; but the comparative rarity of these visitations, perhaps, renders it all the more desirable that an efficient remedy should be at hand and ready for immediate application at the shortest notice.

In very many developing rooms the ordinary course of aluming forms a portion of the regular routine, and is resorted to at all seasons of the year—a practice to which may probably, in a great measure, be due the comparative immunity from trouble. But even where such precautions are invariably taken, sudden attacks are by no means unknown, and when

these do occur, the usual remedies appear to be utterly useless. Such chance visitations are by no means confined to the hottest weather, for we recently experienced one on a day which, for the season of the year, was decidedly cold; but they are more prevalent during the summer than the winter months. They occur, too, with even the most reputed makes of plates, from which facts it is not unfair to argue that the primary cause is most probably to be traced to atmospheric conditions during the process of manufacture, and not to any abnormal circumstances prevailing at the period of development; in fact, it may generally be taken for granted that it is the plates themselves that are at fault, and not the development.

It is a well-known fact that under certain electrical conditions of the atmosphere, solution of gelatine, or indeed gelatine in any form in the presence of moisture, undergoes a change partaking more or less of the character of decomposition, and considerable loss frequently occurs from this cause to manufacturers of gelatine, glue, dry plates, and similar articles. In the case of dry plates the change may occur in the case of a large batch of emulsion after it has been tested, or even after a portion of it has been coated and the plates dried and rendered safe; so that even plates from "the same batch" may exhibit the faults spoken of, while others are wholly exempt.

The great prevalence of frilling in the early days of gelatine plates arose mainly from the employment of far softer kinds of gelatine than those in use at present. Not only are such samples more prone to swell, pucker, and blister than the harder sorts, but they are also more readily decomposed; and if we take into consideration also the methods of prolonged emulsification formerly in vogue, there need be no surprise at the very common occurrence of frilling in former times. The trouble arising from the use of a too soft gelatine, as such, is totally different from that occurring from decomposition. In the former case the gelatine merely swells, and in consequence partially or wholly leaves the glass in an unbroken sheet. In the latter the evil assumes a variety of shapes, in all of which a tendency to rottenness of film is shown. Blisters, "pits," and partial solution of the film, are common phases, and in bad cases the film will break away from the glass in small pieces the instant the plate is moistened. Very seldom in such instances is there any appearance of "frilling," properly so called, as from the rotten nature of the gelatine it is incapable of swelling or expanding.

Where frilling arises from the first of the causes named, or mainly so, the mere treatment with alum after or during development will in almost every case prove effective; but where decomposition has occurred the treatment is practically useless. The employment of alum in the emulsion itself may have a beneficial or even an absolutely curative action, and is very commonly employed when not actually necessary, but only as a safeguard. Where, however, this application of the remedy fails, its subsequent exhibition is useless or worse.

The question therefore arises as to what alternative method of cure we can fly to in case of need. The old stock remedies, or rather precautions, such as the addition of Epsom salts to the developer, or the use of ice-cold water, are after all only applicable in cases of over soft gelatine. Such agents as tannin or gallic acid are equally limited in their application, as before they can possibly exercise any chemical influence in hardening the film, its disintegration has already taken place. There are also serious objections to the use of these from other points of view.

Wholly different in character, and specially suited for use in all cases of rottenness of film, is the remedy proposed ten or eleven years ago by Captain Abney, consisting of the application of a coating of collodion to the gelatine film before development. This, as a matter of course, binds a rotten film together, while it also prevents the swelling of one otherwise liable to that form of the evil. As a thoroughly efficient preventive of frilling, the collodion method might be recommended, if it were not for its objectionable features, chief of which is the impervious character of the compound film. So completely does the collodion film protect the underlying gelatine, that with an ordinary exposure it is almost impossible to develop an image, however long the plate may remain in the solution; while with a greatly prolonged exposure no density of reduction can be secured, and, needless to say, fixing and washing are equally prolonged.

A method, however, which possesses the advantages without the objections of collodion was first utilised by us some years ago, when every other remedy had failed, with a batch of rather valuable exposures upon hopelessly frilling plates, and in an article in our ALMANAC for 1888, by Mr. W. Clement Williams, the method is again briefly alluded to. It consists in the use of an alcoholic developer, the proportion of alcohol being of course dependent upon the severity of the case to be treated.

As a test of the efficacy of this mode of treatment in preventing mechanical injury to the film, we may mention that an emulsion that had become permanently liquid through decomposition was spread upon glass and dried by heat while in a level position. Such a film would of course suffer very rapid solution in the ordinary developer, but when treated with a mixture of alcohol and water in equal parts, and the usual proportions of pyro, ammonia, and bromide, it entirely withstood all injurious action and produced a fairly good negative. Even under the abnormal conditions stated, namely, the perfect solubility of the gelatine film, the combined action of the alcohol and the pyro produced a sort of tanning effect, and the film was capable of withstanding for some time the action of plain water, though it eventually succumbed.

In the case of a film only partially soluble, or so rotten as to cause trouble with the ordinary developer, the alcoholic treatment answers perfectly, and in this case there is practically no danger of the subsequent solution or damage of the film in washing. The hardening or tanning effect is sufficient to apparently remove the original rottenness or tendency to solution, even though the proportion of alcohol be considerably less than that stated.

As regards any counterbalancing disadvantages beyond the additional cost of the alcoholic developer we have found none, unless it be a slight prolongation of the time occupied in the process. This is chiefly noticeable in the early stage, and especially when using hydroquinone, the image taking a longer time to commence to appear. Afterwards it progresses with ordinary rapidity, and the total time consumed is not much longer than usual. The alcoholic developer, however, has a tendency to produce a clearer and more brilliant image, and may be employed with a smaller dose of bromide than usually employed with the aqueous solution, and it is more than probable that the increase of time may be neutralised by the reduction of the bromide.

A further advantage in using the alcoholic developer is that the stock solutions may be alcoholic, and will then require no acid or sulphite to give them keeping qualities. Many operators object to the use of these preservative agents, and are equally loth to employ alcoholic solutions on account of the

unpleasant "greasiness" caused by the presence of very small quantities of alcohol in the developer. When the proportion is increased, that difficulty disappears.

Silver still retains its high price, and there is very little prospect of its becoming lower at present. Nitrate of silver is not the only material that photographers employ, and for which they will, probably, have to pay a higher price in the near future. It is stated that a chemical union is about to be, or is, formed after the style of the "salt union"—to take over most of the largest alkali and chemical works in the United Kingdom. This, of course, means that the present prices of chemical products will be enhanced generally. Paper makers in particular view the scheme with alarm, and are said to be projecting a combination among themselves to establish works of their own, on a large scale, to manufacture such chemicals as they require, so as not to be dependent upon "the ring."

Hyposulphite of soda, amongst other chemicals, is consumed very extensively by paper makers as an anti-chlor, and they naturally look with dismay at any material rise in its price, or that of the other materials they use so largely, hence their proposed combination. With these unions there is little doubt but that prices will become higher generally; but whether the quality of the chemicals will be correspondingly improved remains to be seen. At the present time there is no question there are many samples of hyposulphite of soda now in the market which are totally unfitted for any photographic purpose whatever, although they may answer very well as an anti-chlor. For the most part, hyposulphite of soda is now obtained as a by-product at the alkali works. Inferior "hypo" has much to answer for in connexion with fading photographs. We do not, however, in spite of the union, anticipate any exorbitant rise in the price of the chemicals used in photography, inasmuch as the keen competition of the Germans will to a great extent act as a deterrent.

One day last week a clergyman applied at a London police court for a summons against Messrs. Carter Paterson & Co., the well-known carriers, for the alleged illegal detention of a can of paraffin oil. From his statement it appears the oil was delivered at his house, but he refused to sign the "delivery sheet," therefore the carman took it away. Further particulars were required before the magistrate would grant a summons. If it is granted, or by the time the rev. gentleman gets his oil back, he will probably have discovered that it would have been far less trouble to have signed the delivery sheet in the first instance.

Apropos of signing the delivery sheets of carriers and railway companies, it may be well to call the attention of photographers who are continually forwarding and receiving negatives and other fragile articles to the fact that signing the sheet, to an extent, implies that the goods are received free from injury. In most cases, broken glass can be detected by shaking the parcel. Then, if it be refused, it will be returned to the consigner, or it may be opened in the presence of the carman, and his sheet signed "received damaged." In every instance where injury is suspected, the package should be opened in the presence of the porter. When this is done, trouble may often be saved in recovering compensation.

In a case of our own a few years back, liability for damage to some photographic apparatus was disputed on the ground that the sheet was signed by our servant or representative. The carrying company —which by the way we believe does not now exist—alleged that the signing of the sheet was an acknowledgment that the goods were delivered free from damage. It is seldom, however, that any respectable carrier, or a railway company, would adopt this means of shirking their liabilities.

The short and dull days of winter are fast approaching, and those photographers who intend to adopt artificial lighting in the studio, or for enlarging purposes, should lose no time in making their arrangements. Since the Electric Lighting Act has been amended, there is, or shortly will be, scarcely a street in London where electricity cannot be laid on like gas; and there are few provincial towns where similar facilities do not exist. When the current can be obtained for use as required, the installation of the light for photographic purposes is a very inexpensive matter compared with the outlay necessary for generating the current on the premises. A further advantage is that most of the companies undertake the supply of the necessary lamps and appliances. As many of the companies are young, and will have their hands full for some time to come, it will be wise to give them as long a notice as possible of what will be wanted, so that it may be ready by the time required.

With regard to the kind of lamp, a "focus-keeping" one, though a convenience, is not an essential for studio work, but for enlarging purposes it is absolutely necessary. By a focus-keeping lamp is meant one that will retain the point of light always at the same spot, and this necessitates a special construction and mechanism. As one carbon is consumed at about twice the rate of the other, it follows that the arc would be constantly altering its position, and this would be fatal to sharpness in enlarging, though it is of little or no consequence in taking portraits. However, lamps are constructed that will keep the light steadily in the same position, and their cost is not very much more than that of the ordinary ones.

We are continually receiving inquiries from collotypers and others whose work requires reversed negatives—for plates, prepared ready for stripping the film therefrom, similar to those supplied on the Continent for this class of work. In America, in Germany, and other places on the Continent, such plates are regular articles of commerce, and it may be presumed that they are profitable to their makers. It was rumoured a little time back that some of the English manufacturers were about to put similar plates on the market, and within the past few days our attention is directed to the fact that Mawson & Swan and the Autotype Company manufacture and catalogue plates of this class. Probably, as mechanical processes requiring reversed negatives are, comparatively, so little worked here, other manufacturers consider that stripping plates would not prove remunerative.

Now that several Photographic Societies' Exhibitions are announced, and others are being projected, we call the particular attention of their promoters to the medals question. This subject has always been, and probably ever will be, a vexed one, owing to the judges' awards not being always in accord with the ideas of the competitors. Much of the heartburning may, however, be averted if the conditions of the competition were, in the first instance, made more definite and distinct. For example, when a prize is offered for the best picture, or series of pictures, in a certain class, however bad the best picture or series may be, the exhibitor considers himself—and rightly too—entitled to the award, unless a discretionary power is placed in the hands of the judges, and it is clearly so stated in the prospectus first issued. The omission of precise terms has caused more discontent in medal awards than anything else.

HISTORICAL NOTE ON LENSES.

The history of the aplanatic or quick-acting doublet now so universally manufactured having been so definitely set forth in recent editorial notes in The British Journal of Photography, the subject might now be left but for two or three considerations.

One consideration that presents itself is, that sufficient prominence has not been given to the character of the change introduced by Steinheil; that is to say, to the real great point in which his lens, the aplanatic, differed from those preceding it, and so constituted a first-class invention. It has been said, though not by the editor, that the principle involved in the construction of the rapid rectilinear lens is included in that of the wide-angle rectilinear, the last-mentioned lens being understood to be closely similar to Steinheil's aplanat. One of the principles made use of is certainly common to these lenses, *i.e.*, that of having the negative or denser element outside; but this principle,

as has been shown, was adopted by Steinheil, not only in his aplanatic lens, but in his earlier lens of January, 1865, to say nothing of the older application of it by Grubb. If, therefore, this is the principle in the Dallmeyer lens of September, 1866, which is supposed to cover the rapid rectilinear, both instruments were also covered by Steinheil's earlier production.

As a matter of fact, however, the point which constituted the novelty and utility of Steinheil's aplanatic was the freedom from spherical aberration obtained by the use of curves, and of kinds of glass specified. This freedom from spherical aberration, or aplanatism, was such an immense step in advance of what had previously been done with cemented lenses, that it has practically revolutionised the manufacture of photographic lenses for general work; opticians all over the world—Mr. J. H. Dallmeyer more promptly, perhaps, than others—having till now occupied themselves with manufacturing lenses after this model under a great variety of names.

Petzval was the first to construct a lens of large aperture—rapid, that is—from which spherical aberration was so perfectly eliminated that, in spite of its large aperture, fine definition was obtained. His portrait lens, which was the admiration of mathematicians, was also the model for manufacturing opticians universally. Steinheil's elimination of spherical aberration from a cemented lens was another optical triumph of the first order, and places its inventor, with Petzval, in the highest rank of optical mathematicians to whom photography is indebted.

With regard to the Dallmeyer wide-angle rectilinear itself, I think more might be said in its favour as a wide-angle lens than has been done. The aplanatic form being adaptable, with modifications shown by the inventor, for wide-angle lenses, has been very generally taken as a model, and in many points is an excellent one, and exceedingly portable. There is one point, however, equality of illumination, in which for wide angles it is necessarily behind lenses of deeper curvature, such as the Dallmeyer wide-angle, Busch's pantascope, and some others which have gone out of manufacture. It is obvious that with a shallow curve the light which falls at any considerable angle is to a great extent lost by reflection, and as the margin of a wide-angle picture is always deficient in illumination, if only from the fact that the diaphragm for marginal rays is practically an ellipse, it is very undesirable to allow these marginal rays to be further weakened by loss from reflection. This fault is one that is inherent in lenses of shallow curves, and therefore, for very wide angles at all events, I think that the deeper curves formerly more general are to be preferred.

The circumstance that lenses after the model of the Steinheil aplanatic have been so universally manufactured under such a great variety of names suggests the question as to whether it is legitimate or desirable for manufacturers to use as a title for a lens a name already adopted by another house. When the name is what may be called a fancy one, there may be ground for complaint if it is used by a later manufacturer; but when, as in the case of such expressions as rectilinear, aplanatic, wide angle, &c., they describe a characteristic quality of the instrument, it would be very unreasonable to claim a monopoly of the title, so that another maker should not be at liberty to describe his production as what it really is. I never heard of Steinheil making any complaint of other makers using the word aplanatic to describe lenses made after his model; and, indeed, it may be urged that those makers who do use this descriptive title are willing to acknowledge thereby their indebtedness to him, and do not seek to claim credit for an originality which they do not possess.

The last consideration is, that the historical matter furnished by the editor being mostly in the form of appends may be difficult to find when wanted for future reference. If he would gather it into one focus, and put it all into the form of an article, say, in the forthcoming YEAR-BOOK, it might prove more permanently useful.

W. E. DEBENHAM.

POSITIVES IN THE CAMERA.

THE number of negatives from which we take prints bears, perhaps, but a fractional relation to the total number of negatives we produce in the course of a season's work, except in the studio of a professional photographer, where we must exactly reverse the comparison. In this respect there is probably not one amongst us who has not sinned. We expose our plates, develop them, are pleased or dissatisfied with the results, as the case may be, and perhaps take a silver print or two from them just to see how the positive comes out; but we tone not, neither do we fix, unless we are exhibitors, or new to the art, or steeped to the eyes in the most thorough-going enthusiasm. I say *perhaps* we take a silver print or two, and it is a liberal qualification, for most of us do not; the negative is our goal, and beyond it we will not venture. Our chief delight is to watch the picture grow under the action of the developer, a pleasure of which we never tire. Compared with any process of photographic printing now extant, negative development is more instructive, more fascinating, and, if I may dare to say so, more amusing and interesting to the great majority of us.

If we only took half a dozen prints from each of our negatives we should make the sensitive paper manufacturers exceedingly busy. The number of unprinted negatives lying hidden away in grooved boxes must be enormous. The world at large loses by the imprisonment of so much that is, or rather would be, pleasing to look upon, if not artistic and positively beautiful. We deprive ourselves of the pleasure—the pardonable pleasure—we should feel at beholding the finished results of our travels in search of the picturesque. Good negatives are pretty things to look at, but we soon tire of holding pieces of glass or celluloid up to the light even for our own admiration, and, besides, we do not see the pictures as we should. How much more satisfactory it would be to our friends and ourselves to be able to pass round the mounted print or the well-filled album!

In addition to the fact that we are tolerably content to work for negatives only, and derive as much pleasure from scanning them as we should in viewing the positive prints, there are probably other reasons which interfere to prevent our striking prints from them. If we have the inclination, we are without the time or the money; or we may make up our minds to have a day's printing when the weather is finer, or a night with bromide development when we get home early. But the weather does not improve, and the claims of business are too strong, and so our good resolutions are never carried out. The sum of it all is, that we cannot or will not spare the time, money, or trouble. If I might make a confession, this strongly resembles my own case, and I believe it is the same with many others.

But besides paper prints we could turn our negatives (when they are worthy of the distinction) into transparencies, which we could utilise for decorative purposes and so forth. But how often is this done? Too rarely, and for the reasons already given. I think it a great pity that so many negatives should be allowed to waste their sweetness on the desert air of obscurity, and will endeavour to suggest a means for abbreviating the trouble of reproducing them, in order to induce others to take up the idea and put it to practical tests.

Some weeks ago, when writing of the reversal of negatives by contact-exposure, and development, followed by dissolution of the positive and development of the negative layer beneath it, I was struck by the reflection that possibly the notion was capable of being further pressed into service. In this manner we get a negative from a negative. Could we not also obtain a positive from a positive by similar operations? Obviously, as an unfixed positive consists of a layer of metal upon a bed of unaltered haloid, so also has an unfixed negative a film of pure bromide beneath it. Remove the positive and a negative in true gradation is developed; remove a negative and of course a positive should be obtained.

Such being the case, it is easy to see how we may secure a transparency direct in the camera. We may not at the moment of exposure have decided that the subject we have exposed for is suitable either for printing or for making into a transparency, but when we have developed we are charmed with its beauties, and we then have a choice of the two methods. We can fix the picture, and the negative will remain for printing purposes, although the probabilities are that it will never be printed from. If it is at once made into a transparency we get the opportunity of utilising it for decorative purposes. Let the negative therefore be chlorised, dissolved off with a solvent of silver chloride, the residual layer of unaltered haloid exposed to light, and placed in the developing solution, and there is our transparency—a positive from a positive at one operation. I refer the reader to the articles on *Reversed Negatives on Gelatine Plates* for the necessary practical details, which have simply to be "turned round" to render them applicable to the production of positives.

Provided our exposures are correct, there is no rapidity of plates which is unsuitable for employment in taking direct positives. We have to bear in mind what we are working for, and arrange our procedure accordingly. In these days of non-staining developers there should be no difficulty in keeping the films perfectly clear, while, if the final positive picture has rather a thin deposit, which might frequently happen, there are many admirable formulæ for intensification at hand to remedy the defect. Probably the commonest fault

of positives obtained by a direct process would be the unsatisfactory colour of the picture, but here, again, we have innumerable methods of toning to help us. In short, I see no reason why the quality of these transparencies, with proper care and skill, should fall below those obtained by printing in contact with a negative and development.

Manufacturers of bromide paper do not give us a great thickness of film—or, perhaps, it should be said a sufficient thickness—otherwise there would be no insuperable obstacle in the way of our getting an occasional direct positive on paper in the way thus described. The emulsion is, I believe, rapid enough for all exposures where there are no moving objects. On the other hand, the bromide opals now in the market are, I fancy, too slow, except for the class of subject that will stand a tolerably long exposure, or we should be in a fair way to be able to take direct opal positives. Of course, we must not hide from ourselves the fact that in working for positives at one operation we are destroying the means of ready reproduction which we possess with the negative, although on the other hand, where one has a transparency and no negative, the latter is easily made from the former.

I simply throw out the foregoing as a suggestion which has occurred to me upon reflecting over the number of negatives that are never printed from. It is not much more difficult to work for positives than for negatives. Transparencies give pleasure to those who are ignorant of photography, while it requires an expert to appreciate a negative. Transparencies could be framed and hung, and if of suitable size, passed through the lantern, and so interest many others besides their producer. The unprinted negative is of interest to nobody but he who developed it, and too rarely to him; stowed away in its box it may fitly be compared to the buried talent of the parable.

Of course, nobody will for a moment imagine that I am advising amateurs to abandon negative work, but I put it as worthy of consideration, that where there is small likelihood of a picture ever being properly printed from, it would be preferable for many reasons to seize the opportunity on the completion of development and before fixation to convert the negative into a transparency, and so make it of pictorial interest to somebody. But I repeat that what I have written is entirely suggestive. I will try and take another opportunity of discussing the practical aspects of the question.

THOMAS BEDDING.

THE USE AND ABUSE OF HAND CAMERAS.

[A Communication to the London and Provincial Photographic Association.]

In opening this discussion, I should like to say that I had no idea, when suggesting the subject, that I should have to open it, but I fancy Mr Cowan, who proposed that I should, was bearing in mind some peculiar remarks made by myself on the occasion of our last outing on the subject of hand cameras, or luncheon boxes as I called them. I believe on that day about half our number carried hand cameras; well, there are some of our members who can take out a hand camera and a dozen plates, and can bring home twelve pictures. They are men whose names we may say are as household words in photography, and they deserve every credit for the labour and time expended in perfecting their experience and apparatus, and there are many more workers like them throughout the country, men who have thoroughly mastered the two great factors, as I take it, in this matter, which are, judging distance and development; but these we find form a very small percentage of hand-camera users. What do the dealers say? "People are buying those hand cameras extensively; they treat photography as a toy." One hears on every side, "Quite easy, you know; you push the button and the thing is done!"

These new recruits of ours consequently take out their dozen plates and fire away regardless of lighting and subject; sometimes they get one fair negative out of a dozen exposures, and that result is about the proportion for their first gross or two of plates. Naturally they get disheartened, and a large majority of them turn the thing up in disgust. As an example, at Bettws-y-Coed lately I met a young American lady who was going about there snapping at all those beautiful scenes with a Kodak. In conversation with her I ventured to hint at her probable non-success, but I was completely silenced by her answer that the dealer in New York, just before she sailed, told her it would take anything. I also met a gentleman in the same locality carrying a very neat, morocco-covered detective; he was just going to take the Miner's Bridge with it he told me. Many other instances of the "abuse" side might be noticed; there is the playful habit some gentlemen have of taking their fellow-photographers in all sorts of grotesque attitudes.

Taking a view at St. Albans on our last Bank Holiday outing, and trying to arrange a group of children in the foreground, I was mercilessly snapped at by three hand-camera men. I show results of two; I have not seen the others yet, but they will, no doubt, be shown on the screen in due time.

In conclusion, I should like to appeal to all who follow this interesting art not to allow themselves to be led away by this fashionable craze; it is all very well to grumble about carrying the tripod, but let us think what will be the future of landscape photography if we allow such a thing as a little extra weight to carry to count as a factor in our picture seeking.

It is granted that hand cameras are indispensable for such as street views, or on the beach, or on shipboard, but they are decidedly out of place for use as picture producers. Therefore let us oppose all attempts to popularise the use of hand cameras at our photographic outings, the high standard of pictorial excellence to which landscape photography has attained being in great danger of reduction by the use and abuse of hand cameras.

R. P. DRAGE.

THE AMERICAN PHOTOGRAPHIC CONVENTION.

MR. J. M. APPLETON delivered the following:—With mingled feelings of pleasure and pride I greet you to-day at this our eleventh annual Convention.

Of pleasure because, through the goodness of an all-wise Providence, we are again permitted to come to the occasion of the year, a time to which the progressive photographer looks forward with great anticipations of cordial greetings and fraternal handshakings, of the renewal of old and the forming of new friendships. An annual feast of good things, the fruits of our year's labour, which we have brought together for emulation and enjoyment. A sort of photographic "Harvest Festival." Of pleasure because of the indications I see in your faces of goodwill and harmony, which are so important and essential to the greatest good for our Association. May this continue even more and more until as one man we stand, with but one aim—the advancement and elevation of photography; and to this end may all selfish purposes be sacrificed and *progress* be the motto of all.

Of pride because of the privilege of presiding over such an assembly, and at this the first Convention we have ever held in this beautiful and queenly city, our nation's capital and pride. Of pride because I am a member of the greatest photographic Association in existence, and the one capable of the most good; and shall be proud to know, if that from the deliberations and work of this Convention may spring new thoughts, new incentives and plans, that shall lead to greater achievements, better work, and aid in ennobling our beautiful art and science.

Much has been said and written towards the securing of better prices, and a general bettering of our condition. Associated efforts have been tried and yet all to no purpose. Careful consideration has led us to the conclusion that such things are largely controlled by the law of demand and supply, and all efforts to remedy through any other channel are more than useless.

Cheap prices have prevailed for several years, and the public is surfeited, and there is now demanded a better and higher order of work. Are we prepared to furnish it? Are we making such work as requires the utmost skill and care, and just such as *any* man would have to charge a good price for. I do not say that there has been no advance made among us since we last met, for we see evidences about us to the contrary; the beautiful photographic art productions to be seen at this exhibition show that somebody has been studying, somebody has been working and advancing during the year. But in this busy, *busy* world, where photography seems to be penetrating almost every known science and art, and men of science, education, and talent are working at it incessantly, it behoves us to look well to our laurels as professionals, and apply ourselves most diligently to study and work, that we may keep to the *fore*, or we may find in the near future our occupation gone. Realising then that what we most need is advancement to a higher plane, to a more extended knowledge and art education, we have arranged to have the work of this Convention along this line. So, in order that we may get the most possible benefit, let us each be in attendance at all the sessions devoted to this.

Our "practical talks" will be introduced by short papers on the subject, to be followed by discussion. If you have anything to offer do so, and make it to the point. Do you want to know?—ask through the question drawer, no doubt some one present can answer.

Our "art lectures" will be the criticising of photographs which have been kindly contributed for that purpose, and fairly represent the standard of American photography. These criticisms are intended to point out to us wherein we have failed from an artistic standpoint, and we hope will prove to us an excellent object lesson.

While we do not claim to have the best possible programme, yet hope you will recognise it as being in the right direction, and if it meet with approval, that it may be followed up another year still better, and so from year to year may we progress toward a more intelligent photographic culture.

Of our financial condition I need not say more than to refer you to our Secretary's and Treasurer's reports. I will say, however, that in round numbers we have deposited in bank in Chicago over $2000, which may be a matter of interest to some.

Considerable has been said during the year of the advisability of merging the offices of Secretary and Treasurer into one. This, you know, requires a change in the Constitution, and must be offered at one session to be voted on at the next. Now, if it be your pleasure that such change be made, I would recommend that an amendment to that effect be offered at this session, to be voted on to-morrow morning, and then your Nominating Committee could report in conformity therewith.

I desire now to respectfully call your attention to a matter which has been mentioned a number of times, but toward which nothing has yet been done. I would recommend that active steps be taken at this Convention to reach the desired end, if in your good judgment it is deemed wise and best. I refer to the securing of a permanent home for the Photographers' Association of America.

Our Conventions, if they do the good they are designed to do, must necessarily be expensive, more or less, according to location and circumstances. And as the Association grows older, if it increases and enlarges its spheres of usefulness, we can reasonably expect the expenses to increase.

Now we hope you will be considerate enough to allow that your officers each year conscientiously do the best they can to ensure as profitable and as successful a Convention as possible within our present circumstances.

To reduce expenses and increase our surplus, as I understand it, is the great *desideratum*, with the object in view of course of being permanently located some time, and better equipped for work. But this seems an impossibility under the existing order of things.

Now we think that the moneys that could be saved each year, by being so situated, coupled with what could be raised with a fair effort on the part of each, would secure for us just such a place as we need, and where our expenses would be light, and we could soon have money to devote to scientific and artistic improvements.

Studios and laboratories could be built there, where practical demonstrations could be made each year. A school might be established, and a collection made and placed there permanently, showing from year to year the progress of photography. Such a place, if properly located, could be made a source of revenue by renting parts of it at least during the year. And in a few years at most we could be firmly established as one of the educational institutions of the world. Then could our Association grow into its destined usefulness. This in turn would have its reflex influence for good on us all at our homes.

Now I hear you ask: How can this all be accomplished? how started? Let me suggest. But before doing so, I want to say in justice to others that this plan was *suggested* to me, and thinking well of it I herewith submit it. A crude plan is something like the following: Let stock be issued, say, at twenty-five dollars per share without dividend or interest for five years; each man holding one share being entitled to all the Association privileges during that time. We should think one thousand men at least could be induced to take one share each or more.

Now, if our manufacturers and dealers, of which one hundred could be found, would take ten shares each on the same terms, this, together with the one thousand one-share men, would net the sum of fifty thousand dollars, which we think would build and start the concern; and to this could be added at any time bequests. Possibly some one present would like to make one.

The saving to the dealers and manufacturers of the annual expense of fitting up their stands for exhibits would be quite an item toward their stock, for they then could fix their locations permanently.

I am told that this Museum Building cost about one hundred and fifty thousand dollars; a building one-fourth the size of this would be ample, or at least until the Association should become so wealthy and large as to require something more congenial.

These, of course, are only suggestions for a general plan which a Committee could work out in detail. But I think it of sufficient importance and interest to be worthy of your consideration, and so submit it, hoping that you may think favourably enough of it to take decisive steps towards it at this Convention, and that from it may come something that will result in a lasting benefit, not only to ourselves, but to those who are to follow. *Then* shall we as an Association have existed to some purpose.

PREPARING FOR AN EXHIBITION.

The first thing to suggest in giving hints for the preparation of work intended for an exhibition, is avoid presenting those views which have only local interest. It is a difficult thing to persuade a man that his dog, he is a bachelor, or his baby, if he is a married man, is not as interesting to every one as it is to himself. Such subjects seldom lend themselves to graceful composition. Let the exhibitor, therefore, beware and present only those views which have pictorial value or great local interest. An exhibitor must remember that he is publishing his work, and that it will be compared with the work of others, harshly or favourably, according to his knowledge of composition in the selection of a view and the arrangement of subjects, his skill in the development of the negative and making prints therefrom, and his taste in mounting them.

Having obtained a good negative of a good subject, the problem is: How shall it be reproduced so that the effect of nature existing at the time it was taken be suggested? No one process, however good it may be, is the best for all negatives. A burnished print is objectionable, as a general rule, because the polish presents a surface, and prevents one from imagining they are looking into a view; but in a few instances this polish, by making the shadows transparent, gives better results than other processes, which may make certain subjects appear "stale, flat, and unprofitable."

One should avoid printing by a method giving a colour entirely impossible to the scene represented; a blue tint of a landscape is particularly objectionable if there is much mass; but if the view is made up mostly of half tones and has distance, it is possible for a blue print to give a really fine result, as the colour lends to the picture an effect of atmosphere and the suggestion of distance. If it is desired to get the effect of early morning, when grey tones predominate, the bromide or platinotype process should be used; if it is desired to suggest the warmth of an afternoon landscape, then the sepia platinum or silver printing upon plain paper is the most suitable.

The following formula gives brilliant blue prints; the solutions are stronger than those usually recommended, but the results are better than those usually obtained:—

No. 1. 900 grains ammoniacal citrate of iron, 4 ounces of water.
No. 2. 600 grains red prussiate of potash, 4 ounces of water.
Mix equal parts of one and two as desired.

With a soft sponge, previously dampened in water, and then squeezed out, swab this solution over the paper, going backwards and forwards, say, once east and west, and then once north and south. This paper will not give clear whites after the second or third day. Clear whites, however, are not always desired. Fine results are secured by using this paper after a week old; then the blue is not so conspicuous, the tones are more of a grey, and if a heavy grade of Whatman's drawing paper has been used the effect of atmosphere is excellent. Blue prints are well adapted to marine studies, and if upon a paper with a grain, an effect of aerial perspective is obtained not to be equalled by any other process.

Bromides.—When asked how I secured the bromides shown at an exhibition of the Pacific Coast Amateur Photographic Association, I readily told the secret: Out of every ten prints of the same subject pick the finest. If one is careful and keeps a note-book of exposures, as he should do, such foolish extravagance is avoided. My practice has been to give a long exposure; to use more than the quantity of bromide suggested, and to dilute the developer about one-third. In this way rich tones are obtained, and there is a reserve, for if the print has been underexposed a much stronger developer can be used.

The beauty of bromide work is the amount of dodging one can do. By shading any part of the negative with a piece of cardboard during the exposure, "trembling" it to prevent sharp outline, obstinate high lights get their share of the exposure. If in development a shadow "pops up," it can be subdued with the acid solution. A camel-hair brush and a developer, proportioned as strong as one part of iron to four of oxalate if necessary, can then be used to bring out clouds or other effects. This dodging applies equally well to enlargements. I have one negative in which the foreground receives ten seconds' exposure and the sky fifty. The foreground comes up quickly, and is lightly washed with acetic acid solution to stop development; then the brush and a strong developer is used to bring out the clouds in the sky.

For a long time I got a straw-coloured sky in my bromides which closely resembled the warm tone of certain etchings; I afterwards found it due to washing all night in water having a reddish tinge. The effect is so good I have never tried a remedy. Perhaps a similar result can be artificially secured by soaking the prints in a weak solution of tea or coffee.

Silver Printing.—Although sometimes a burnished print upon albu-

menised paper will give fine effect by the depth imparted to the shadows, it will generally be found that a rich silver print upon plain paper gives the best average result.

The best paper for the purpose is that used for the finer etchings. It is made in Japan, and comes of various grades; it must first be sized and salted by floating about two minutes upon the following solution :—

Water	1 ounce.
Gelatine	5 grains.
Chloride of ammonium	40 ,,
Chloride of sodium	40 ,,
Chrome alum	4 ,,

First dissolve the gelatine in warm water, then add other chemicals, and filter.

When perfectly dry, the paper should be floated for two or three minutes upon a weak silver bath, thirty or forty grains to the ounce. After fuming, it is printed, washed, toned, and fixed in the regular way. The toning takes place rapidly; any good bath may be used, and very little gold is required. The tones vary from a sepia to a rich dark purple.

This process gives very fine results on Japanese tissue paper. When floated upon any solution this paper spreads out instantly. It is difficult to handle when wet; care should be used that it does not lap over on itself, as it is impossible to separate it. The printing is the same as with ordinary paper, save that the prints should be a trifle darker. Toning takes place even more rapidly than with the India paper, and it is best not to have more than four prints in the bath at one time. The prints look best when toned to a sepia, so do not carry too far. After ten minutes in the hypo the prints are soaked in a bath of common salt before the final washing. To dry them, it is well first to take up the surplus water with blotting paper, and then to spread upon a clean towel. If the print should lap upon itself don't try to separate it; put it back in the water, and it can be straightened with a little care.

Mounting.—In what dress shall the print appear? As a *belle* will look even more charming in becoming attire, so may a good print be bettered by being properly mounted. Notice the harmonious effect of a room furnished in one tone throughout. Let this give you suggestion for the scheme of presenting your work both as to mounting and framing. Beware of strong contrasts. A light print should have light surroundings, else the high lights will appear chalky; and a dark print should have a dark mount, or the shadows will appear blocked.

Blue prints are most attractive when mounted upon a paper having the same tone; if upon cardboard they will be improved by having a blue line drawn around them.

The soft neutral grey of the bromide lends itself to various schemes of mounting. The simplest and perhaps the best way to present them is to mount upon Whatman's drawing paper with a gelatine mountant. Do not cut the edges of this paper with a blade; use a paper knife, that the hand-made effect of the paper will be preserved.

Bromide and other prints will not cockle when mounted on thin paper by the following solution :—

Fill a graduate up to the three-ounce mark with cooking gelatine. Soak in cold water until soft, then dissolve in a water bath. Add three ounces of alcohol and an ounce of glycerine. Strain through a piece of coarse cloth and it is ready for use. It will keep for weeks, but the addition of a small pinch of salicylic acid dissolved in alcohol will make it keep indefinitely. The secret of using a gelatine mountant is to have plenty of it and to keep it hot. An oil stove is handy for this purpose. Apply with a wide brush, using a stick in the cup to "wipe" the brush on. Before pasting, place the print upon a piece of paper cut larger than the print, and use a fresh piece each time.

Centre the print on the mount by using a mask with an opening larger than the print. Adjust the print inside the opening of this mask, and mark two corners with the point of a pencil. To "square" a print upon a mount turn it face down, then the image will not disconcert you.

To mount with gelatine one must work quickly; there can be no shifting after the print touches the mount. Holding the print by the edges, adjust to the pencil marks. Rub quickly into place with the palms of the hands. With a thin piece of paper and a pocket knife rub the print down, giving particular attention to the edges. Put blotting paper between the prints as they are mounted or they will wrinkle. To put a print upon each side of a mount, let the first one dry thoroughly. If the solution becomes too thick, thin with alcohol and water, equal parts.

A simple "cut out" gives a very good effect, and is simply made by cutting out of proper material an opening a little smaller than the print. For cutting, use a sharp knife and a piece of glass underneath. Hold the knife aslant so as to produce a bevel. By mounting what is known as charcoal paper (to be obtained at any art dealer's store) upon common cardboard with starch paste, a cut-out can be had of the desired tint.

What is known to framers as the English mat is very effective for any kind of print, providing the colour of the mat is in keeping with its general tone. These mats are made by cutting an opening of the desired size out of cardboard and then covering the cardboard with paper. First thoroughly dampen the paper with a sponge. Place the cardboard upon it, and cut the paper so that it will lap over on the back of the cardboard. Glue these laps with prepared glue. In cutting the laps do not go quite up to the corners, else they will appear too sharp, and the cardboard will show through. If the print is already mounted, place this mat over the mount and glue both together. This method will give you a print mounted in the most serviceable and attractive manner. Before tissue prints can be so mounted, they must first be dampened with a sponge; being of a tough material they will stand this handling much better than supposed. After dampening the print, moisten its edges with glue, then adjust the mat into place. When dry, the print will be found stretched tight, and will present a much better appearance than its previously wrinkled condition would seem to warrant. To protect the print, the back of the mat should be covered with cardboard or heavy paper.

A very simple and attractive way to mount India and tissue prints is that adopted by art dealers for etchings. The prints are simply touched with glue at the corners and fastened upon plain cardboard. Before this can be done with either India or tissue prints they must first be stretched by being dampened and fastened to a board by running glue around the edges of the print. When bone dry, cut loose with a sharp knife and the print will be found "as flat as a pancake."

These plain paper prints look particularly well with a margin, as the delicate tint of the paper harmonises with the warm tone of the print itself. It is therefore best to mat the prints in the printing frame. They will also be improved by having a line drawn around the edges of the print; for this purpose a steel pen and some brown water colour is best. The rough line of a writing pen is better than that of a ruling pen for this purpose, because the line is not so stiff.

Prints made with a margin, and prints mounted upon any kind of paper, are made more attractive and have a more finished look if given a plate mark. Some accomplish this by using a piece of metal and squeezing upon the mount in a press. It is much easier to get this effect with a piece of cardboard and a pocket knife. Cut out a thin piece of cardboard as much larger than the print as you wish your margin to be. Round the corners slightly. Equidistant from the print make points with a pencil. Place your cardboard on top, squaring it to the marks. Turn over without letting the cardboard slip. It takes some knack to do this, but by placing one hand flat on the cardboard and sliding it and the paper to the edge of the table without slipping, the other hand can be put underneath and the whole turned over quite easily. If the print is large, place a flat iron on top to hold it in its place. With the finger-nail or the end of a pocket knife go around the edges, creasing the paper sharply or softly according to requirement. This will give a plate mark for all purposes exactly like that obtained from a copper plate. It is difficult to describe this process, which can be shown one in a few seconds. The results are worth the few failures due to letting the paper slip; but the process is really so simple that few failures will result after the first attempt.

A good effect is made by creasing a line around the print with the rounded end of a Yale lock key. As it is impossible to plate-mark cardboard, save by heavy pressure, this is a good way to relieve prints so mounted. Mats and cut-outs are improved by having these crease lines around the openings, just at the edge, or further away according to taste.

Silver prints which have been slightly overdone can be made to look well by putting in optical contact with glass. Dissolve a few slips of gelatine in a couple of ounces of hot water. Take the print, which must be previously soaked in slightly warm water, and place in contact with the glass by using a squeegee. Prints so mounted look very well with a mat made of leather. There is a tough Japanese paper made to imitate morocco, which is also very well suited to this purpose.

I have taken pains to call particular attention to prints upon Japanese paper, for in my experience of all the processes that one has given the most satisfaction, both to myself and to those of my friends, who by years of devotion to the artistic have a critical eye for agreeable effects. The process is inexpensive, the prints are quickly produced, and if properly made are permanent.

These suggestions have extended to a greater length than should appear in an annual mainly devoted to terse articles; but they are written in the belief that too little attention is paid to printing processes, and that too little attention is given to the print after it is made. The

work of the painter is practically over with the last stroke of his brush; but with the ambitious photographer the production of the negative is only a third of the work. The painter sends his production to the framer, and, save for the selection of the frame perhaps, that is the end of his labour; the artist photographer who would have his work appear to the best advantage should do the rest of the work himself, that he may get the very best effect out of each print.

It takes time and trouble to make and properly mount prints by the processes herein described, but it is hoped those who possess the patience to read these lines have negatives worthy of that trouble. If they have, and are willing to spend the necessary time over their productions, they will be contributing, not alone to the progress of photography, but to a higher realm—the domain of the fine arts. A. J. Treat.

—*Anthony's International Annual.*

WEIGHTS AND MEASURES.

Our English cousins at the recent Convention at Chester made another effort to induce photographers to adopt a rational system of weights and measures. For this purpose a Committee was appointed, consisting of William Bedford, of the Photographic Club, A. Cowan, A. Haddon, A. Levy, A. Pringle, G. Watmough Webster, and Professor C. H. Bothamley. A copy of their report lies before us, and it is an interesting contribution to photographic literature.*

After a number of preliminary observations as to the present confusion of weights used by photographers, the following recommendations are given:—

A. *Weights and Measures.*—1. If the metric system be used, weights will naturally be expressed in grammes, and measures in cubic centimetres.

2. If the English units be used, the minim and the drachm should not be employed at all. All weights should be expressed either in grains or decimal parts of a grain, or in ounces and fractions of an ounce; all measures in fluid grains, or in fluid ounces and fractions of a fluid ounce.

B. *Formulæ.*—3. Formulæ should give the number of parts of the constituents, by weight or measure, to be contained in some definite number of parts, by measure, of the solution. The mixture can then be made up with (*a*) grammes and cubic centimetres, or (*b*) grains and fluid grains, or (*c*) ounces and fluid ounces, according to the unit selected.

4. The standard temperature for making up solutions should be 15° C. or 62° Fahr. No appreciable error will be introduced by the fact that these two temperatures are not quite identical.

5. Formulæ should give the quantities of the constituents to be contained in x parts of the finished solution, and not in the quantities to be dissolved in x parts of the solvent. When a solid dissolves in a liquid, or when two liquids are mixed, the volume of the solution or mixture is, as a rule, not equal to the sum of the volumes of its constituents. The expansion or contraction varies with the nature of the solids and liquids, and the proportions in which they are brought together. In making up a solution, therefore, the constituents should first be dissolved in a quantity of the solvent smaller than the required volume of the finished mixture, and after solution is complete, the liquid, cooled if necessary to the ordinary temperature, is made up to the specified volume by addition of a further quantity of the solvent.

6. It is very important to specify in the case of liquids whether parts by weight or parts by measure are intended. The equivalence between weight and measure only holds good in the case of water and liquids of the same specific gravity; a fluid ounce of ammonia solution or of ether weighs less than an ounce; a fluid ounce of strong sulphuric acid weighs nearly two ounces.

7. Whenever possible, formulæ should give the quantities of the constituents required to make up 10, 100, or 1000 parts of the solution.

8. When a mixture (*e.g.*, a developer) is to be prepared just before use from two or more separate solutions, it is desirable that the proportions in which the separate solutions have to be mixed should be as simple as possible; *e.g.*, 1 to 1, 1 to 2, 1 to 3, 1 to 10.

9. When metric units are employed the original French spelling "gramme," should be used in preference to the contracted spelling "gram," in order to avoid misreading and misprinting as "grain."

These recommendations are exceeding simple, and well worthy of trial by all intelligent photographers. The metric system is most assuredly the best to use, since measures and weights in this system can be purchased from any manufacturer of chemical apparatus, and the more enterprising of the photographic merchants. These weights and measures are just as cheap as those made upon the old system, notwithstanding any statement to the contrary. We have before us a price list of metric weights in which a set, 20 grammes to $\frac{1}{100}$ of a gramme, is marked at less than $2. These would be used for all small quantities. For larger quantities, up to 1000 grammes, a set of iron weights are listed at $1·25. Therefore, by the investment of $3·25 for weights, and not more than the same amount for measures for cubic centimetres, every possible contingency in the metric system would be met. This part of the recommendations given above we entirely agree with, but the use of ounces and grains is to our minds a delusion and a snare, and only tends to complicate a decimal system. If you get a set of weights on the grain system you would need a set of measures on the same system, and these are not easily obtained. If you use ounces and follow the decimal system, weights of decimal parts of ounces would be necessary, and the corresponding fluid measures. At the present time decimal fractions of ounces and fluid ounces are unknown to us. We therefore protest most emphatically against the adoption of any such system. The metric system is so simple that we cannot believe there is a living photographer who is not intelligent enough to use it. All that has to be remembered is that one gramme of water measures one cubic centimetre, and that these are multiplied and divided by tens. It seems to us almost impossible to conceive anything more simple. The difficulty has been, as we have said on a previous occasion, that writers on this subject have tended to complicate the system, as far as weights and measures are concerned, by introducing a lot of terms that are valueless, and serve only as an exhibition of their knowledge of Latin and Greek prefixes. The beauty of the metric system to all those who have used it is that the measures and weights are expressed in cubic centimetres and grammes, and that the subdivisions are decimal. If we were to write for a week we could not add anything to this, and the mere statement teaches the metric system. All that is necessary to carry it out is to buy the weights and measures and use them; they are infinitely easier to manage than any other system yet devised.

The use of the metric system has become so important and is so simple that the Committee of Revision of the United States Pharmacopœia have decided to introduce it into the next edition of that important volume, which is now under consideration. This has been done after the mature deliberations of hundreds of physicians and druggists in the United States, who recently met in Washington, D.C., to consider the revision of the United States Pharmacopœia. It will therefore be essential for every druggist to understand the system, and surely photographers may readily do so.

The other recommendations in the English report we heartily indorse. We would call special attention to paragraphs five and six. It is extremely important to make solutions containing a definite number of parts of chemical *in* a given volume and not parts added *to* such volume. The use of correct terms either in weight or measure for liquids heavier or lighter than water is also often neglected.

We hope that the time is near at hand when, 20 grains = 1 scruple; 3 scruples = 1 drachm; 8 drachms = 1 ounce; 16 ounces = 1 pound; with the fluid measures, 60 minims = 1 drachm; 8 drachms = 1 ounce; 16 ounces = 1 pint—will be things of the past. How different the metric system, 1 cubic centimetre of water = 1 grain.

—*Anthony's Bulletin.*

* This report appears *in extenso* in The British Journal of Photography, page 420.

SHOP WINDOW AND SNAP-SHOT PHOTOGRAPHS.

[*Daily Telegraph.*]

Eminent photographic firms no longer, we are told, look upon the photomania of a few years ago as a source of income. Well-known shops, "for years useful to artists in want of photographs of celebrities," are closed, and no man is bold enough to adventure re-opening. The peripatetic vendors of like wares have disappeared from the public streets, or filled their carts and barrows with more saleable merchandise, and, according to the same trade authority, the Automatic Photographic Supply Company has discovered that the fascination once exercised by likenesses of ladies and gentlemen of the dramatic profession has sensibly waned, even though these gifted personages were to be procured, like everything else nowadays, by dropping a penny in the slot. Amongst learned and scholarly circles there is still a demand for bishops, men of letters, and "advanced thinkers" of various schools. Poets and artists and novelists are asked for and invested in, and there is still extant a fondly loyal class delighting in the possession of photographs of all "Royalties" of all countries, at all ages, and in all positions. It must also be admitted that the "family album" is still a cherished institution, and that usually dreary volume is highly useful as a record of the fitful changes of fashion, a study of the rise and fall of crinoline, and chignons, and similar eccentricities as extinct as the dodo. The rage for the purchase of celebrities or "notorieties," however, is stated to be exhausted. What has led to this remarkable change in public humour, and whence

comes the disappearance of a once popular whim? This is a question which the authorised organ of the craft is powerless to answer, contenting itself with a regretful record of the facts. A little investigation may possibly furnish some clue to the mystery.

Perhaps the secret lies in the fact that, while the purchase of public photographs issuing from well-known *ateliers* has sensibly decreased, the practice of the art of photography has spread enormously among the ranks of the amateurs. Really beautiful, sympathetic, and serious work is shown year after year in the photographic exhibitions; the mysterious varieties of the various "processes" are being gradually mastered by the amateur apprentices; and the cult has been brought to such perfection that high-class photography may in truth be said to have captured Phœbus Apollo and made an artist of the Sun-God. The serious artist-photographer, then, would scorn to buy a picture not of his own producing, and it is likely that a similar spirit inspires his more comical brother, who has taken up the merry pastime of playing with one of the various amusing forms of "detective," or, as they are often very properly termed, "demon" cameras. These ingenious "snap" detectors—remorseless recorders of a chance attitude, possibly inartistic, nay more, possibly compromising—are concealed in despatch or cigar boxes, peep out with inquiring eye from the back of a harmless neatly bound book, or can even hide their inquisitive eyes in the most innocent-looking of brown-paper parcels. With a couple of dozen "dry plates," a combination of a string and a shutter, and this apparently guileless instrument in his possession, the owner has only to learn the knack of holding it steadily and firmly against the body, and he can literally "shoot his friends flying," when they never dream of pose or smile. The flight of birds, the movement of a horse and its rider in the very act of topping a hurdle, the rush of a racing yacht through the foam—they have even gone so far as to be able to snatch the changing shapes taken by a charge of small-shot in mid-air—are all picturable by the new race of "Peeping Toms." The pictures are wonderfully brilliant and sharp, and the detective camera fairly takes rank with Edison's phonograph as part of that new movement which may be termed the ceaseless surveillance of science. How Fox Talbot, and Daguerre, and others, who almost contemporaneously gave to the world the secret of producing a photographic image by the action of light upon the sensitive salts of silver, would have wondered could this *ne plus ultra* result of their experiments have been prophetically revealed to them! Their advanced disciples are now numbered by millions, and it is no doubt largely to the spread of amateur photography, especially of this humorous though not altogether comforting detective character, that is to be attributed the alleged falling-off of the demand for the works of the professionals.

Of course, no one likes the idea of being caught, fixed, developed, and mounted, when unprepared. It is not given to all men and women to be habitually graceful, and even the most elegant youth, whose permanent public pose is that described by lady novelists as suggesting "a young Greek god," may sometimes relapse from his habitual Hellenism, and, what is more to the point, be caught in the act. It is hard, very hard, to evade the all-searching eye of this remorseless inquisitor. That astute convict "Henry Fergusson," as told by our Paris correspondent the other day, in spite of the fact that he possessed "finely cut features" and had "hair falling in ringlets over his shoulders," displayed a resolute antagonism to be photographed. He made grimaces at the lurking camera, and wriggled out of focus, despite all the efforts of the prison authorities of Rennes. He may have had some rooted personal objection to having his "finely cut features" sent to all the police albums of diverse countries; for many convicts entertain a singular prejudice against this artistic custom. It was only after he had spoiled many negatives, and successfully escaped all recording recognition a dozen times, that he was "snapped" when in the presence of the judge and jury of the Assize Court by a concealed camera, and in this unsuspicious moment handed down his features and his ringlets to posterity and the French police. Mr. "Fergusson," of Rennes, however, is by no means the only objector to the "snap" system, for complaints on the subject are to hand from erudite and scholastic circles. At a certain large public school it is one of the canons of chastisement that when a form-master is under the painful necessity of caning a truculent or perversely stupid boy, the punishment must be so inflicted that the cane is raised no higher than the master's own shoulder. This benevolent and merciful rule was, it appears, habitually neglected by one of the form-masters, whose style was of the lofty brandishing order. Various chastised culprits from time to time made protest against this literally high-handed proceeding. They requested that the regulation horizontal and not the perpendicular movement should be rightly adhered to, and protested as strongly as did their cricketing forefathers, before the rules were revised, against the "overhand delivery." The castigator stoutly denied the accusation, and the situation became very involved indeed, until one of the youthful offenders bethought him and bought a detective camera. At the very moment of punishment, when naturally, as the correspondent puts it, "the master's attention was otherwise occupied," a flash on a dry plate exhibited beyond all possibility of doubt the cane elevated above the regulation point. The fatal film was shown to the head master who, with impartial Spartan severity, rebuked the transgressing under master on the evidence of the photograph, and at the same time gave the audacious young photographer four hundred lines of a recognised classical author to write out for "playing in class." These instructive stories point out some of the possible terrors of the new photography, but to continuously upright and properly behaved people there should be no ground of apprehension at all. "So act," says Kant, "that the motive which influences you shall be fit for law universal;" and, coming from the region of pure ethics to more sensuous æsthetics, it might be suggested as a parallel maxim, "Always conduct yourself in such a picturesque and graceful fashion that you may boldly defy the doings of the demon camera, and stand in no fear of a random snap shot."

ROYAL CORNWALL POLYTECHNIC EXHIBITION.

The old town of Falmouth this year, to all appearance, has had more than its share of visitors, owing to the increased facilities given by the Great Western Railway, the whole journey being accomplished in a little over eight hours from Paddington, instead of twelve or thirteen hours. As for accommodation, apartments have been at a premium; and there is no doubt that the West will become a fashionable resort. Cameras are to be seen everywhere on a fine day; they appear to spring up like mushrooms. There are also several dark rooms to be had for changing plates in the town. The Polytechnic Society opened its fifty-eighth exhibition on Tuesday, the 26th, and owing to the number of visitors, the spacious hall was packed to the utmost. The Right Hon. Leonard Courtenay, Esq., M.P., was President, and gave his address in a most able manner, which lasted nearly one hour. He was then followed by Sir Joseph Pease, M.P., Sir Edward Sieveking, M.D, and Pendawes Vivian, Esq. The photographic department is under the management of Mr. W. Brooks, of Reigate. The number of pictures exceeds previous years, and they are of high merit in all classes. This department is one of the chief features in the exhibition, as evinced by the large attendance.

Not only can dark rooms be used for changing plates, but supplies of plates can be obtained at several places, chiefly England's and Ilford plates.

Photographic Section—Judges' Report.

The judges have great pleasure in congratulating the Society on the maintenance of the high excellence of the exhibits in this department. As regards the number of pictures, they are far in excess of any previous year. Several of the old exhibitors are again well to the front, and also many new exhibitors who are well known adepts in the art science. The judges are well aware that many exhibitors have apparently been passed over whose productions are of high technical excellence; in some of the classes the judges have been obliged to double the awards on that account. In the professional section, landscape subjects are not so numerous as in former years.

Mr. R. W. Robinson is still persevering with his self-imposed task of *Artists at Home*, which, when completed, will form a very valuable and interesting collection. Platinum printing is fast driving silver printing out of the field, as quite two-thirds or more of the exhibits are printed by the former process. The amateur section is also well maintained. In the photographic appliance department, Messrs. Oakshot & Co., of Falmouth, occupy a room, and exhibit almost every requisite required for either the amateur or professional photographer, which will be very attractive during the exhibition.

Professional Section.—The Autotype Company, of London, are represented by some of their well-known work—enlargements in carbon—the best of which is a portrait enlargement of the Right Hon. Earl Selborne in his robes of office; and also two portraits of the Marquis of Salisbury and Mr. W. E. Gladstone. There is also a goodly number of pictures, chiefly enlarged portraits, by a local photographer, Mr. W. M. Harrison. J. R. Gibson sends a series of cloud studies which are of great value to artists; he also sends several landscapes which show careful work. Mr. T. Protheroe, of Bristol, contributes three enlargements; for No. 23 he receives a first bronze medal. Mr. Lyd Sawyer sends some masterpieces in instantaneous photography; and the judges think he might have shown better taste if he had left out those objectionable tickets which each frame contains, stating the awards received at other exhibitions; it might impress many people that they were put there for influencing the judges. Pictures sent in this way in future will at once be disqualified. No. 26 of this series has been awarded a first silver medal, *On the Tyne;* the treatment is admirable, and the whole series by this gentleman is well worthy of careful study. Mr. R. H. Lord sends two pictures (composition). No. 37, *Work and Play*, is a very fine study, to which is given a first silver medal. Mr. T. G. Whaite takes a first bronze medal for an enlargement—a group on the seashore—which shows good work. Mr. W. E. Henry sends six frames; the subjects are of Lichfield Cathedral, which show skilful manipulation. Mr. H. P. Robinson is not so happy in his subjects this year; No. 51, *Gossip on the Beach*, a composition picture, is a little too hard

to be effective, and not by any means up to his usual standard. Mr. W. J. Ankorn sends two clever little pictures of the *genre* order. Mr. E. S. Spencer is represented by six pictures of merit. Mr. H. W. Reeves has some clever interiors; to No. 65 has been awarded a first bronze medal. Mr. Richard Keene, of Derby, receives first bronze medal for his series of pictures in platinum of Old Moreton Hall, Cheshire, which are very fine indeed. Mr. W. W. Winter, also of Derby, takes chief award in portraiture, viz., first silver medal, No 81, *Miss Gibbs*. This gentleman's work needs little or no comment. Mr. C. C. James shows several good pictures. Mr. B. Wyles shows several portrait studies of large size, and several other very clever studies. Mr. J. D. McNeille sends two pictures, the best of which is *Hoar Frost—Holy Trinity Church*. To No. 110, by Mr. F. Whaley, has been awarded a first bronze medal for his clever and effective picture, *A Tale of the World*. Miss Annie Blake shows some coloured work by the air brush, the colours being far too crude to give any artistic effect. Mr. S. W. Bhedwor contributes a goodly number of small pictures, which receive honourable mention. Mr. R. W. Robinson takes first bronze medal for his picture, landscape with cattle, which is well treated, and with good atmospheric effect; he also continues his series of *Artists at Home*, which are exceedingly fine. To these honourable mention has been awarded. Mr. H. Hewitt forwards two pretty little pictures. Messrs. York & Sons, of London, exhibit a frame of lantern slides, the subjects being well chosen, and are awarded honourable mention. Mr. L. Berry shows two pictures of the high altar of St. Mary's. F. W. Edwards is again represented by several of his well-known pictures of large size printed in platinum; one of a silver shield is a marvellous production. Mr. J. E. Goold shows some exceedingly good instantaneous pictures of ships of war. Mr. W. J. Byrne, of Richmond, is represented by three frames of panel portraits, taken at the homes of the sitters, which leave nothing to be desired, being soft, brilliant, and well modelled; frame No. 179 receives the award of a second silver medal. Mr. F. Greene shows some fine cloud studies. Mr. G. Speight shows one picture. Mr. J. Lewis sends a series of pictures by Dr. Nichols' kallitype process, similar in effect to platinum pictures.

Amateur Section.—Mr. Westly Fry has been awarded a first bronze medal for No. 203, *Young Naturalists*, an enlargement on bromide paper. It is full of atmosphere, and the subject is very artistically treated. Mr. John Pike also sends some very fine enlargements on bromide paper, the best of which is *Castle Garth*. Mr. C. V. Shadbolt shows some very careful small work. Mr. A. G. Taglioferro is represented this year by two productions, *Choragium*, a classical subject, treated in a masterly way, and the surroundings are well in keeping with the subject; to this has been awarded a first bronze medal. Dr. J. J. English has three frames of good work. The Rev. H. B. Hare carries off the chief award, viz., first bronze medal, for the best landscape in the section, *Under the Mendips*, which is a gem in its way. The same gentleman is represented by several other pictures of equal merit. Mr. S. F. Clarke, L.D.S., forwards a pretty little picture, *What Love hangs by*, of the *genre* class. Mr. A. K. Dresser is very strong in his exhibits, which are very varied; No. 225, *Corbiere Rocks in a Gale*, takes a first bronze medal. Mr. C. V. Roe shows several well-chosen subjects. Mr. J. W. Charlesworth sends a perfect little gem, No. 241 (instantaneous), *A Grey Day*, very tenderly treated, and has been awarded a first bronze medal. Mr. T. H. Morton shows five frames, Cathedral subjects. Mr. T. H. Hermon also sends five frames of good work. H. D. Arnott, No. 256, a frame of interiors, takes a first bronze medal; these are exceedingly fine, and well rendered in every respect. Mr. J. Mountford shows some capital studies on the Avon. A. Steiglitz, F. P. Perkins, T. L. Buck, C. Court Cole, and several others, show very good work. The latter gentleman's productions are printed by Blanchard's platinum toning process, and have a very pleasing effect.

Photographic Appliances.—Mr. James Wood, of Liverpool, exhibits a print washer with adjustable rack for plates of improved pattern which seems very effective. Mr. W. Rooke, of London, also exhibits a washing machine for prints with spray bar, which rises and falls by means of floats on each side, and is automatic in its action. Mr. E. Spencer sends a head-rest of very ordinary character, similar to those used for children twenty-five years since, and at that time were in every dealer's catalogue.

The Art Union of Cornwall.

There is an Art Union in connexion with the annual exhibition; the draw taking place at the end of the exhibition. Money prizes are allotted to the successful members, and pictures in the Fine Art Department—including photography, professional section—must be selected to the amount, and by that means a number of works are disposed of. The drawing took place last Friday evening, with the following result:—

319. W. N. Carne, 10*s*. 766. W. N. Grylls, 1*l*. 943. B. Freeman, 5*l*. 926. W. H. Olver, 2*l*. 220. Miss Simmonds, 1*l*. 676. E. Spencer, 10*s*. 906. Dr. H. Moore, 2*l*. 4. W. J. Hosking, 1*l*. 802. Captain Hrestendahl. 592. R. Fox, 8*l*. 648. R. Lidderdale, 15*l*. 789. E. W. Newton, 3*l*. 180. W. Johns, 3*l*. 991. E. Hancock, jun., 1*l*. 129. Earl of St. Germans, 5*l*. 1068. Dr. Banks, 1*l*.

THE CHAUTAUQUA (N.Y.) SCHOOL OF PHOTOGRAPHY.

[Read at Chautauqua by the Instructor of the School.]

"We study the Word and the Works of God," the motto of the C.L.S.C., now displayed in our amphitheatre, describes most thoroughly the work done in Chautauqua, and by Chautauquans all over the inhabitable globe. The study of the Word has been followed by that of His Works, and the fruit of our labour has become visible all around us.

We are endowed with perception, and our judgment has commanded us to examine into the forces of nature, to observe their effects and to inquire into their causes, and by doing so we are awed by beholding the work in its entirety and in its every detail. We have learned to look into the construction of the minutest organisms, even those invisible to the unaided eye, we follow the course of celestial bodies with ceaseless attention and their nature and composition has been revealed to us. Objects from the bowels of the earth, or the bottom of the ocean, unknown to mankind but a short time since, have been laid open to be studied, and we have become as intimately acquainted with our planets' atmosphere as with the growth of forest and field, or with the beautiful prairie flower. Strata of rock and alluvial formation have been opened to our view, the madly rushing waters of the cataract have been commanded to stand still, as it were, for the purpose of being examined, and of the form and construction of man more perfect and truthful representations are now made than can possibly be attained with brush or chisel.

What has aided us towards these marvellous attainments, and what assists in our efforts to look so deeply into the works of God that the most remote detailed of organic and inorganic beings are open to inspection and our diligent studies?

It is all accomplished by most simple means. A piece of glass only, coated with a peculiarly compounded substance, and upon which the rays of the sun or artificial light reflected from a visible object is concentrated by another glass, ground in spherical form; in short, by the camera obscura and the light-sensitive plate. We write by these means, produce pictures, or, as we say in modern language, we photograph.

Wonderful things have been done by photography in the abstract sciences, as in astronomy spectrum analysis is almost entirely dependent upon, and microscopy's absolutely necessary recorder is now the sensitive plate. To facilitate the study of natural sciences, of botany, biology, and a multitude of others, to learn more distinctly of nature's beauties and marvels, to better educate our eye and heart, Chautauqua has given to her students a School of Photography.

It is needless here to tell of all that photography, the "art science," as it happily is now called, is able to accomplish. What can be or is done by the force of chemical and physical means enlisted to her service you all are thoroughly acquainted with, and it is more to the present purpose to tell you of our modest institution, and how far we have entered into the ideas of popular instruction, and of the success the school has had to the present.

Our method of teaching is very much like that of the C.L.S.C., and the examinations of the students after the course of instruction is completed the same. Our work demands, however, more than reading or theoretical instruction, the student must practise, and ocular demonstrations are necessary in frequent if not in all cases. We have, therefore, established practising classes here on these beautiful grounds in summer, and in winter at the school headquarters in New York. Many students embrace the opportunity, and the results obtained are most creditable to the instructed and gratifying to the instructor. But many others, the majority of students in photography, are debarred from these benefits. Those residing on the Pacific slope, and others whose home is beyond the seas, can hardly be expected to come to our practising classes from so far, and there are many who are prevented by the force of other circumstances to join. All these students receive instruction by printed lessons, and by communicating at regular intervals with the instructor. Numerically the corresponding class stands in the front rank, in accomplishments it is not second to either of the practising classes, as the specimens exhibited before you will testify.

Our school work commenced only a few years ago under very adverse circumstances, and has since gained largely in almost every direction.

The first class, that of 1886, had only five students. The list of members of the school year ending June 30, 1890, has 157 names.

We instruct in practical and theoretical photography in four classes, viz., the Corresponding Class, the Practising Class at the Assembly Grounds, the Local Class at the New York Headquarters, the Post-Graduate Class.

To the Corresponding Class belong at present	81	students.
In the Practising Class there were instructed during the past year	49	,,
In the Local Class there were instructed	21	,,
In the Post-Graduate there are now	6	,,
	157	,,

Of these are :—

Females	64
Males	93
	157

The ages of the students are from fifteen to sixty-four years.

Of the 157 students, were trained for professional work	15
To assist in the avocation of engravers, draftsmen, engineers, &c.	23
Professionals, teachers, scientists, &c.	30
Amateurs	89
	157

The following States and Territories are represented by the students of 1889-90:—New York, 49; Massachusetts, 14; Ohio, 13; Pennsylvania, 11; New Jersey, 7; Connecticut, 7; California, 5; Michigan, 5; Kentucky, 3; New Hampshire, 3; Minnesota, 3; Iowa, 3; Idaho, 2; Oregon, 2; Kansas, 2; Maryland, 2; Illinois, 2; Rhode Island, 2; Texas, 2; Utah, 1; Washington, 1; Tennessee, 1; Colorado, 1; West Virginia, 1; Wisconsin, 1; Indiana, 1; Colorado, 1; Delaware, 1; Vermont, 1.

Of foreign countries are:—England, 2; Turkey, 2; Canada, 1; Dutch Guiana, 1; Japan, 1.

The *Photographic Times*, which is the official organ of the school, has established a separate Chautauquan department for the instruction of students. It is issued with its monthly edition.

The Chautauqua Photographic Exchange Club, an institution of the school, has proved to be an extremely useful and instructive adjunct.

Many of the students in photography were not connected with any of the Chautauquan institutions before joining the school. They have without exception become, since, enthusiastic admirers and followers of the Chautauquan idea.

THE EIKONOGEN DEVELOPER.

It is very nearly a year since this new developing agent was introduced to the photographic world; that it has rapidly grown into favour on its own merits is attested by the increasing number of plate manufacturers who are recommending it as superior to the pyro developer, advising its use if the best results are to be obtained.

It is seldom a new developing agent is so favourably received, since it is hard to overcome prejudices in favour of old-time developers, but the advantages of eikonogen are so manifest to any one who tries it fairly that it frequently converts the most conservative at once.

It is an extremely simple developer, and, unlike pyro, will develop the latent image without the presence of an alkali, that is, as commonly understood, for we think it is the presence of the sodium salt in the sulphite of soda that supplies the alkali element in a small degree. It has been found, however, that a plain solution of eikonogen without sulphite will develop a plate.

The varied experiences of those who have given the developer a trial show that it does not work alike in all hands, which may be probable because of the different grades of preserving chemicals used. The best form of developer we have used is made with the clear, pale, green crystals dissolved in a perfectly chemically pure solution of sodium sulphite, Merck's C. P. crystals are what we prefer. When mixed, these give a pale green solution, perfectly clear, and very vigorous. We find this solution if preserved in a darkened room keeps clear for a long time.

To make the stock solution, simply dissolve two ounces of sulphite of soda in forty ounces of warm distilled water, and add one ounce of eikonogen. By stirring with a rod it is soon dissolved. Where it was formerly advised to mix the alkali (carbonate of potash solution, three ounces dissolved in eight ounces of water) with the eikonogen, it is now recommended to begin the development with the simple plain eikonogen, diluted one fourth with water, until it has permeated through the film; then, after the image has started, or is too slow in coming out, add to two ounces of developer twenty minims of the alkali, or carbonate of potash solution. By pursuing this course the minim amount of alkali introduced into the developer prevents the appearance of alkali fog, keeps the solution from getting thick, and reduces to a minimum the tendency of the plate to frill.

During development more or less particles of the film along the edge of the plate will become detached, and if the solution is warm some of the gelatine will dissolve, which will cause the developer to thicken perhaps after the development of two or three plates; hence it is advisable to frequently filter it, and to make good the loss by adding a little fresh eikonogen. The strength and activity of the solution is thus maintained.

When a series of plates has been developed, instead of pouring away all of the developer, some of it should be filtered and preserved in a small bottle kept tightly corked for use in mixing with fresh developer, especially when time exposures are to be developed, since it has the same effect as the addition of a bromide (that is, aiding in producing density), without retarding the development.

A correspondent interested in the subject complains that he has difficulty in obtaining density, is troubled with frilling, and notices that the solution rapidly darkens after use, though kept in a tight-stoppered bottle. He suggested that the first difficulty may be due to too large an amount of alkali in the developer, and the turning of the developer, possibly, to an impure grade of sodium sulphite. His supposition is very nearly correct.

Want of density is sometimes due to too weak a solution of eikonogen, or in not leaving the plate in the developer long enough. The rapid change of the solution is accounted for by the use of insufficient sodium sulphite, or of a poor grade of the same.

From experiments it has been determined that the larger the amount of sulphite in the developer the slower it works.

It is rather interesting to note the varying quantities advised by different makers of plates. Our correspondent has gotten up a tabulated statement which shows clearly the differences alluded to, based on the ounce standard:—

	Eikonogen.	Sodium sulphite.	Potassium carbonate.	Sodium carbonate.	Potassium bromide.	Distilled water.	Glycerine.	Potassium ferrocyanide.	Remarks. Sodium sulphite, gr. to the oz. of solution.	Potassium carbonate, gr. to the oz. of solution.
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.		
Formula of manufactrs. of eikonogen	1	2	15	16	1-16	45			17 1-5	9 1-7
Seed Dry Plate Co.	1	6	1½			60			43 2-3	10½
Cramer Dry Plate Works	1	2½	1½			83			22	11
Eagle Dry Plate Works, time expo.	1	2	6			128			7	20 31-56
,, ,, ,, ,, instant. expo.	1	2	1			30			29	14½
Harvard Dry Plate Works	1	2	2			80			11	11
Allen & Rowell Co.	1	4	2			80			22	11
,, ,, instant. exposure	1	4	2			40			43 7-10	22
,, ,, bromide paper	1	3	3			128	1		10½	6 53-64
,, ,, lantern slides	1	5	1	1		128	1	¼	17	3½
,, ,, average for plates, bromide paper, and lantern slides	1	3 1-9	2½			74½				

Most of the formulæ are based on 437 grains to the ounce; taking that as a standard, and summing up the number of grains to the ounce in the six separate formulæ of the sodium sulphite and carbonate of potash, then taking their average, the amount of sodium sulphite for the eikonogen developer is found to be twenty-four grains to each ounce, and carbonate of potash eleven grains to the ounce.

No satisfactory reason is given for the unusual amount of carbonate of potash recommended in the Eagle plate formula; experience shows that it would have a tendency to fog the plate, or to frill it if the gelatine is soft.

During the hot weather of the summer, eikonogen crystals have been observed to change in colour from a pale, clear green to a brown-black tint, even though sealed in bottles, excluded from the outer air. When dissolved, such altered crystals make a dark-green solution, but the power of the eikonogen does not appear to be lost. It is only in looks that it seems to be defective. This change may be brought about by heat, but as yet no reason is advanced, except that it is known that eikonogen which has been made for some time gradually discolours. It is to be presumed that further investigation will decide what is the actual cause of the discolouration, and doubtless before many months a way will be found to prevent it.

We are informed by the manufacturers that the discolouration will be prevented or checked if the salt is emptied from the package and spread

out so that the air may have access to it. We are also advised that a dark-green solution of eikonogen may be clarified by the addition of a few drops of a saturated solution of bisulphite of soda. We dissolved 480 grains of the bisulphite in two ounces of water, and ascertained that half a drachm (thirty minims) added to one ounce of the dark-green eikonogen solution was sufficient to change the colour from green to a light red, but it did not appear to make the solution any more transparent.

Applying this altered solution to a bromide print, we were unable to develop the pictures after five minutes' immersion, except to see a slight image. A few minims of carbonate of potash solution were added, then the print developed out with moderate rapidity. The colour of the developer was also altered from red to green again.

It would seem from this experiment that the addition of sufficient bisulphite of sodium to the developer to change the colour is not advantageous, that it undoubtedly shows the action was manifest. We think it may be used to advantage in mixing up the original developer, and probably one ounce will equal in preservative quality that of two of sulphite of soda. We shall experiment further in this direction.

—*American Amateur Photographer.* F. C. BEACH.

A CAMERA CLUB FOR TORQUAY.

As the result of circulars sent out by Mr. George Edwards, a preliminary meeting of those interested in photography, principally amateurs, was held at St. Winifred's School on Thursday evening last week, with the object of considering the desirability of forming a Photographic Society or Camera Club for Torquay and the neighbourhood.

Mr. E. Vivian presided, and in the course of a few introductory remarks, observed that it was doubtless well known to most of those present that he had long taken an interest in photography. He was amongst the earliest amateurs who had a camera in Torquay, and, as the consequence, he had a whole heap of negatives, to the use of which the members of the society, if it were formed, would be very welcome. These negatives would show the history and advance of photography in a rather different manner to that in which its progress was generally regarded, viz., the manner in which the different preparations had faded—a fact which was not thoroughly understood. He thought it would be very desirable to form some sort of society for the furthering of photographic knowledge. As a rule, he never desired to interfere between amateur and professional workers in art or science unless the two could go hand in hand and afford mutual help, but he understood that in this case there was a belief expressed that a combination between the two would effect that good object. Under these circumstances a society was not only quite feasible, but was most desirable.

Mr. George Edwards, as the convener of the meeting, referred to the many difficulties which he had experienced in the pursuit of what was to him a fascinating hobby. He had decidedly felt the need of some society, the members of which could vie with each other and compare prints, negatives, and other photographic matters, by doing which they would discover errors, learn "wrinkles," and progress generally in the art.

Mr. Walter D. Welford said there could be no doubt that a photographic society, carried on in a proper manner, was a very great benefit to either amateurs or professionals. A case in point had actually occurred during his visit to Torquay as the guest of Mr. Edwards, because he had there met with several amateur friends who wanted to know "Is this right?" and "Is that wrong?" because they had had no opportunity of finding out if their work was right. With a society, however, they would be able to meet together, mutually explain difficulties, and show what each one was able to do, so that they might profit by each other's experience. They would also be able to practically illustrate, before members of the society, the various processes. They would likewise often find that makers of apparatus and introducers of new processes would not recognise an individual amateur, but that a good society would stand on a different footing, and that they would be able to have cameras and other apparatus sent down for inspection and approval of the members. The actual conduct of such a society would be a very easy matter. He would suggest that they should meet once a-month in the summer and fortnightly during the winter. One feature which, as a young society, they would find very interesting would be the conversational evenings, at which members would gain assistance from others by the interchange of ideas. On the other evenings, papers could be read upon different subjects by those members who had had a little more experience than others—for instance, on platinotype, lantern work, hand-camera work, and other things. Lantern work was a very important feature of society's work, as by showing their pictures enlarged upon a screen would be an incentive to others to do equally well, or to excel. Altogether the society would benefit the members by producing better work. They would see what other people in the country were doing, and they would not only increase their personal interest in photography, but would generally advance the art.

It was then resolved that a society be formed, and Mr. George Edwards was appointed Hon. Secretary *pro tem.*; and a provisional Committee was also elected, consisting of Messrs. Dixon, Baynes, Staddon, Howell, and Tozer.

Mr. Welford then proceeded with his lecture. He dealt first with the wet and dry plate processes, showing that one of the great advances made in photography, viz., the introduction of the dry plate process, had made the hand or detective camera perfectly feasible. As most of those in the room were photographers, it was unnecessary for him to explain the difference between the wet and dry plate processes, but the recent rapid progress of the hand camera was due principally to the modern dry plates. Certainly optical improvements in lenses in the direction of speed and covering powers, and also mechanical improvements in shutters, had helped in this direction, but the most important feature was decidedly that of the dry plate. Before proceeding further, Mr. Welford explained the terms "hand" and "detective" cameras. The hand camera was one that was carried in the hand or used upon any temporary available support, such as a wall or fence, but not upon a tripod. Those cameras being designed in such a way that the general public would not be likely to know their use were called detective cameras. At the same time they were all hand cameras, and therefore, photographically speaking, the term "hand camera" was the better of the two. Mr. Welford then showed a camera which he used himself, called the Ideal, and also one lent by Mr. Edwards, the Beck; and he referred to the two principal features of these cameras, which were dark slides as in ordinary cameras, or the utilisation of some automatic mechanical means of changing the plates. For instance, in the one he used he was able to carry twelve plates, which were changed almost instantaneously by pulling a lever. Each method possessed advantages, but he claimed, as one of the principal features of the automatic changing methods, a saving of time. To illustrate this, he mentioned that whilst he was on the New Pier on the day of the Regatta, he found himself by the side of a gentleman with an ordinary camera upon a tripod, and also another amateur with a hand camera, and he was able to take two pictures of a yacht coming towards them at great speed, while both the other photographers failed because of their not being quick enough. Mr. Welford concluded his introductory remarks by showing and opening out the two cameras before mentioned. The room was then darkened, and over a hundred pictures, all taken by means of the hand camera, were exhibited on the screen by the aid of the oxy-ether light supplied and worked by Mr. J. Tozer, optician, of Fleet-street. Picture upon picture followed, the first few having been taken by means of the Kodak. Mr. Welford showed these because the Kodak, owing to its being the best-advertised piece of photographic apparatus, was a term in everybody's mouth. It is a tiny camera, in which the pictures are taken upon a transparent film, instead of on glass, to minimise the weight, one hundred exposures being thus rolled into a small space. In reply to the Chairman, Mr. Welford said he did not know the origin of the word Kodak, but he imagined it was simply a name adopted, adding that to a certain extent it was enriching the English language, because we now had another word from it, viz., Kodaker, or one who Kodaks. Mr. Welford then continued his exhibition and explanation of the pictures, which were so arranged as to show different branches of hand-camera work pure and simple, such as street scenes, studies of English life and character, &c. He next showed other things that can be done by means of the hand camera, including marine views, the breaking of waves, and sunlight effects, some of these necessitating an exposure only of the one-hundredth of a second. By means of photographs taken in a fair, and other crowded places, Mr. Welford also demonstrated the advantage of a hand camera in obtaining such pictures, pointing out that as a matter of fact many of them would not have been obtainable otherwise. Mr. Welford mentioned that at a recent Conference in London, after the reading of a paper by an artist upon photography as an aid to the artist, one speaker said he hoped photography would not be considered as a back doorway to art itself. Commenting upon this, Mr. Welford pointed out that the hand camera had no claims to be considered a back door to artistic photography, but it was a ready means of obtaining pictures in which the ordinary camera man failed by reason of the want of time. He also showed how a holiday, or even a business trip, could be utilised by bringing back, for one's own pleasure and that of others, photographic reminiscences in the shape of little pictures of the places gone through. He referred to a two days' visit he made to Newcastle-on-Tyne, and

showed pictures upon the screen illustrating the quay-side and shipping. "Now," added he, "if it had not been for the hand camera, I should not have been able to have obtained these, because on a business journey the paraphernalia of an ordinary camera and its accessories would be quite out of the question, whilst a hand camera is so tiny that it can be carried easily and without attracting attention." Mr. Welford concluded by exhibiting pictures that, unlike some of the others, were really taken for artistic effect. Many of these consisted of marine subjects taken against the light, and showed very pleasing results.

Foreign Notes and News.

How indispensable an adjunct is photography for all modern scientific investigators becomes every day more apparent, and a very characteristic instance in point has recently been chronicled from Germany. The Royal Academy of Sciences has made a grant of 3000 marks to Dr. A. Möller to assist him in undertaking a journey to Blumenau, in Southern Brazil, for the purpose of prosecuting botanical studies. Dr. Möller intends commencing his journey during the present month, and has formed the determination of residing in Blumenau for a period of two years, and erecting a laboratory there. As a preparation for his undertaking, Dr. Möller worked practically for several months in the Photochemical Institute of the Royal Technical High School in Berlin in order to render himself sufficiently proficient in the art to enable him to record his observations permanently by its means. Dr. Möller is taking several hundred Peruto plates with him, as well as eosine-silver films. The principal object of Dr. Möller's investigations will be directed to the artificial cultivation of fungi.

In Berlin there has existed since 1885 an institution for the purpose of instructing young ladies of the better classes in various branches of employment suited to enable them to earn an independent living. The school of drawing attached to the institution has recently been supplemented by the addition of a department for instruction in photography, which is to be opened on October 1. Instruction is to be supplied, not only in the various printing processes, but also in retouching, and even in book-keeping—in everything, in fact, which may qualify the "young ladies of the higher classes" to occupy situations in photographic establishments. Herr Schultz-Hencke, hitherto assistant in the Royal Technical High School, is to act as manager.

Herr Guido Maegerlein, of Chemnitz, one of the oldest members and most regular attendants of the Berlin Photographic Society, has recently retired into private life after a professional career of forty-eight years. Herr Maegerlein has emigrated to Dresden, where he will doubtless be able to gratify that love of high art which persistent devotion to photography so often fosters.

We are informed that a large number of intending exhibitors have already signified their intention of taking part in the approaching exhibition in connexion with the Congress of the friends of photography. Those intending to send exhibits are consequently requested to send in their names to Herr Schultz Hencke as soon as possible, as the available space is limited.

The *Photographische Mittheilungen* has been falling foul of various utterances in the *Bulletin Belge* tending to throw discredit on German photographic materials, such as albumen paper and other articles, which are very largely exported to foreign countries. The observations in the *Bulletin* were, it seems, originally based on some remarks in the correspondence columns of The British Journal of Photography, which has often fallen in rather heavily for the strictures of our contemporary. Whatever may be the rights or wrongs of the question, it may be as well to remind the *Mittheilungen* that this Journal is in no wise responsible for the statements or opinions advanced by correspondents.

In a recent communication to the Upsala Photographic Society, Herr Lindstrom has pointed out that sulphate of iron solution keeps in better condition in sunlight than in the dark. It is always interesting to learn what is regarded as *news* in another country.

Another photographic novelty has been recently introduced by Mons. C. Bertrand, of Paris, consisting, namely, of ordinary chloride paper. Prints with this paper are stated to exhibit a fine and particularly delicate tone. How about the price, however?

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,327.—"A Photographic Change Box for Cut Films." W. W. Beasley.—*Dated August* 25, 1890.

No. 13,381.—"A Photographic Posing Chair." Complete specification. J. McK. Dow.—*Dated August* 26, 1890.

No. 13,395.—"Improvements in Frames for Photographs." H. W. Taunt.—*Dated August* 26, 1890.

No. 13,455.—"An Improved Method of Producing Photographic Vignettes, and an Appliance to be Used therefor." A. G. Palmer.—*Dated August* 27, 1890.

No. 13,497.—"An Apparatus for Use in Taking Photographic Copies or Enlargements." H. Ransom.—*Dated August* 27, 1890.

No. 13,615.—"Improvements in or relating to Photographic Cameras." H. du B. B. Espeut.—*Dated August* 29, 1890.

No. 13,631.—"Improvements in Roller Holders for Photographic Cameras." H. G. Ramsperger.—*Dated August* 29, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 8	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 9	Derby	Society's Rooms, Derwent-buildings.
,, 9	Manchester Amateur	Manchester Athenæum.
,, 9	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 10	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 11	Birkenhead	Hamilton Rooms, Birkenhead.
,, 11	Manchester Photo. Society	36, George-street.
,, 11	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

August 28.—Mr. F. W. Hart in the chair.

Mr. F. A. Bridge showed a finder which he used attached to the side of the camera, a position more generally useful for cameras working on a stand than on the top. He also showed an arrangement for following moving objects, such as clouds or a vessel, with the camera. It consisted of a rod with a cup-shaped head screwed for fitting to the baseboard of the camera. The cup head was large enough to rest between the metal sides and centre of the tripod head of an outdoor stand. The rod was held in the hand and the camera directed with the aid of the finder until the object was in the desired position on the plate, when the pneumatic ball was pressed with the other hand and the exposure given.

The Hon. Secretary then introduced the subject of the evening by reading a short paper on *The Use and Abuse of Hand Cameras* [see page 595].

Mr. A. Cowan said that Mr. Drage began by saying that some few results of hand-camera work really did make good pictures, but at the close of his paper spoke strongly against the use of the hand camera for anything but record purposes, on the ground that the pictures taken by it were not artistically composed. He had seen some hand-camera work that was really first-rate, and that he thought could not be beaten by those produced at greater leisure by other means. He would instance a number of Mr. J. B. B. Wellington's productions in this direction, at least fifty of which he thought could not be beaten.

Mr. Bridge had noticed a decided deterioration in the quality of lantern slides since the introduction of hand cameras.

Mr. Cowan thought that it was such a great advantage to have the camera ready charged, so that if any object of interest presented itself it might be secured, instead of having to wait whilst fitting up apparatus, when the opportunity might be gone.

The Chairman said that there was one point that he had not heard noticed, it was that people were sometimes photographed in positions which they considered unbecoming, and which they would be unwilling to allow to go forth for general inspection. He instanced a case of this kind, which, however, ended by the gentleman who considered himself aggrieved requesting more copies of the photograph, as they were so much in request by his friends.

Mr. J. S. Teape said that the word detective was a misnomer as applied to hand cameras. People had become so accustomed to them, that although there might be no projection or anything else to attract notice, they at once recognised the apparatus, and behaved as they would do with a lens in open use.

Mr. T. K. Fernshwater inquired whether it was practicable to photograph people coming out of a public-house at night.

The Chairman said that it was quite practicable.

A member said that some firm of photographers was ready to undertake the work by flash light.

The Chairman said that they could not do it without infringing his patent.

Mr. W. E. Debenham asked what was the point in any patent that would be infringed.

The Chairman said that he would not discuss that matter then.

The last summer outing of the Society was fixed for Saturday, September 20, at Hampstead. Meeting to be at the Flagstaff at three o'clock, and tea at the "Bull and Bush" at six o'clock.

The subjects for discussion were fixed for September 11, *The Carbon Process*,

introduced by Mr. W. E. Debenham; and September 18, *Is there any Advantage Gained by Using a Large Object Glass in the Optical Lantern?* introduced by Mr. T. E. Freshwater.

HACKNEY PHOTOGRAPHIC SOCIETY.

AUGUST 28,—Mr. Arthur Dean presiding.

Several prints were shown by Messrs. Pailthorpe, Roden, and Grant. The former gentleman's prints were taken on a hand camera of his own construction.

The Secretary reminded members of the excursion to Broxbourne on Saturday, September 6, and also announced that Mr. Jno. Reynolds had kindly presented an album to the Society.

Mr. HUBERT then read a paper on *Portraiture and Retouching*. He thought the rivalry that existed between amateurs, or rather professionals, was a mistake. They must move with the times. A good photographer must be an artist. He said he preferred graduated backgrounds, even to scenic ones, which ought not to be sharply defined, or they would detract from the sitter. He always judged his background from the sitter's dress. A rapid rectilinear lens could be used, but if in a room the portrait lens was best. The amateur should, when in a garden, find out the north-east light, screen off the south-west, and with some light material shade off (regulatable) the top light. He demonstrated the lighting with the assistance of two members, and concluded by giving a demonstration of retouching, for which he is noted.

A hearty vote of thanks followed.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

AUGUST 28,—Mr. W. J. Harrison, F.G.S., in the chair.

Mr. THOMAS MASON gave a *résumé* of the half-day extursion to Warwick, and Mr. Leeson of the excursion to Lichfield.

The CHAIRMAN said that Mr. Moore had kindly put on the table a most interesting and complete set of photographs by the late Mrs. Julia Cameron. They were the best set he (the Chairman) had seen. Mrs. Cameron, he said, was fifty-four years of age when she took up photography, and was the forerunner of the naturalistic school. She gave long exposures, and her negatives were wholly untouched. Artists of her day admired her work; photographers did not. One of the prints—Tennyson—is still the best photograph in existence of the Poet Laureate.

Mr. Godfree, Mr. Stait, Mr. Rushton, and others, exhibited prints taken during the Lichfield excursion.

Mr. Pickard called the attention of the members to the approaching competition; and Mr. Horton mentioned that the Temperance Hall has been secured for the annual exhibition for December 16, 17, 18, and 19 next, when all pictures for competition must be framed.

Mr. Leeson announced that Mr. Sershall would read a paper on September 25; subject, *Art in Drawing and Photography*.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE eighth ordinary meeting of the twenty-seventh session was held on Thursday evening, the 28th ult. at the Club Rooms, 3, Lord-street, Mr. Paul Lange in the chair; and there was a large attendance of members.

Mr. Thos. B. Blackburn was elected a member of the Association, thus making the forty-second new member added to the Association this year.

Mr. WM. P. CHRISTIAN exhibited a frame containing tinted lantern slides of "The Alhambra (Granada, Spain), and some scenes of Algerian life." Mr. Christian stated that about two years ago he had been working Obernetter paper, and, putting the bath away, he had never used it until reading a paper by Mr. G. F. Blackmore, of the West London Photographic Society, in the *Amateur Photographer* of March 8, 1889, on *The Toning of Lantern Slides*, and was struck with the idea that for architectural subjects better effects might be brought up, so he experimented with the old bath, tested the action of sulphocyanide, adding more gold, &c. He spoiled a number of plates, but at last succeeded in making up a bath, and was thus able to put before the members a series of slides of various tints, not one of which was done on an Alpha plate. After the exposure had been made in a printing frame in front of a gas jet, and the plate had been developed, he bleached with bichloride of mercury one ounce, twenty ounces of water; washed well, and soaked in the following bath, viz:—

No. 1.

Water	14 ounces.
Hypo	3 minims.
Sulphocyanide of ammonia	40 grains.

No. 2.

Chloride of gold	5 grains.
Water	2½ ounces.

Taking of No. 1 two ounces, and of No. 2 half an ounce. This bath works better when it has been kept a few days. The tones produced varied from yellowish brown to golden brown, and deeper brown, passing afterwards to purple and a steely blue and black. The time of toning might be accelerated or retarded by the addition or reduction of the quantity of gold. The addition of more hypo he found gave a yellowish brown tint; of more sulphocyanide a blackish brown. He preferred a bath rich in gold, giving a peculiarly warm, luminous character to the slide. He had made various other experiments with other toning baths. The borax bath ordinarily used he found did not seem to make any appreciable difference in the tone. Bleaching in mercury, and then immersing in a bath of water and a few drops of ammonia, gave a fine black tone, being the ordinary intensification. As pointed out by Mr. Blackmore, a considerable range of tones was obtained by soaking the slide after bleaching in a solution of one grain of chloride of gold to one ounce of water before placing it in the toning bath. He added that he preferred the chloride plate for the operation or toning, notably "Cowan's" or "Edward's." If there was any yellowish stain after toning, this could generally be removed by immersion in a weak bath of hydrochloric acid and water.

The Hon. Secretary (Mr. E. M. Tunstall) exhibited a new photographer's exposure table published by T. Manson, of Kendal.

This being an evening devoted to the discussion of photographic matters in general, the members were invited to start subjects in which they were interested, and the question box was placed at the disposal of those who desired to remain anonymous.

A discussion took place on Schölzig's new method of obtaining platinotype results with matt-surface silver paper and printing under green glass. Messrs. F. K. Glazebrook, J. Price, W. Tomkinson, and E. M. Tunstall had made some experiments with the paper, but had only obtained very indifferent results so far, and not approaching the finest platinotype tones as stated by Mr. Schölzig.

A negative belonging to Mr. F. K. Glazebrook of a view taken at Llangollen caused considerable room for discussion on account of a curious fog in the centre of the plate, and the reproduction of a house in the fog. The lens was a Ross portable symmetrical, and the plate was the only one so marked out of a dozen or so exposed that day. Messrs. A. T. Cleaver, Rev. T. B. Banner, T. Norman Thomas, J. A. Forrest, &c., endeavoured to explain the cause of the phenomenon, which, however, did not seem to satisfy the meeting, and at length it was agreed that Mr. Glazebrook write to Messrs. Ross, sending them the lens and negative with the hope that they might explain the matter.

Mr. T. A. Sinclair gave a formula of a good eikonogen developer for lantern plates, viz.:—

No. 1.

Eikonogen	½ ounce.
Sulphate of soda	2 ounces.
Water	20 ,,

No. 2.

Washing soda	2 ounces.
Carbonate of potash	2 ,,
Water	20 ,,

Take one ounce of No. 1, half ounce of No. 2, to half ounce of water. This will develop eight or ten plates.

Mr. B. Boothroyd exhibited some fine bromide prints of views secured by him in Norway on a recent trip this summer.

Several albums were handed round, notably two by Mr. H. Lupton, in silver and platinotype, of views taken in the English lake district and in the South of Ireland.

Various novelties were shown, including an ingenious bamboo tripod (ball-and-socket arrangement) obtained by Colonel Collison from London, and the "Baroness" half-plate camera by Mr. W. Tomkinson.

The arrangements for the excursion to Haddon Hall on Saturday, the 30th ult., were explained.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

To the EDITOR.

SIR,—Kindly permit me to remind intending exhibitors that Monday, September 15, is the last day for receiving "packing cases" from the country by our agent, Mr. Bourlet, 17, Nassau-street, Middlesex Hospital; and also that the same day is the only one for receiving pictures and apparatus at the Gallery, 5A, Pall Mall East, S.W. Any further information may be obtained from me.—I am, yours, &c.,

EDWIN COCKING, *Assistant Secretary.*

5A, *Pall Mall East, S.W., September* 1, 1890.

"THE BEST USES OF PHOTOGRAPHY."

To the EDITOR.

SIR,—As a competitor, I have read with some amusement the correspondence on the above subject, and should like to offer one or two suggestions.

Like your other correspondents, after finishing my paper I was filled with pride, and felt satisfied that though a few competitors might do nearly as well, none could excel on a subject so familiar to me as the uses of photography. Besides the points mentioned by your correspondents, I mentioned one or two others. I said, in my opinion, the *noblest* use of photography was its position as a link between the past, present, and future, bringing back, as it did, old and dear friends gone before, &c. The greatest use I considered was as a means to transmit to future generations incontrovertible facts of historic, scientific, and artistic importance; and the greatest use that it *might* be put to was the same, better organized. I also mentioned survey, which seems to have been overlooked.

When the winning paper was published, I was forced to acknowledge that though Mr. Hanneford had not mentioned what I considered as the greatest uses of photography, yet his composition as a whole was far

superior to mine, and, if I may be allowed to say so, your other correspondents also. A sermon, perhaps, it may be, but a very excellent one.

Another point is that we were not asked for the *greatest number* of greatest uses, and this seems to have been forgotten.

I do not know whether the competitions in connexion with *Short Cuts* or similar papers are genuine or not. I have no cause to think otherwise, though I never in my life won anything; still, I think it would be advisable that all who have any doubt should not compete, especially if they cannot acknowledge themselves honestly beaten.

The competency of the judge seems a point of little moment, as judgment in all competitions must be a matter of opinion, and I see little use in combating that. Perhaps (if it would be "in order") you would settle the point of competency by giving an opinion on the merits of the articles put before you, leaving my own out of the question of course, as I have expressed myself satisfied.

I cannot quite agree with the correspondent who suggests that thanks are due to his brother in distress for pointing out what I am sure the average photographer has discovered for himself.—I am, yours, &c.,

H. Colebrook.

LABOUR AGENCIES: GOOD, *AND BAD*.

To the Editor.

Sir,—Having written in your columns of the action which we are about to take in the interest of operative photographers (as the forerunner of a union which will be impossible until some competent and energetic leader can be found among the London workers), I want to warn them against professional proposals, extended ostensibly in the interests of the workmen, but in reality simply in the interests of the proposers.

All I shall be able to deal with this week is the question of Labour Agencies or Employment Bureaux. It will be remembered that at our meeting on Unionism at the Polytechnic, we came to the decision that we could most easily attain our object by working out first the most important idea in our programme, viz., the institution of an agency conducted by friends of photographic unionism, into which would be registered only such workmen as are absolutely worthy, and from which we should supply labour to firms whose record from a workman's view we should carefully examine before entering into arrangements with them. A well-known professional artist aids us in this who has special knowledge of the character of most employers, and with whose assistance we have secured the means of similar information from most trade centres. During the approaching "dead" season we shall spring our agency on the benighted ranks of photographic labour, and be it known to all that *object is to form from the names of those workmen who pass through our hands a union, or the nucleus of a union*, which, if not sufficiently strong to stand on its own feet, will amalgamate with the Litho Artists' Society. But here comes the warning.

Our trade is free up to now of the professional "placers" of unemployed labour, the "servants' registry offices," or *bureaux de placement*, which exist with the primary object of sucking the blood of the desperate unemployed. These agencies give no guarantee whatever of their ability to procure fair employers for applicants; their chief source of supply in that direction being simply the advertisements of masters in the trade journals. The unfortunate applicant mortgages a percentage on his salary for months in advance, and usually he is made to contract himself into an agreement that this percentage is payable even when the situation is not retained, the applicant's efforts to obtain further engagement through the same channels landing him deeper and deeper in the mire. The value of these establishments may be estimated from the fact that they are not anxious to examine the qualification of applicants; they content themselves with asking them to "forward all the particulars they can."

Now it will be noticed that our proposal, being for a *workmen's protective* agency, offers safeguards on all the above points. But it is almost certain that professional vampires will appear in our midst when our proposal becomes well known, and it behoves workmen to keep aloof from all such. They may know them by carefully noting how far they will be justified in answering "yes" to the following questions:—

1. Is the agency in question worked by or responsible to working men, and are its methods of management open to the inspection of working men?

2. Is there any control or guarantee by noted and reliable supporters?

3. Is there a guarantee that applicants for employment will be placed with satisfactory employers? If not, that no charge for placing will be demanded if the situation is not according to description?

4. Are any means provided for obviating the injustice (to efficient applicants) of negotiating with workmen of any or no degree of merit?

5. Are the promoters identified in any way with the movement for the organization of the *employés*, or any other work in the interests of the labour side of the question?

As for the Union Registry, we are just now feeling for big support in the after which will make success a certainty if we can secure it, but even if we cannot we shall (with more trouble, it is true) open the approaching year with every promise of successful work in the interest of the professional worker. All the individuals and branches of the trade which desired to see a union, but could not sacrifice for it, can join our agency, with every chance of its working out into a big thing for unionism.—I am, yours, &c.,

Arthur Field.

Maidstone, August 30, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange good cabinet portrait lens for whole-plate wide-angle lens and whole-plate rack and pinion.—Address, J. G., 121, Bridgeman-street, Bolton.

Wanted, wide-angle doublet, twelve or thirteen inches equivalent focus, in exchange for apparatus or for Ross' doublet, nine inches focus.—Address, Coles, Photographer, Watford.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. Greenwood & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

Photographs Registered:—

J. Horsburgh, Edinburgh.—*One photograph of Miss Ada Cavendish.*

F. W. Broadhead, Leicester.—*Photograph of Right Rev. W. Hopwood, Abbot of Mount St. Bernard's Monastery, Leicestershire. Photograph of the Abbot and clergy at Mount St. Bernard's Monastery, Leicestershire.*

Jacques Moll, Chatham.—*Two photographs of H.R.H. the Prince of Wales and family, with officers, on board H.M.S. "Thrush."*

E. Martin, Melbourne, Derby.—*Two photographs of Mrs. Ann Burton, the Ticknall centenarian.*

M. Warburton.—Send us a few prints to examine, as from your letter we can form no idea of the cause of the stained and mottled appearance.

Experimentalist.—In a drying box it is very undesirable that the fumes from burning gas be allowed to come in contact with the plates. It must be avoided.

C. C. Hopkins.—There does seem a discrepancy in the price of 7½×5 plates and that of other sizes, but we cannot say the reason. The question must be put to the manufacturers.

P. McB.—The only method of making the picture copyright is by registering it at Stationers' Hall. Copies are not required at the British Museum and other libraries, as in the case of books.

Ceylon.—Pyrogallic acid is still more extensively used by professional photographers in this country than either hydroquinone or eikonogen. The ferrous oxalate is seldom used by portraitists here.

G. H. N. A. (Brixton.)—We are glad we have been the means of securing the return of your specimens. We have received from the firm an explanation, which we have entered in our register, together with your complaint.

Hawthorn.—Collodion transfers are very little used now; bromide paper has almost, if not quite, superseded them for cheap enlargements. Our advice is to eschew collodion and adopt bromide enlargements. The results are better and easier to produce.

Scotty.—If you have no idea of the amount of silver in the residue, upon what data do you form the opinion that you have not received its full value from the refiners? How can we assist you? The firm is a very respectable one, and we can say no more.

S. H. W.—If the colour comes off the mounts when a moistened finger is applied to the surface, there is little wonder that the whites of vignettes suffer when mounted upon them. The mounts should be rejected as being unfit for photographic purposes.

SOFT PICTURES.—If you have a complete set of blinds at the roof, and a double set of curtains at the sides, you ought to obtain any effect of lighting desired in such a studio. If you cannot get soft shadows by arrangement of the blinds and curtains, reflectors must be brought into use; then the shadows can be softened to any extent.

W.—Evidently you are a novice with the wet collodion process, or you would not meet with any difficulty in reproducing such subjects as those you mention. If the plates are fogged it shows the chemicals are out of order. If these are right, there is no difficulty in getting any amount of density required. Better get instruction from one conversant with the process.

H. STEPHENS (Liverpool).—If you must have Daguerreotype plates for your experiments we imagine you will have some little difficulty in obtaining them, as their manufacture ceased some decades ago. The only suggestion we can offer is to try at some of the oldest photographic warehouses. They may possibly have some old stock by them. Have you tried at Mr. Atkinson's, in your town?

A. PALMER asks: "Would you kindly inform me whether there is any known means of vignetting direct on to the sensitive film of the negative during exposure in the camera?"—Yes, there are several. The simplest, and possibly the best, is to place a white screen with a serrated opening of suitable size between the sitter and the camera, but, of course, out of the focus of the lens. If the screen be kept slightly in motion during the exposure, additional softness is obtained.

C. Z. says: "I have recently purchased an old business, and amongst the stock there are many thousands of collodion negatives of all sizes, some of them on patent plates, which will never be wanted again. Can you tell me how to dispose of them? I have applied to several dry-plate makers to purchase them or to clean them off and recoat the glass for me, but they all decline to have anything to do with them, as they say they only use new glass. Can you assist me?"—We do not know of any use to which the negatives can be put, except C. Z. were to clean them off and recoat them himself for future use.

ANNOYED writes as follows: "A few months ago I took the portrait of an old customer who soon afterwards died. I have just heard that the friends have sent my picture to a London firm, who are supposed to only work for the trade, to have some finished enlargements made from it. Can I, if I at once make the picture copyright, stop this proceeding? I should also like to ask if you consider it fair for wholesale firms to undertake commissions from private individuals, and thus compete with their own customers?"—It would be of no use making the picture copyright, as you took it in the ordinary course of business. The other question is purely a trade one. Some firms, we are told, will not undertake work from any one but professional photographers; on the other hand, some take all fish that come to their net. We sympathise with our correspondent.

PERPLEXED writes: "I am asking your assistance to unravel the mystery of some spots on prints which have plagued me for some time. I thought at first they were due to careless floating, but I find such is not the case. My printer assured me that he could see no sign of them before toning, and I went to the trouble one evening of going carefully through all the prints just before toning, and I could only testify to the printer's veracity; nevertheless, next morning there were spots on many of the prints. I enclose a print showing what I complain of. The one on the face is not, however, due to the same cause, for the printer tells me he noticed it during printing, and it had a reddish colour. They vary but little in size, seldom being much larger than those on the print. They seem to vary from day to day—sometimes more, then less. All prints do not have them. Nor does it seem to be attributable to the paper; I have used different kinds with same result. Printer tells me he never notices them until either fixing or washing, generally the latter. Would there be anything likely to cause such spots in the water? One would fancy not, for then all the prints would be affected. I thought one time it was due to particles falling from the ceiling, but I had that papered without any improvement. Can you throw any light on the matter?"—At first we were inclined to think the spots were due to minute air-bells adhering to the paper while the prints were in the fixing bath, but a more careful examination inclines us to the opinion that the spots are caused by floating particles of some pernicious matter settling on the prints while they are in a moist condition.

GEO. CROSS writes: "A friend wishes me to construct a small camera obscura for him, and I am at a loss how to proceed. Will you kindly tell me, in your Answers to Correspondents,' the best kind of lens to use, and how I should construct it so as to throw the image at right angles to the view? The image required to be about 12×10."—The mechanical principle upon which a camera obscura is constructed depends upon two things: first, whether the observers are inside of a darkened chamber and view the objects on a white table in front of them, or, second, whether the camera obscura is a box with a horizontal ground glass on which the images are viewed, a dark cover being thrown over the heads of the observers. If the former, the best way is to have a mirror placed diagonally towards the view, and the lens then mounted as close to it as convenient, this being, of course, in a horizontal position. The table on which the image is depicted then stands below. For the purpose spoken of by our correspondent, the latter will prove the more convenient way for examining camera-obscura images. Let there be constructed a box of sufficient size, and in front of this fix the lens, which may be either plano-convex or slight meniscus in form, the flatter side being outwards. To ensure sharpness it will be desirable to place a diaphragm outside of the lens; how large and how far must be determined by experiment. A mirror must be mounted at a slope of 45°, and a ground glass or sheet of diaphanous paper must be stretched flat above, on looking down upon which the image will be seen.

A. E. COE.—Thanks for the Kennett pellicle, which we will lose no time in trying. The machines generally used for cutting sensitised paper are what are known as label-cutting machines, which may be obtained of any dealer in printers' appliances. They are somewhat expensive, and are only advantageous when working on a large scale. Some little time ago we saw at the Eastman Company's a small apparatus of a portable nature which appeared to us to answer the purpose when small quantities were operated on. You had better communicate with them.

R. BRUTON says his studio is overlooked by his neighbours, which sometimes causes annoyance to sitters. As he is about to rebuild it, he asks if we would recommend that side to be glazed with ground glass. With the present studio he often has to work through muslin blinds, but he is afraid that ground glass will stop off more light than can be afforded, as the side light is always much subdued by the surroundings.—Ground glass does not obstruct so much light as many imagine it does. However, fluted glass stops off far less, and it cannot be seen through.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, September 10, *Modifying Lenses;* September 17, *Extemporised Modifications of Photographic Cameras.*

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject, September 11, *Carbon Printing,* opened by Mr. W. E. Debenham; September 18, *Is there any Advantage in the Use of a Large Object Glass in an Optical Lantern?* Mr. Freshwater. September 20, Last outing for the season, Hamptead. Tea at the "Bull and Bush" at half-past six.

"PHOTOGRAPHIC SCRAPS."—With the September issue of this sheet the Britannia Works Company, Ilford, E., completes one year's issue of the handy leaflet. Speaking of the numbers the firm have gratuitously circulated, they say, "We set out with the intention to please, interest, and instruct, and we cannot but feel, when we read the thousands of kind letters sent us, that we have succeeded. We made no great promises at our advent, and we make no great claims now, but we do think readers will say we worthily fill a *niche* in the world of photography which they would be unwilling to find vacant."

NEW CARD FRAMES.—Messrs. Marion & Co. have sent us samples of a novel style of what they term card frames. They are intended to serve as Christmas and New Year's cards, with photographs of the senders. The mounts are furnished with a strut back, so that they can stand on a table, mantle, or cabinet without other support. They are in various styles, all in excellent taste, and the mottoes are chastely printed and, of course, in keeping with the season. Photographers will do well to obtain a supply of these, as there is no doubt considerable business may be done with them.

SOUTH LONDON PHOTOGRAPHIC SOCIETY FIXTURES.—At 76, Peckham Rye: September 5, *Mounting and Finishing,* Mr. C. Hoddle; September 19, Exhibition of Mr. F. W. Hart's apparatus for flash light, with demonstration, also stands for optical lantern screens, photographic backgrounds, &c., Mr. F. W. Hart. At Hanover Hall: October 3, Lantern night, Mr. Boydell and other members; October 17, Demonstration with Alpha paper, the President; November 7, Lantern night (*A Tour to the Channel Islands*), Mr. H. Banks. November 21, The Annual Exhibition; December 5, *Photographic "Dodges,"* discussion to be opened by the President; December 19, Experiments with optical lantern, Messrs. H. Banks and S. W. Gardner. During the month of January, 1891, Mr. Leon Warnerke has kindly consented to give a demonstration on *Mechanical Printing as Applied to Photography.* The following medals are offered for competition at the exhibition for work done by the members:—One silver medal for the best general work; one silver medal for the best six pictures taken at the Society's excursions; one bronze medal for the second best six pictures taken at the Society's excursions; one bronze medal for the best set of six local views; one bronze medal for the best series of lantern slides consisting of not less than six nor more than twelve. All communications to be addressed to the Hon. Secretary.

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WET COLLODION PLATES FOR LANTERN SLIDES.

As the outdoor season closes in, many of our amateur readers will shortly be preparing for the winter campaign by adding to their store of lantern slides from the stock of negatives acquired during the summer, and the choice of processes will perhaps, in some cases, be a matter for careful consideration. So great is the variety in character as well as quality obtainable by the judicious selection of a suitable process, that we doubt not many of our readers will avail themselves of the services of more than one method, and amongst the variety, collodion plates will no doubt be found to figure largely.

But what form of collodion plate is to be chosen? To the large majority of modern amateurs collodion is practically unknown, and not one perhaps in a thousand has ever touched or tried to work a wet collodion plate, while to learn the process solely for the sake of producing at most a few dozen lantern slides is more than can be expected. Collodion emulsion as ordinarily employed is, by most who have used gelatine plates, considered too slow, except for contact printing, although the quality of result is of the highest. Then, again, the adoption of collodion emulsion, or indeed of collodion in any form, involves the preparation of one's own plates, which, we fear, is a fatal objection nowadays in too many cases. Nevertheless, we are about to recommend a collodion process.

The process we shall describe is based upon the employment of an emulsion which may be used either wet or dry, the former for camera reductions, the latter for contact printing, although, by a method we shall describe, the wet plates may be used for contact work, in which case a higher degree of sensitiveness will be obtained, and at the same time the trouble of drying the plates saved.

A word may be said on the subject of the supposed trouble involved in the coating or preparation of collodion plates. To the amateur working on a small scale this is not one tithe of that connected with gelatine plates, in consequence of the necessity with the latter for levelling slabs, properly ventilated drying cupboards, and endless care in the matter of temperature. With collodion emulsion, on the other hand, after the "smack" of "coating" is once mastered, the glass may be covered at the rate of one or two per minute, and the plates passed into the washing tank, where they may remain until required for use if to be employed wet, or until a sufficient number are ready for placing in the drying box, which need only consist of an ordinary box made light tight. In the old dry collodion plate days we have frequently coated a dozen plates and had them in the drying oven considerably under the half hour, and in a single evening have prepared the whole stock of plates for a ten days' tour. However, more will be said on this subject when we arrive at the mode of working.

The first consideration, is, of course, the emulsion, which for the present purpose may be, or indeed should be, preferably an "unwashed" one, as this is not only easier to prepare, but also enables the finest possible results to be obtained with less care than is required in the case of a washed emulsion. The process of compounding a simple collodion emulsion has been described and demonstrated over and over again, but for the benefit of those of our readers who have not seen the operation performed, we may briefly recapitulate it.

The materials required consist of ether and alcohol, pyroxyline or guncotton, bromide of ammonium, bromide of cadmium, and nitrate of silver, and a small quantity of pure nitric acid. The ether and alcohol may both be methylated, the ordinary methylated spirit of the shops, if of good quality and strength, being perfectly suitable; care must be taken, however, that "finish" is not substituted for the latter, as if such be the case the sensitive film will be rendered so impervious by the "gum" it contains that it will be impossible to develop a satisfactory image. "Finish" may be distinguished from "spirit" by pouring a few drops into a glass of water, when if any milkiness be caused it arises from the presence of the "gum" contained in the "finish," and that sample must be condemned. Guncotton suitable for the purpose may be obtained from several of the dealers in photographic chemicals, as well as from Messrs. Hopkin & Williams, the quality known as "high-temperature" being best.

The following is a good formula to take as a basis, the quantities of solvents being varied as a thicker or thinner emulsion may be desired, but the relative proportions between the bromides must be adhered to strictly:—

Methylated ether (sp. gr. ·720)	13½	ounces.
„ alcohol (spirit)	6½	„
High-temperature pyroxyline	120	grains.
Bromide of cadmium (crystallised)	150	„
„ ammonium.....	80	„

Much trouble will be saved by paying attention to the following directions as to the mixing the ingredients. First of all, by means of a doubled strip of paper, introduce the bromide of cadmium into a clean dry bottle, or one that has been rinsed out with methylated spirit, and then pour in the above quantity of alcohol, and shake well until the bromide is dissolved; next insert the bromide of ammonium, and shake until that dissolves. The reason for this is that by first dissolving the cadmium salt, which is very soluble in alcohol, the less soluble ammonium salt is more quickly taken up. Be careful that the

crystallised bromide of cadmium is obtained, as if the *anhydrous* salt is substituted the quantity must be reduced to 120 grains.

The bromides being dissolved, the pyroxyline is pulled out into tufts and thrust into the bottle, and when well saturated, the ether is finally added, and the cotton will be almost instantly dissolved. This constitutes the bromised collodion, and must be set aside until perfectly clear, all particles of insoluble matter having settled to the bottom; it may be used as soon as clear, but greatly improves by keeping.

When required for use, pour off the requisite quantity of the clear liquid, measuring carefully. There are two methods of employing the emulsion, namely, with excess of bromide, and of silver, respectively; the latter is the more sensitive, but will not keep many hours, whereas with excess of bromide the emulsion keeps well for weeks. Where it is intended to keep, the whole quantity may be sensitised at once, but if the more rapid emulsion with excess of silver be required, only as much as will be wanted should be made.

For each fluid ounce of the bromised collodion twelve and a half grains of nitrate of silver will be required for the slower emulsion with excess of bromide. Weigh out the required quantity and introduce it, if the quantity be only small, into a long test tube, with about half as many minims of water as there are grains of silver salt; heat the tube over a gas flame until the crystals are dissolved, and have at hand a vessel of boiling water into which to plunge it to keep the contents hot. Now add, for each ounce of collodion to be sensitised, one drachm of methylated alcohol, pouring it into the tube a few drops at a time, in order to avoid suddenly chilling the solution, which will cause the precipitation of the silver. If this should occur, let the tube remain in the boiling water until it redissolves. Supposing two ounces of collodion are to be sensitised, the formula will be as follows:—

Bromised collodion	2 ounces.
Nitrate of silver	25 grains.
Water	15 minims.
Alcohol	2 drachms.

When the test tube has remained a minute or two in the hot water to thoroughly warm it, pour the contents a few drops at a time into the collodion, shaking vigorously after each addition, and taking care that none of the concentrated silver solution runs down the outside of the test tube. When the whole has been added, pour a little of the emulsion into the tube and shake well, in order to rinse out the last traces of silver, repeating this two or three times, and returning the emulsion, of course, to the bottle. This operation of sensitising must, of course, be performed in the dark room, but the emulsion at this stage has so little sensitiveness that the light of a naked candle or lamp can scarcely do any harm; a single thickness of orange paper is ample protection for artificial light, and a couple of thicknesses for daylight.

The hitherto transparent collodion will now have become opalescent or milky, and if the bottle be shaken, and the light of a candle or match examined through the liquid as it runs down the sides, it will be found to be of a rich orange colour, which in course of time becomes deep ruby; this test may usually be accepted as a sign of good condition. If, on the other hand, the contents when so examined present a granular appearance, with no orange colour, something has gone wrong; either the silver has been added too suddenly—that is, too much at once—or probably the pyroxyline is not suited to the purpose. In the latter case nothing can be done, but in the former, vigorous shaking at intervals will bring all right. If not, another measured quantity of the collodion must be added, which will cause the precipitated bromide to re-emulsify, after which it must be re-sensitised with the proper quantity of silver for the added portion of collodion.

If the more sensitive preparation of collodion be desired, it is only necessary to increase the quantity of silver, using fifteen and a half, or sixteen grains, or even more, to each ounce, according to the sensitiveness desired, always bearing in mind that the larger the proportion of silver the shorter will be the time the emulsion will keep. Along with the silver in this case must be added one minim of pure nitric acid to each ounce of emulsion.

A convenient method of working consists in sensitising the full quantity of collodion with the smaller proportion of silver, in which state it will keep well for a long time, and go on improving up to a certain stage. Then, if at any time the more rapid emulsion is required, it is easy to add the requisite additional quantity of silver, and to use up the emulsion at once. If a small quantity of it be left over, a measured quantity of bromised collodion may be added to it to restore the excess of bromide, and when again required the necessary quantity of silver is added to re-sensitise. In this manner the emulsion may be constantly employed in the more rapid state without loss or waste.

The preparation of the plates will form the subject for another article next week.

A NEW USE FOR EIKONOGEN.

One of the chief advantages claimed for eikonogen is the remarkable immunity from stains obtained by its use, both hydroquinone and pyro, according to almost unanimous opinion, being surpassed by the newer agent in this respect. With this fact in view, the "new use" suggested to us by a correspondent presents itself as a very curious one, for it amounts to nothing short of the employment of a plain solution of eikonogen *as writing ink*.

We were inclined to regard our correspondent's statement as an attempted joke, although he averred that his letter was written with his "newly invented ink;" but on examining the writing closely it seemed to differ slightly in appearance from the regulation ink produced from galls, so we resolved to test the accuracy of the statement before relegating the communication to the waste-paper basket. The simple instructions given were to "make a hot, strong solution of discoloured eikonogen, and to allow it to cool, then decant." No quantities were named, nor was it stated whether the old make or the newer crystals were used; the former, we should imagine, as we have never seen the crystals exhibit such a depth of colour as would seem to render them suitable for the purpose. However, as we happened to possess a splendidly discoloured sample of the original make, we proceeded to experiment upon that, and with the most perfect success.

A quantity of it was treated with hot water, in fact, boiled in a flask to make a saturated solution, and the excess allowed to crystallise out. When quite cold the dark liquid was decanted from the crystals, and without further addition of any sort forms a writing fluid that flows easily and does not exhibit any tendency to thicken or to corrode the pen, while its colour on paper is a most intensely rich pure black, although the solution itself is of a brown-red colouration. We have tried the addition of various substances, but only with the result of producing an inferior result as regards colour.

On the question of permanency it is impossible to say anything, but it seems only reasonable to imagine that the colour should deepen with age; that, however, only time will prove.

The crystals deposited from the dark-coloured liquid are, after rinsing in cold water, nearly colourless and perfectly utilisable for developing purposes; in fact, we described this very method some few months back for purifying the discoloured eikonogen. Wherever a stock of that material exists here is a useful way of working it up.

We have not tried whether simple oxidation of a solution of the clean crystals will produce a similar result.

EXPANSION OF PAPER AND DISTORTION.

There is considerable misconception among photographers with reference to the expansion and stretching of photographic paper, and the distortion frequently arising therefrom. The terms "expansion" and "stretching," as here used, as will presently be shown, are not synonymous. We have examples now before us of finished portraits made from the same negative that seem to be very dissimilar, inasmuch as in some impressions the features appear to be longer or broader, as the case may be, than they are in others. Not only is there an apparent dissimilarity, but a pair of compasses will, by actual measurement, prove that the fact exists, and sometimes to a considerable extent.

It is now pretty generally understood by our readers that photographic paper, like all other papers, expands when wetted, also that the expansion is greater in one direction than it is in the other; hence it has been assumed by some that if one cabinet portrait be printed on paper taken one way from the sheet, and another on a piece cut at right angles to the first, there will be a considerable difference between the two pictures. There will be a difference, it is true, but, under normal conditions, it will be so slight as to be undetectable by the eye. Still, there are instances where marked distortion does exist in some finished prints that is not present in others from the same negative; and, as we shall show, it is easily accounted for.

All papers when moistened with water expand, and the greatest extension is always in the transverse way of the web, while in the longitudinal direction it is very much less, though we have recently seen the reverse asserted. Longitudinally the extension is almost *nil*. We are now referring to machine-made papers, all photographic papers being of this kind. The expansion of paper is analogous to that of wood. A deal board, for example, twelve inches wide, will expand as much or more in its width as it will in a ten or twelve feet length.

Some few years back we went fully into this subject of distorted prints by stretching of the paper. We obtained some Rives' paper as taken from the roll. It was a little over twenty-four inches wide and several yards in length. From this a number of strips two inches wide and exactly twenty-four inches long were cut, both lengthwise and crosswise. Each strip was then marked with pencil to distinguish the direction from which it was cut. They were then soaked in water for an hour or two to allow of the greatest possible expansion. When carefully measured, the strips cut longitudinally were found to have expanded less than the eighth of an inch in length, while the expansion of the others was a little over half an inch. From this it will be seen that it is very unlikely the normal expansion of the paper will produce any perceptible distortion in, say, a cabinet size portrait. The maximum extension being but half an inch in two feet, it follows that it would be inappreciable in an inch and a half face. Here we are referring to the simple expansion of the paper. We now come to the more important point, its "stretchability," and it is to this that the palpable distortion often met with is attributable.

In our experiments we found, in mounting the wet strips of paper on thick mounting boards with starch in the ordinary way, and gently stretching them in the operation, that those strips, cut longitudinally, when dried measured over twenty-four and a half inches. Those cut from the reverse direction were no less than twenty-five and three-quarter inches. This was with plain paper, but on repeating the experiment with albumenised paper a greater extension was obtained; over two inches in the twenty-four—equal to one-twelfth—in the paper cut laterally. It will now readily be understood that in two prints from the same negative, made on paper cut crosswise of the web, the one placed on the negative in one direction, and the other in the reverse, and both stretched in mounting in the direction of greatest extension, a very marked difference in the two portraits will naturally result. In the one case the length of the features may be extended one-twelfth in their length, and in the other to an equal extent in their breadth.

It is a very common practice with mounters, when a print is misplaced, instead of removing it entirely from the board, to gently strain it into position: we have often seen it done. In the larger sizes of pictures, such as panels and imperials, one often sees them badly mounted, the edges of the prints not being truly parallel with those of the mounts. This is often attributed to carelessness in the trimming of the print, but very frequently it is due to unequal straining of the paper while attaching it to the board.

From what has now been said it will be seen that when any perceptible distortion is noticed in portraits it should be attributed to the mounting, and not, as is more generally done, to the expansion—*per se*—of the paper.

In the current number of the *Athenæum* is recorded a very singular result of composite photography. In reviewing a work, *The Criminal*, by Mr. Havelock Ellis, it criticises the three photographs taken by this method that illustrate the work, saying that they "curiously show the effect of composites in smoothing down deviations from a normal type. Thus a composite of eleven individuals produces a heavy jaw and broad, unprepossessing features; one of twenty 'dullards' presents a regular and not unpleasing expression; while one of thirty-eight is almost half angelic." Those practically conversant with photographic methods will not be at all surprised at such contradictory and incongruous results of a method of representation which by some scientific observers is considered so satisfactory and, indeed, valuable a mode of average portraiture-recording.

The process termed Nesslerising is one most generally adopted for readily ascertaining the amount of ammonia when present in small quantities, and it would, perhaps, be the quickest for making the determinations we recently alluded to when treating of the loss of ammonia by volatilisation from pyro-ammonia developers. With this in view, it will not be without interest to describe a new source of possible error in such determinations when not provided against. It is nevertheless very singular that it has not been before alluded to. Messrs. A. Hazen and H. W. Clark have, according to an article in the *American Chemical Journal*, discovered that unless the test is used with the ammonia samples all at the same temperature, a variation error equivalent to about from twenty-five to fifty per cent. will be observed. The warmer the ammonia solution, the deeper the colour produced upon the addition of the Nessler solution. Thus, a

standard containing 4 c.c. of ammonia solution Nesslerised at 30° C. will give a colour equal to that obtained from 5 c.c. Nesslerised at 15°, or 6 c.c. Nesslerised at 0°. This is such a remarkable result to obtain from an old and well-known method that some curiosity as to what other experts may have to say upon the matter may be expressed.

The "Father Perry Memorial" has taken a decided shape, and, as hinted, will be a fine telescope for Stonyhurst College Observatory. Mr. A. C. Thomas, of 30, North John-street, Liverpool, is the Hon. Secretary and Treasurer *pro tem.*, and an influential Committee has been formed, which includes some of the most distinguished astronomers. It has been decided that the best mode of perpetuating his name would be to aid the carrying on of the astronomical work in which he so long laboured. Shortly before his death (in a lecture at the Royal Institution in May, 1889), he said, "For the last ten years I have been anxiously endeavouring to make Stonyhurst as efficient an observatory as the means at my disposal would admit." The memorial will thus carry out his own wishes; and we may venture the hope that many readers of this Journal, whom Father Perry has interested and instructed by the articles he wrote for it, may be found in the list of subscribers to the "Memorial."

In the *Gasworks Statistics*, recently published by Messrs. Hazell, Watson, & Viney, were some singular facts that will assist in throwing some light on obscure causes of variation in photographic results. We frequently read of, say, "five" or "six seconds' exposure to an ordinary gas-burner." Now, apart from the absurdity of speaking of a gas burner in a quantitative light as regards its illuminating capacity without giving its size or number, the book before us shows how much variation is to be found in the illuminating powers of particular samples of coal gas themselves, and, naturally, *pari passu*, in its photographic qualities. A large number of gasworks still adhere to the good old 14-candle rule, yet others make gas giving more than twice as brilliant a light. For example, at Berwick the gas is 30-candle power; Liverpool, 21½; and Matlock, 21. These are English samples. In Scotland the quality is far better. Thus, at one town, Colinsburgh, the gas is of the extraordinarily high quality of 65-candle power; while in over twenty-seven Scotch towns the standard is 30 or upwards, and it never falls below 20. We thus see that the best English gas is, with only one or two exceptions, inferior to the lowest quality of that supplied to Scotch consumers. Ireland is about equal to England in this respect.

ON THINGS IN GENERAL.

Editors of serial periodicals are popularly supposed to be always on the *qui vive* for new and good things applicable to the particular gig they drive, and the editor of The British Journal of Photography has surely met with a novelty at once piquant and popular in the suggestion "The Angler" makes on page 559. We are all familiar with the eternal round of medals offered by Brown and Jones and Robinson for the best picture from negatives taken on their plates—medals that no exhibition committees ought ever to be connected with, and which few, if any, committees have had the courage to decline. As these energetic, if often misguided, body of photographic helpers and enthusiasts have been so very ready to copy the dog-shows by instituting the class beloved of the fanciers—the "Challenge class"—I often wonder why they do not take a step further in the same direction, and only recognise "shows held under Kennel Club Rules," substituting, of course, some other word for kennel. However, having taken the angler's bait, I must be content for him to wind up the reel and bring me back to where I started from—the excellent suggestion he makes, that instead of the plate makers medalling their customers, their customers should medal them; form, in fact, a mutual testimonial society. Who can doubt that the idea is good? The question is, would they submit to it? Those who have occupied the onerous post of picture hangers know the difficulty involved in getting a picture of moderate size placed exactly to please, even with experienced workmen in charge. How great would the difficulty be in hanging the plate makers themselves! Some readers may say that some makers deserve hanging, but that would be merely a frivolous interruption. Certainly they are not all men of great corporeal substance, but I candidly confess I should object to hang any of them personally; and in fact, the difficulty imagined by the writer of finding suitable judges would be as nothing compared to that of finding suitable "hangers." The plan looks and sounds very attractive. I am afraid, though, that there are practical difficulties in the way sufficient to prevent its realisation, quite apart from the action some of the humanitarian societies would be sure to take.

The most delightfully refreshing letter that has appeared for some time, however, is that of Mr. H. Colebrook, a gentleman who candidly admits that his own article in a literary competition on a photographic subject was inferior to the one that obtained the prize. Here in very truth is a worthy recipient of a medal of another sort; I should like to shake hands with him. A number of other gentlemen who had entered the same competition have sent to the editor, for our benefit, copies of their compositions, which, strange to say, did not all win the prize. The editor points out that some of them forgot to mention portraiture when enumerating the uses of photography; but this is a mere detail. The readers of this Journal may gauge for themselves the turpitude of the conductors of the periodical offering a prize yet withholding it from the authors of such gems of literature.

I have been much struck lately at the fuss made over the supposed novelty of using a reflector inside a camera to perform the double function of exposing shutter and finder. The only novelty that I can see in the descriptions of it that was not possessed by a camera I had in my hands a score of years ago, is that the reflector in the new article is in one piece, while the instrument I speak of had the reflector divided in the middle into two. The rapidity of action is thus in the recent patent reduced by more than one-half. Something more novel would be refreshing. After the fashion, say, of Mr. W. B. Bolton's remarks upon the form of shutters. I do not hesitate to say that I endorse every one of the practical suggestions he makes, and I am glad he has spoken out. The multitude of shutters, loose and attached to hand cameras, that has been introduced for the last few years past is remarkable, and yet how many are defective in the very way Mr. Bolton points out! Why the passing of a circular instead of a rectangular aperture across the field of view should be selected in so many cases I am utterly at a loss to comprehend; nor is it given to me to be able to propound a cause for the giving curved instead of rectilinear ends to a slot used for the same purpose. Mr. Bolton gives a thoroughly practical exposition of the hollowness of the theory that shutters opening from the centre give greater sharpness than would the same volume of light (to adopt his useful form of expression) coming through a diaphragm of equivalent aperture. Let as much as possible of the lens be uncovered at once is what I would advocate. Every part of the surface of a lens can give an image; why prevent any of its action by a shutter of ill-chosen shape and proportion?

I am much interested in Mr. Barrett's papers on retouching. In speaking of early retouching, I think Mr. Edge, of Llandudno (but of Preston in those days), deserves "honourable mention," for he was one of the first, if not the first, to adopt it for all his work. I believe all his prints, too, were retouched. Indian ink was what he always adopted. In view of Mr. Barrett collecting his articles together some day, I may ask, in his own interest, would it surprise him to learn that so far from a collodion negative unvarnished not allowing of a pencil being worked over it, I have done such retouching on more negatives than one? Also, I would ask him what he means by "eighty grains of gum dissolved in an ounce of benzole?" It is easy to guess at his meaning, but it is not expressed; and some one may try to dissolve some "gum arabic," which is familiarly known as "gum," with results more instructive than useful or gratifying. Free Lance.

THE ART OF RETOUCHING.

Chapter XVII.—Treatment of Copies and Enlargements.

The difficulties presented to the retoucher when working up negatives taken from very old and faded photographs are indeed considerable, and in very many cases demand very considerable skill to succeed in producing a satisfactory result. In a lengthened experience I have

had many strange things to do in connexion with retouching *copies*. I have had to retouch negatives taken from pictures cracked and damaged all over. Also copies of glass positives which were broken to such an extent that they represented all the difficulties of a pictorial puzzle to put them properly together. Such work does not pay if looked at from the purely commercial point, as the work must be very carefully carried out, and takes considerable time, and, comparatively speaking, the pay is not adequate. The fact is, the better the work is done the less labour it seems to be, and is consequently less thought of by those unable to thoroughly appreciate the difficulties.

Negatives taken the same size as the original will be found quite bad enough, but still more so are those enlarged to extreme sizes, from, say, the ordinary photographic *carte-de-visite*. Within the last six weeks I had to work up a *panel* vignette which was enlarged from a "*magnum*" photograph. As if this were not enough, it happened to be for a customer who could not see any reason why the enlarged photograph should not be in every way equal to the original. After considerable trouble (real downright trouble) the customer was satisfied, but on the whole it was very thankless work. As a rule, the worker gets but a faint measure of appreciation. In many cases the highest marks of approval are signified by the fact that we do not get a general blowing up for lack of success. Well, these enlargements, copies of small paper pictures, when carried to any extreme degree, such as I suggest, will be found almost invariably to possess a very coarse quality and present generally a bad and granular effect—a result due, naturally, to the coarse texture of the paper in the original being enlarged, and in many cases exaggerated.

In retouching such a negative, the first thing to be done is to thoroughly decide in one's mind the effect we are desirous to produce. If our taste be only to make the copy *passable*, a slight amount of work may suffice; but, on the other hand, if we desire to arrive at the best possible result, we will have a long and very wearying task before us. In such a case *general effect* rather than *extreme fineness* of touching should be our aim. I say this because a retoucher with taste can produce a soft effect which will yield a good printing texture with a comparatively small amount of work, whereas should he try to thoroughly get rid of the grain of the paper a very long and complicated work has before him; besides, the result will, even then be anything but commensurate with the amount of skilful labour expended upon it. To aid in getting this soft effect the retoucher should keep his eyes, when working, as far as possible from the negative, as he will thus lose the offensive character of the grain more readily.

If it be possible to have the original *as a guide* while working, by all means have it. It will be a very great help when putting in the lights, and aid us in avoiding the danger of exaggerating. Of course, any exaggeration in this regard would tend to give the appearance of *hardness*, whereas all our efforts should be employed in the production of *softness*. Having made up our minds as to the treatment of the texture of the paper, we, of course, would then proceed to the general retouching of the face, which would be carried out in a similar way to that of one taken direct from life.

A general defect in almost all copies is an unfortunate disposition towards *flatness*. A kind of grey half tone seems to pervade the entire picture, depriving it of its vigour, and leaving it in many instances without one single high light. In such cases it will be found that we will have, practically, to put in the *features*, utilising the *half tone* of the photograph as the *grays* in nature, and, by forcing up the high lights, obtain a certain degree of vigour and contrast in our picture. This same half tone, although a great bother in many ways, can with skilful treatment be turned to considerable advantage. We can utilise it in our struggle to produce not the vigour and contrast necessary to make a picture, but also to secure the necessary roundness which should be in every artistic picture.

The copies or reproductions made from the old Daguerreotypes will be found to be very much less exacting and troublesome, for the very simple reason that the negatives in these cases will be quite free from all *texture*, owing, of course, to the natural qualities of the polished silver plates. All Daguerreotypes show a bright and level surface to the light, and will, therefore, lend themselves to the process of reproduction much more satisfactorily than would an old and faded silver print. Indeed, it will be found in many cases that nothing beyond the ordinary modelling and general softening will be required. I have seen many negatives taken from such pictures, and after having been skilfully retouched, produce a much better result even than the original. In many cases the face will be all right, while very often the figure will not stand out from the background. This defect will seldom be so visible in the reproduced negative, as there will be much more contrast than in the Daguerreotype.

There are numerous difficulties in the way of copies of oil paintings. I can call to mind a very notable case which came under my personal knowledge some years ago. It was a life-size portrait in oils of a lady which wanted copying. Quite a dozen negatives, varying from quarter to whole-plate sizes, were taken, but all seemed most horrible. Everybody who saw the picture and the negatives was completely astonished at the defects. The painting was a very smooth and highly finished work, most finely and carefully painted, highly glazed, and showing a good surface for photographic purposes. Indeed, really good negatives were taken, but the faces in them all were very badly seamed with dark markings running across them from right to left. At last, after an exhaustive examination, it was found that the varnish had turned yellow in parts, and hence all our trouble. It was decided that this could be very easily altered by asking permission to remove the varnish and having it done afresh, but this proposal did not meet with the approval of the owners of the picture, who in their turn decided that if the picture could not be satisfactorily photographed without touching or disturbing the original they would not have it done at all. There was nothing for it, then, but to have all the negatives most carefully worked up. This was done, and the pictures turned out successfully. In cases similar to this, great care must be taken to preserve the likeness, and not allow our work to interfere in the least with the drawing. This is no very easy matter, I can assure you, where so much has to be taken away.

The difficulties in the way of copying oil portraits, or, indeed, any other class of pictures, are not so numerous or troublesome as they were some years ago. Mr. Dixon has shown us some very wonderful results with his orthochromatic plates, and negatives taken by his process will not require anything like the amount of work demanded by a negative taken in the ordinary way. The plates do not altogether dispense with the retoucher's work, but it is undeniable that they more than cut his labours in half.

In many cases it will fall to the retoucher's lot to alter the background of a portrait; if it be too dark, to lighten it, and if, on the contrary, it be too light and should be required to be darkened, we must be prepared to do it. In a case where it is too dark and we desire to lighten it, the simplest way is to coat the back of the negative with either a white or yellow varnish, give it a few minutes to dry and harden, but before it becomes quite dry run a line all round the figure with a sharp penknife and then remove the varnish from the figure, only leaving it on the background. This will cause the background to print much lighter. In taking away the varnish it will always be better to leave a little line behind the figure than to take away too much. Should it be only one side that requires lightening, use the ordinary matt varnish, and then take a stump charged with plumbago and work upon the part or parts requiring to be lightened. This done, be sure to soften the edges well by rubbing with the finger or a clean stump, as failing to do this we may leave a defined marking which will completely mar the success of our picture.

If, on the contrary, we have got a very light background, and a dark one may be desired, or some offensive piece of furniture may require removing, we must proceed in a very different manner. In such a case put the negative in the retouching desk, then with a very sharp and well-pointed knife cut away very carefully the film surrounding the figure. In this way, if desired, we may cut away the entire background, or leave only such portions as will enable us, with the brush and pencil, to put in any fresh background and accessories that may seem most appropriate or advantageous. The greatest care must be taken should the face of the subject be posed in profile, as the least false touch would endanger the success of our operation, if not altogether ruin the picture. In all such delicate operations it is advisable that the arm should be firmly fixed, so as to avoid the chances of slipping, and thereby perhaps taking a piece out of the

face of the picture. I may here say that mishaps of this kind are most difficult to rectify. The knife, too, should be extremely sharp; and if used by a steady and sure hand, the gelatine film can be cut down to almost any density and still never come to the bare glass.

Many retouchers use a needle fastened in a piece of wood to scrape away the background surrounding the figure and face; but, personally, I have always used the knife, and it has always rewarded my confidence in its powers. If the artist be skilful to the highest degree, a negative can be so treated, and a background put in with the pencil and brush that it will look quite as though it were the original one. On the gelatine films of to-day it is much easier to avoid a hard outline around the figure than on the old collodion plates of long ago; indeed, the former lend themselves completely to the successful use of the knife. It is not looked upon as a matter of much moment to cut down or reduce the offensive lights that may show on the negative of a lady dressed in black velvet or plush. I refer principally to the unfortunate wrinkles and lights that often show about the bust of a lady, and which may be the result of bad *posing* or carelessness. Whatever the cause may be for their presence, they are most objectionable, and their removal will amply repay the trouble incurred in the operation by the beauty and grace that will surely result.

There is another manner of altering or stopping out a background, and that is by masking it. This, however, has many disadvantages, not only in the difficulty of doing it properly upon the negative, but also in producing prints fairly alike afterwards. However, by a judicious use of these hints a great deal may be done to make a picture, if not absolutely successful, at least passable, which would otherwise be "*impossible*."

In all reproductions or enlargements the prevailing fault is flatness and what may be termed want of the light and shade in their proper gradations. In life-size portraits the judicious use of the stump may produce a light upon a face that may make the success of the picture. These lights are not so very necessary when the copies are printed in carbon as they are in plain silver printing. The reason is, naturally, because we can pick out the lights in the former with a knife or an ink eraser, this operation being, of course, impossible in the latter. Thus we can secure a brilliancy in the one that the other must ever lack—one can be made to possess all the gradations of light and shade, while the other still remains *flat* and unalterable.

Having said so much about the manner of obtaining *lights* in a copy or enlargement, it may not be inopportune to say a few words about what is of quite equal importance—the deepening of shadows. Many times in copies and enlargements the shadows are very weak and devoid of all quality from a printing point. I hold it, too, that brilliancy in the *shadow* is as necessary a quality to a successful picture as it is in the *light*. This can, however, be materially altered. The lines and markings, too, in people advanced in years, the texture of the face, &c., are more than often far too harshly marked in the enlarged negative. All these, however, can be much softened to any extent, even entirely taking away, by printing through tracing paper over the negative; that is to say, by so interposing a certain thickness of tracing paper *between* the negative and the sensitised paper upon which the print is to be ultimately produced. I need not say we have the option of also *working* upon the said tracing paper, and carrying out such alterations as may seem to us most desirable.

When working upon a negative under these circumstances, say a 24 × 18, I always stain tracing paper on the *reverse* side of negative. It will serve a double purpose, inasmuch as it not only softens the printing, but it is a first-rate medium for working upon with either stump or pencil to strengthen the high lights. It can also by its means deepen the shadows of drapery, or other objects that may require treatment.

To do this I make up a bottle of varnish made of one drachm of Canada balsam, and one ounce of benzole. I dip my brush in this, and pick out the shadows I wish to strengthen upon the tracing paper. The Canada balsam making the paper considerably more transparent in the places touched by it, the light acts more quickly, and necessarily ends in greater depth of shadow being procured upon the print. The distance the paper is from the film thoroughly softens the edges that might otherwise exist. In this way, with care and skill, a good picture may be obtained of a copy or enlargement from a most unfavourable negative.

I think with this I must conclude. I can call to mind no point upon which I have not touched, and, I hope, given satisfactory information regarding its treatment. If I have omitted anything, I hope charity will step in and cause my censure to be tempered more by pity than by anger.

I can fancy the sigh of relief that will burst from the lips of those patient souls who may have followed me throughout these pages now I have come to an end. I hope, however, in the joy they feel, they will not altogether forget the efforts made to satisfy their curiosity regarding the *Art of Retouching* by REDMOND BARRETT.

INSTANTANEOUS PHOTOGRAPHY.

[Read at a Meeting of the Leytonstone and Epping Society.]

THE camera has been called "a trap to catch a sunbeam," and although there are many who contend that photography is mechanical, and therefore not an art, it is still a fact that the result produced by this entrapped sunbeam depends entirely on the skill and individuality of the worker. I propose to consider to what extent and under what circumstances "instantaneous photography," or the power of depicting objects in motion, can be used to produce artistic results; for "picture making" should be the aim of every photographer, and any result which is not an artistic success should be considered an unqualified failure, however perfect, technically, it may be; but equally should it be considered inadmissible to allow an artistic result to be marred by technical defects or blemishes.

There is a great charm in successful instantaneous work, and it would almost seem that its uncertainty is one of the elements of this charm. The best workers only produce their successes after many failures and the most careful and systematic work.

There is probably no part of an amateur photographer's equipment so injudiciously used as the instantaneous shutter, and consequently it is sweepingly condemned by many who feel the artistic loss to photography that its misuse involves; still, my object in asking your attention is to plead for a more extensive, but more *judicious* use of the shutter, to consider how far it may with advantage replace the cap, and how far our photographs may be improved artistically by the change.

Without discussing the correctness of the term, I propose to consider, under the title of *Instantaneous Photography*, all exposures that require to be made with any other contrivance than the cap, or, in other words, all those of shorter duration than one second.

There are two widely distinct classes of work to be done with the shutter, and as these differ so materially in character, in the object for which the shutter is used, and consequently in its rapidity, it will be necessary to consider them independently.

First, those subjects in which figures, animals, or other objects moving slowly, are used as an aid to an otherwise imperfect composition, for which a very slow shutter is required, giving a quarter to half a second; and second, ordinary instantaneous work, in which quickly moving objects form the subject of the picture, necessitating the use of a rapid shutter, varying in speed from one-eighth to one-eightieth of a second. Subjects requiring a shorter exposure than one-eightieth of a second I do not propose to consider at all.

The artistic aspect of each class should first receive our attention, and then the practical, the special apparatus necessary, the advantages and disadvantages of various forms, and any difficulties that occur in practice that ordinary work is free from.

On looking over an amateur's collection of landscape photographs, the marked absence of figures, or life of any kind, in nearly all, is very striking, and probably most workers have experienced the difficulty, not so much of obtaining suitable figures, as of photographing them under ordinary conditions of working. Sometimes a photographer can so arrange or manage his figures that they can be taken with the cap, and the subject and lighting may necessitate an exposure far too long to allow of being taken with the shutter, and some subjects, too, are better without figures; still, in the majority of cases, waiting for figures to fill of their own accord positions in which they will harmonise with and help the composition will produce the best result. Natives of country places, if arranged and told to keep still, lose the great charm of naturalness, which would not be the case if they could be taken while at their ordinary work, or following their own inclinations; even if arranged satisfactorily, one or more may move at the critical moment and spoil the whole work.

In such instances a shutter capable of giving a quarter or half second exposure with certainty, and without having to look at the camera, as would be necessary if the exposure were made with the cap, is a great power in the hands of a careful worker. The whole subject can be

watched, the composition of the figures studied, and the moment that their arrangement is as desired, and their movement as little as possible *across* the field of view, the ball held in the hand is squeezed, the exposure made mechanically, and a result obtained that with the cap would be an impossibility.

The direction of motion of the object photographed, relatively to the camera, has an immense influence on the extent to which the exposure may be prolonged without producing blurring: an object crossing the picture at a right angle, at the rate of four miles an hour only, would move about *seven inches* in *one-tenth* of a second, but if moving at the same speed almost in a line towards the camera, provided it were not too near, an exposure of a quarter to half a second might be given, and the image would be quite sharp.

Almost all subjects, too, in which figures are required can be fully exposed in a good light in a quarter of a second with *f*-16 stop, and many in less, on Ilford ordinary plates.

In what is more generally understood by the term "instantaneous" work—exposures of one-tenth of a second or less—there exists a widely different field for the exercise of care and skill to make *pictures* of objects in rapid motion.

The first consideration should be to choose some subject that is sufficiently picturesque in itself to produce an artistic result if successfully photographed. It is surprising how many amateurs, when commencing, have an intense ambition to take an express train running at its highest speed. Now, I am strongly inclined to agree with Mr. Ruskin that a railway at its best is not picturesque, and certainly, however taken, a train would never make a picture, and even if it did, photographed when running at fifty or sixty miles an hour it appears exactly the same as if standing still.

For instantaneous photography a subject should be chosen that has a different aspect when in motion from that which it has when at rest, or if not, what result is gained? The picture fails to convey any impression of that motion that is the sole object of its existence. A yacht running before the wind, its sails swelling, breaking and throwing up spray before it, and leaving a train of broken water behind, has a life in it that has entirely disappeared when it is at anchor. The same boat on a calm day presents again a widely different picture—scarcely a ripple on the water, the sails idly flapping; but still an instantaneous photograph would render well the idea conveyed by watching the boat.

The fishing boats at the various ports on our coasts form admirable subjects, and give many opportunities for instantaneous exposures, and it is surprising how very varied may be the pictures that they form.

Groups of ducks or swans in water, waves breaking on the shore, the stately steamship, even the meekest rowing boat on the river, may be made to produce artistic results if only the photographer be an artist.

I have occasionally seen, in those photographic papers in which amateurs exchange views and correspond for their mutual benefit, advice given to take waterfalls with an instantaneous shutter in order to render the moving water successfully. Since waterfalls are almost invariably surrounded by heavy foliage, a very long exposure is necessary to secure full detail, and no outdoor subject could be less suited to attempt with the shutter; it might perhaps produce an impression of the water and sky, but all else would be clean glass. There is not the slightest necessity for working rapidly, as the water falls continuously in the same form, and a minute's exposure would reproduce it as sharply defined as a fraction of a second. I recently photographed one, giving an exposure of twelve seconds, and a second negative taken half an hour later from a different point of view showed every touch of light and shade in the water identical with the first.

In considering the special apparatus necessary for instantaneous photography, the shutter should receive the largest share of our attention. A shutter should possess the following qualifications:—1. It should be free from vibration during exposure, and the blow due to its stopping should be as slight as possible. 2. It should be readily adjustable for various speeds, and should be so constructed as to allow of the speed being altered while waiting to suit the exposure. 3. It should be reliable at any set speed, that is, the same setting should always give, as nearly as possible, the same exposure. 4. It should have pneumatic release, so that the exposure can be made without the necessity of watching the camera. 5. It should be as simple as possible; the more complicated, the greater liability to get out of order, and the less possibility of a photographer to set right any accidental derangement. The more complex, too, the less reliable is the speed. 6. It should not interfere with the use of stops. 7. It should admit as nearly as possible the same amount of light to all parts of the plate, excepting for slow landscape work, when, if there is any difference, the lower part of the picture should receive the greater amount. 8. It should be so constructed that there should be no possibility of its fogging the plate while waiting to make an exposure. 9. Indiarubber bands for accelerating the speed, though condemned by many, I prefer to the use of a steel spring. A reserve stock of bands can be carried, and a broken one easily replaced. If a steel spring should break or get out of order, nothing more can be done till the shutter has been repaired by the makers.

The shutter that I propose to consider first is one eminently suited for slow landscape work, but for no other kind. It is well within the power of any amateur photographer to make one, a course that seems preferable, as there seems to be no maker who considers it worth while to put a well-made shutter of this pattern in the market.

A slide is shot upwards from before the lens by an indiarubber band, and allowed to drop back by its own weight (Fig. 1). In some patterns of this shutter, the return of the slide is accelerated by striking a second elastic band, and in others by a steel spring, but while this increases the speed considerably it is to be most strongly condemned, as the jar caused by

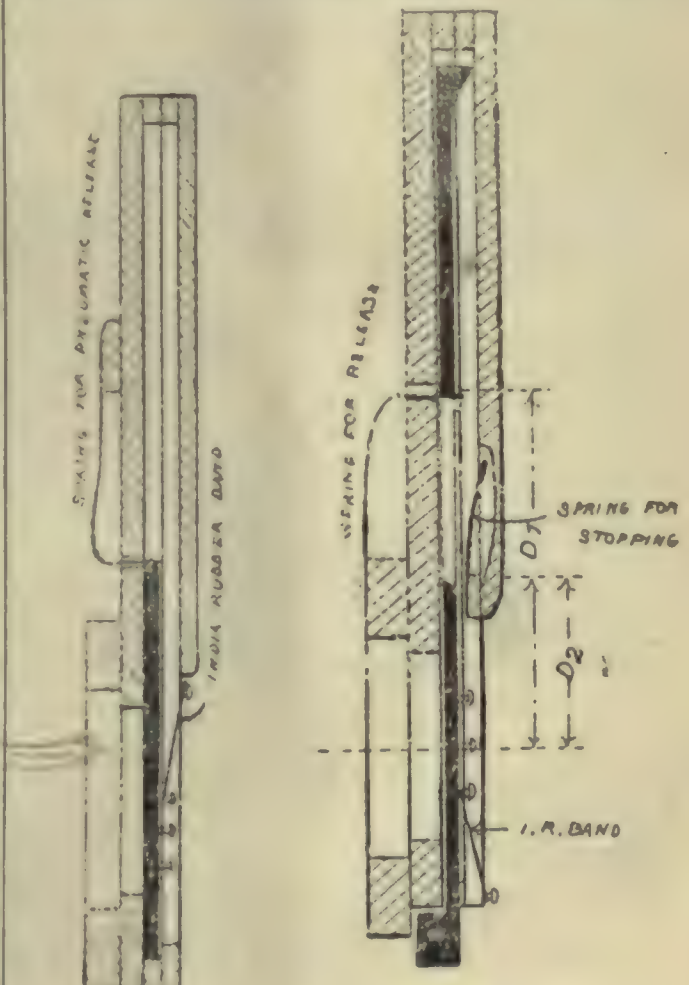


FIG. 1. FIG. 2.

striking the second band or spring when the lens is fully open gives a double outline to all horizontal lines in the picture; and this blurring becomes more pronounced in proportion to the rapidity gained.

In the second model that I show you, I have made an addition that I have never seen in any commercial shutter of this type, and yet it is of vital importance. A front is added so that the whole of the shutter is enclosed to prevent fogging (Fig. 2).

By the formula used for finding the speed of falling bodies—

$$T = \cdot 072 \sqrt{D},$$

in which T = time in seconds,

and D = distance in inches—

it will be found that the slide would drop three inches in one-eighth of a

second, so that if the indiarubber band be so adjusted as to shoot the lower edge of the slide three inches above the centre of the lens, the exposure given will be a quarter of a second, the rise of the slide taking exactly the same time as its fall. A slower exposure can be given by turning the shutter at an angle instead of fixing it vertically on the lens. If it is turned to 45°, and the band adjusted so that the slide travels the same distance, viz., three inches, the exposure will be increased fifty per cent., and if turned to 60°, the travel of the slide still remaining the same, the exposure is doubled or about half a second.

For rapid exposures there are many shutters on the market of varying degrees of efficiency. They may be classified—1, "Go and return;" 2, revolving disc; 3, flash; 4, diaphragmatic; 5, roller blind; 6, drop.

One of the best known of the first or "go and return" type is Newman's, which is a favourite with many amateurs. According to a scale engraved on it, it is adjustable from one-hundredth of a second to one or two seconds according to size, but so far as I have been able to test it in actual work the exposures given are very different from the times engraved on the scale. A celebrated amateur worker who recently published the results of some very careful tests stated that when set to give one-hundredth of a second, the actual exposure registered was about six times this or one-seventeenth of a second; consequently, it is not nearly fast enough for ordinary work, and if it were made to work very quickly it would have a tendency to jar when the lens were fully open, owing to the very rapid reversal of motion necessary. Being made to fit in the diaphragm slot, it does not allow of changing stops readily, and to use stops at all with it, a special set has to be made.

A somewhat similar shutter of the same type is the "Grimston," and two others that fit the hood of the lens are the "Volute" and the "Optimus plunge." All these have the great fault of the "go and return" form, they are not quick enough, and any attempt to work them very rapidly produces a double outline.

A type of shutter which is finding great favour at the present time is the Roller blind, "Kershaw's," and the "Thornton-Pickard." A flexible blind of opaque material being wound on a roller above the lens in setting the shutter is rapidly drawn on to another below it by a spring, an opening in this blind passing the lens making the exposure. This shutter is one of the most perfect, if not the most perfect, at present on the market. The speed is easily adjustable by varying the tension of the spring; ranging from about one-twentieth to one-eightieth of a second, there is no vibration during exposure, scarcely any jar on the stopping of the blind; the instrument is very compact, fits the hood of the lens, and there is no possibility of the plate being fogged while waiting to make the exposure.

The diaphragmatic, while theoretically the most perfect, is in practice by far the least desirable. Even the best are heavy and complicated; and though Caldwell's is capable of giving very rapid exposures, one two hundred and fiftieth of a second, and therefore useful perhaps for special scientific work, they are not nearly so suitable for general use as the more simple.

My favourite shutter for ordinary rapid work is the oldest form—the simple drop shutter. None can equal it for simplicity, it is fully equal to any of those that I have named for efficiency, and it can easily be made to give exposures varying from one-eighth to one-eightieth of a second. In its simplest form it consists of two pieces of wood, each having an opening corresponding to the hood of the lens; a third piece sliding between them, dropping by its own weight, has an opening that rapidly uncovers the lens and makes the exposure as it passes. The speed is increased by the fall of the slide being accelerated by indiarubber bands.

An improved pattern that I have recently designed, while equally simple, is free from the objections that can be urged against the usual form.

The principal difference is that the front is not continued below the top of the lens opening, allowing a more easy application and adjustment of indiarubber bands, while both front and back are taken higher than usual above the dropping slide, so as to form a light casing, and the slide, too, has a projection at its lower end; these together making it absolutely proof against fogging. For this reason the dropping piece can be made much looser in its guides than would be advisable in the usual form, and so prevent any tendency to stick or retard the exposure by friction.

An objection frequently urged against the drop shutter is the blow received by the lens on stopping of the slide. This is easily prevented by causing the stop on the slide to jam against a spring acting on a brake.

This shutter fulfils all the requirements enumerated as being necessary, and, like the shutter shown for slow work, any amateur can make it, and consequently repair it if it should be damaged or fail at any time.

If a drop shutter be made so as to work freely, its exact speed can be easily calculated by the formula,—

$$T = \cdot 072\ (\sqrt{D_1} - \sqrt{D_2}),$$

in which T = time in seconds,

D_1 = distance in inches from top of opening to centre of lens,

D_2 = distance in inches from bottom of opening to centre of lens;

both these distances being measured when the shutter is set ready for action. For example, if the lower edge of the opening is two inches above the axis of the lens, and the opening two inches, the exposure will be one twenty-fourth of a second. In the model shown, the exposure is one twenty-fifth, and in carefully testing by means of a revolving disc, I have found the indicated to agree with the calculated speed; and by using indiarubber bands the exposures have been as rapid as one-hundredth of a second.

So far, in speaking of the speed of shutters, the *equivalent* exposure, or the amount of light admitted to the plate, has been that that I have given. Theoretically, a shutter should open as quickly as possible, remain fully open during a great part of the exposure, and then close quickly; but in practice, especially for very rapid work, they are made so that they only fully open, and then commence closing again, otherwise the shutter would be a very difficult matter to drive it fast enough. Consequently the time during which the movement of the object is impressing itself on the plate is much longer than the actual value of the exposure, as when the lens is partly open only, the light reaching the plate is considerably diminished. If the opening in the slide is equal to the full aperture of the lens, and it should never be less, the actual exposure is theoretically double the equivalent, but practically it may be considered about one and a half times only, as when the shutter is nearly closed the amount of light transmitted from the object is so small that its movement is not registered, especially as the shutter in opening and closing, if on the hood of the lens, exposes part of the plate only.

Finder.—For photographing rapidly moving objects a finder is absolutely necessary, and it is a singular fact that there is not a good practical one in the market. Many that are offered to photographers are small instruments that only indicate when the object is in the centre of the plate, and for artistic work they are of no use whatever. Considering the difficulty of arranging a composition satisfactorily when working so quickly, it is of the greatest importance to have a finder that exactly reproduces on a smaller scale the image received by the plate, and also to have it so fixed that it can be seen without any effort, and both hands being free, one to alter the direction of the camera, if necessary, and the other to discharge the shutter.

The object is not always required in the centre of the plate; sometimes several form one picture, and then a finder is useless that only indicates what is in the centre; and, in addition, it gives scarcely any idea how much of the picture is occupied by the subject. It is very surprising, even to those who may be very experienced in ordinary work, when first attempting to photograph a yacht or similar subject, to find on developing how very small the image is; nothing could be more deceptive. A boat that is expected to nearly fill the plate is found to be so small as to be of no value at all.

The finder that I show you is simply a small duplicate camera, but by means of a mirror the image is received on the focussing screen placed at the side; a card shield renders the image easily seen, even in the brightest light. The size of the screen should, of course, bear the same proportion to the focus of the finder lens as the camera screen to the focus of the lens producing the actual image, in order that the two may correspond. While the best arrangement would be to have the finder the full size of the camera, in any but the smallest sizes this would be so inconveniently large and in the way as to be quite impracticable. In the model (Fig. 3), which is the actual finder that I have used for all my instantaneous work, the lens is a rapid doublet working at *f*-5, and has a focus of about four inches. Attaching to the side of the camera I find to be by far the most convenient arrangement, as it does not interfere with the working in any way. Some finders are made so as to show their image on the top, and are recommended to be fixed to the top of the camera. Since a camera on its tripod measures five feet six inches to six feet to the top, it would be impossible to watch the image in a finder so fixed, though for hand cameras it might probably be useful.

It is very necessary that the camera and stand should be as firm and rigid as possible, and a simple form of camera should be chosen, which, while possessing absolutely necessary movements, has nothing to worry the photographer at the time when, most of all, he must devote all his energy and attention to the work in hand. If a drop shutter is used, the baseboard of the camera should not project in front of the lens, excepting in very large sizes.

Lenses.—For rapid work the best lens is without doubt the rapid rectilinear. Some have lately advocated the euryscope on account of its greater rapidity, but this extra speed is gained at the expense of more important qualities. A rapid rectilinear working at *f*-8 or *f*-10 will be

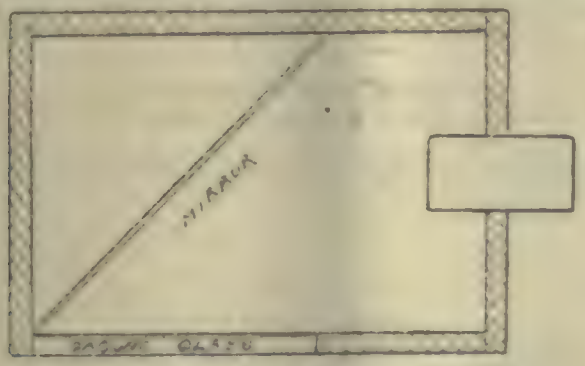


Fig. 4.

found to possess comparatively little depth of focus, and show want of flatness of field, even if it be the work of one of the best makers, and these shortcomings are more pronounced in the euryscope at *f*-6. For all the work treated of in this paper *f*-8 is fully quick enough, while for yachting and similar subjects in a good light, *f*-11 and even *f*-16 may frequently be preferable in order to prevent the plate from being over-exposed. It is always best not to work the shutter quicker than the work in hand really requires; rather than increase the speed beyond what is necessary, stop down the lens, there is greater certainty of getting the object in good focus, and better definition for different plates. Under the most favourable conditions, when working at sea, an amateur whose only lens is a single working at *f*-16 can do equally good work as his more favoured brethren who possess rapid rectilinears, though these should always be used if possible, as if the light subject at its best towards evening, or if it is necessary to work very quickly, their greater speed is sometimes necessary.

For slow landscape work, quarter to half a second exposure, the single lens is quite as suitable as the rapid rectilinear. For such subjects I never use a larger aperture than *f*-16, and almost all single lenses work well with this stop. There is no advantage in using very small stops for landscape work, excepting in special cases, frequently a disadvantage; and most subjects that require figures can be fully exposed in a good light in a quarter of a second, using *f*-16 stop on Ilford ordinary plates.

One of the principal difficulties experienced is obtaining the correct focus, which must generally be found before the object is in sight. A good plan is to focus some object at as nearly as possible the distance at which the subject must be, and then to make a pencil mark on the sliding part of the camera baseboard; this will probably be from forty to eighty feet, according to circumstances. A nearer object may then be focussed, and a second pencil mark made, and in some cases a still more distant object, and a third mark. Then if, at the moment of making the exposure, the object be considered too near or too far for the distance originally focussed, the front can be racked in or out, but great judgment must be used, and if there is any doubt, it is better to keep to the medium distance focus, which will be most suitable for the majority of exposures.

The exposure given must, of course, be determined by the subject, light, and plate. While for ordinary work a full exposure will always give the best result for working at sea, I find a short or sunny one preferable. If the exposure be too long it is very difficult to obtain sufficient density, owing to there being so little contrast between the lights and shadows of the picture. Generally, an exposure that would be sufficient for a cloud negative under ordinary conditions would be correct for an instantaneous exposure at sea, or if using Ilford ordinary plates and *f*-16 stop, one-thirtieth of a second in a good bright spring or summer light. As regards the length of exposure that can be given without producing blurring of the image, the direction of motion of the object relatively to the camera, as already pointed out, is quite as important to consider as its actual speed.

I now propose to hand round a few photographs illustrating the questions treated in this paper; and, in conclusion, I do not wish to advocate the indiscriminate use of the shutter, either rapid or slow. When there is no advantage to be gained by its use, by all means expose with the cap; but if life can be given to landscapes by the introduction of figures or animals, in some cases converting an uninteresting view into a picture that may be a gem, or village scenes portrayed, or pictures made of subjects that require to be represented in rapid motion, then the shutter places a new power in our hands.

While picture making requires very careful thought and consideration, yet an artist should be ready to seize every opportunity, and to see when a scene has the elements of a picture in it. In instantaneous work hesitation is fatal; but the worker must be prepared for many failures, systematic work, and painstaking effort, and it is only by failures and renewed efforts that we can learn to produce photographs that can deserve to rank as works of art.

HENRY W. BENNETT.

DEEP-SEA PHOTOGRAPHY IN JAPAN.

ACCIDENT TO PROFESSOR W. K. BURTON.

WE are sorry to learn that Professor W. K. Burton, when experimenting at Misaki on deep-sea photography, something not previously undertaken, had his leg badly cut, from the knee downwards, by the premature ignition and bursting of a bottle containing flash-light powder, which was intended for being exploded when it touched the bottom of the sea. Thus much we learn from the *Japan Gazette* of August 1, which paper next day gave fuller details as follows:—

"We are in receipt of full details concerning the mishap to Professor Burton and a sendo (sailor) at Misaki the other day. It appears that the Professor, with Professor C. D. West and Professor Mitsukwri, proceeded out into the bay on the evening of the 29th ult. to experiment with gear for deep-sea photography. The *Daimyo* was towed in mid-channel and anchored, and the spinnaker boom rigged out as a derrick to work the gear. After dark the three set out in a sampan (flat-bottomed rowing boat), Professor Burton in the bow with a loaded flash bottle, Professor West seated next to him, then the photographing gear, Professor Mitsukwri on the other side assisting to steady the gear, and next to him the sampan man rowing in the stern. Having arrived alongside the *Daimyo*, a sendo stepped off the *Daimyo* on to the sampan, canting the latter over on its side. The flash bottle exploded with a loud report, which was heard all over the village, and the fragments of glass flew about in all directions. Professor Burton's leg was badly lacerated, and the sendo received a nasty cut on the stomach. The photographic gear fell overboard, but a buoy was left to mark the spot. The two wounded were taken ashore and medically attended to. We are pleased to learn that both are progressing, and that the photographic gear has since been recovered from the bay."

On the 5th of August Mr. Burton writes us that the sufferers are now up and about in a mild way, and adds:—"I shall write a bit of an account of the affair for THE BRITISH JOURNAL OF PHOTOGRAPHY in a few days, as there is something both instructive and affording warning in connexion with the use of mixed flash powders."

Foreign Notes and News.

MESSRS. BALAGNY & HERRÉ have been examining into the tendency to yellow colouration displayed by the gelatine film on the employment of alkaline developers, especially when the exposure has been rather deficient. They find that the evil may be completely removed by washing after development in a bath of 25 parts citric acid, and 1000 parts water. M. Balagny is of opinion that the yellow colouration, which is not visible before fixing, is due to a fine precipitate of sulphide of silver. But M. Herré has shown that pure gelatine films which contain no silver show a similar colouration when dipped in pyro developer, and are consequently an organic colouration of the gelatine, which is destroyed by acid baths, but intensified by the action of alum or chrome alum.

IT does not very often happen to us to have to record a greater triumph in the application of photography to scientific purposes than has recently been chronicled from Vienna. Professors Dr. J. M. Eder, Ritter von Rosinger, and Dr. Sigmund Exner have succeeded—and thoroughly, too—in photographing the visual image on the retina of a beetle.

THE apparatus employed was the large micro-photographic installation by Zeiss, and the beetle, whose devotion to the advancement of science cost him his life, was a male of the species *Lampyris splendidula*, the females having eyes that are far less perfect in construction. The eye was cut out, the pigment removed from the back and immersed on a

plate of mica in a solution of glycerine diluted until its index of refraction equalled that of the blood of the beetle.

The object of the experiment was not only to obtain a photograph of the retina, but also to enable an opinion of the sharpness of sight of the beetle to be formed. One of the windows of the chemical lecture theatre of the Photographic Institute overlooks the neighbouring house-tops, giving an excellent view of the Schottenfeld church and church tower. The windows were shut, and on one of the panes was pasted the letter R cut out in paper, and against this window the eye of the deceased fly was directed, and the resulting retinal image was fixed upon an Angerer bromide plate by means of a Zeiss apochromatic, and a projection eye-piece.

Collotype reproductions of the negative have been supplied to the readers of the *Photographische Correspondenz*, and enable an accurate idea to be formed of what a beetle actually sees. In it the panels of the window are distinctly and clearly visible, as is also the letter R. The distant church appeared as of less importance in the beetle's eye, but was nevertheless distinctly visible. How it occurs that the eye of the insect with its hundred facets succeeds in producing upon the retina so clear and distinct a single image still remains as wonderful as before, but as the first permanent and indisputable record of what a beetle actually sees we venture to think that this successful experiment of Messrs. Eder, Reisinger, and Exner is likely to become classical.

During the spring of the present year Herr Max Junghaendel, of Vienna, paid a visit to the land of the Pharaohs. He has recently returned with a magnificent series of photographs, remarkable both for their size (30 × 40 c.m.) and the excellence of their execution. Two especially are said to be remarkably fine, those of the Temple of the Sun at Philæ and of the Great Obelisk at Karnak. The whole series is to be produced in heliogravure for a forthcoming work on Egypt, from which intending purchasers will have the advantage of being contemplated by forty centuries.

Translations of the Journal articles on the *Latent Image* are just now touring through the Continental periodicals, and have just recently arrived at Vienna, where they appear in the *Photographische Correspondenz*.

According to M. Perrot de Chaumeux, negatives which have become yellow on developing with hydroquinone may be cleared by a bath of—

Water	100 c.c.
Sublimate	1 gramme.
Salt	2 grammes.

Max Jaffé gives a very practical method of obtaining correct copies of photographs which, owing to imperfect horizontality of the camera during exposure, show converging vertical lines. For instance, supposing it is desired to copy an architectural view in which the lines converge upwards, the original is fastened to a board which turns on a horizontal axis in such a way that the one end is brought nearer to the camera which is appropriately tilted than the other. In this way, as may easily be seen, a copy can be produced from which the convergence is eliminated.

Our Editorial Table.

Rathgeber für Anfänger in Photographiren und Behelf für Vorgeschrittene.

Halle: Wilhelm Knapp.

In this *rathgeber*, Herr Ludwig David proves himself the guide, philosopher, and friend of the photographic aspirant. The various apparatus required in the art are explained, and in many cases illustrated, and numerous hints and formulæ are scattered throughout its ninety-nine pages.

Names we Love and Places we Know.

London: Hazell, Watson & Viney.

An elegant birthday text-book of literary gems, one for each day in the year. It contains the same number of spaces for the "names we love," and a few blank pages on which to mount photographs of "places we know." To prevent the little volume from losing its pretty form, the twelve or more photographs which are intended to be mounted on its leaves should be on very thin paper, and of course a mountant must be employed that will not cause cockling. The poetical selections are made with taste and discrimination.

Messrs. Percy Lund & Co., Bradford, have sent us several photographs showing the designs of their backgrounds, some of which are on paper, others on linen. The designs in every case are very effective.

Traite Pratique de Photographie.

Par Ch. Mendel. Paris: Librarie de la Science en Famille.

In this manual the author goes over the usual ground peculiar to handbooks for beginners. To those not versed in purchasing apparatus it will be found very useful and simple.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 13,836.—"Improvements in the Manufacture of Photographic Films and in Apparatus therefor." J. J. Acworth.—*Dated September* 3, 1890.

No. 13,867.—"Improvements in Photographic Cameras." J. H. G. Clarke.—*Dated September* 4, 1890.

No. 13,937.—"Method of Rendering Photographs on Glass, China, or the like Permanent." C. Ball, P. N. Evans, and Q. Wirtz.—*Dated September* 4, 1890.

No. 14,004.—"Improvements in Photographic Cameras." C. C. Gill and J. G. Evans.—*Dated September* 5, 1890.

SPECIFICATIONS PUBLISHED.

1889.

No. 16,528.—"Photographic Plates, &c." Stanway.—Price 6*d*.

1890.

No. 9980.—"Photographic Dry Plates." Shailer.—Price 6*d*.

No. 11,104.—"Photographic Plates." Communicated by Moh. Edwards.—Price 4*d*.

PATENTS COMPLETED.

An Improved Method of Preparing Photographic Plates of Mica.

(A communication from abroad by Oswald Moh, of Goerlitz, in the Empire of Germany.)

No. 11,104. Edmund Edwards, 35, Southampton-buildings, Chancery-lane, Middlesex.—*August* 16, 1890.

This invention relates to an improved method of preparing plates for taking photographic pictures, and it consists in making the said plates or sheets of mica, which is submitted to a treatment by suitable agents to remove from the native mica the mineral grease before applying the fine sensitive coating of bromide, silver, gelatine, or the like.

The mica is a mineral which can readily be divided into plates or sheets of extreme thinness, and it is further known to be as transparent as glass. This very useful material has not hitherto been generally employed for taking photographic pictures, for the reason that the thin coating of bromide, silver, gelatine, or other sensitive material, did not (or not sufficiently) adhere to the surface of the mica, but became loose and detached in the bath.

The object of the present invention, therefore, is to prepare the plates or sheets of mica in such a manner as to enable the same to hold, fixed and firmly adhering to them, the thin coating of sensitive material employed for taking the photographic picture. The obstacle hitherto experienced in fixing the said coating upon the plate of mica consisted in the mineral grease contained in the native mica, the said grease preventing the fixed and intimate adherence of the coating. To remove the said mineral grease, the plate or sheet of native mica, according to the present invention, is submitted to a treatment, continued for a sufficient time, of a solution of chrome alum with an addition of gelatine.

The photographic plates prepared from mica, previously submitted to the treatment described, will hold the thin sensitive coating applied to them perfectly fixed and durable.

They resist any fluid employed for developing the picture, and any jet or stream of water directed forcibly against them, and at any temperature, without at all impairing the clear and fine quality of the image.

The plates, or sheets of mica, offer remarkable and conspicuous advantages over plates of glass in that they are not liable to breakage, are extremely light, are not attacked or impaired by changes of temperature, by acids, or chemical agents and solutions of any of the kinds employed in the art of taking photographs; and they have besides, a sufficient degree of elasticity to allow of conveniently packing and transporting them, and a great quantity of such plates may readily be carried on a journey without materially adding to the weight of luggage.

The said mica plates also offer the advantage over ordinary gelatine plates, or plates prepared with similar emulsions, in not being subjected to deformations or rolling up, which frequently cause great difficulties in taking a good picture, or even render it utterly impossible.

The mica plates, on the contrary, always remain smooth, even, and straight, and owing to their extreme thinness and perfect transparency, they may be readily employed for taking copies either on the front or reverse side. In general, the plates of mica offer an excellent material for photographic purposes.

Having now particularly described and ascertained the nature of the said invention, and in what manner the same is to be performed, I declare that what I claim is:—The method of preparing photographic plates of mica by applying the sensitive coating of bromide, silver, gelatine, or other suitable material, to the plate or sheet of mica, previously submitted to a treatment by a solution of chrome alum with the addition of gelatine, or other suitable agent capable of removing the mineral grease from the native mica, and rendering the same to receive in fixed and solid adherence the said sensitive coating substantially as and for the purpose set forth.

NEW OR IMPROVED LIFTERS FOR PHOTOGRAPHIC PLATES, PAPERS, AND FILMS. No. 16,328. THOMAS STANWAY, 24, Cauldon-road, Hanley, Staffordshire.—August 16, 1890.

My invention relates to the lifting of photographic plates, papers, and films during developing, fixing, cleaning or other similar manipulations; and my invention has for its object the manufacturing of new or improved lifters by the use of which handling the said plates, papers, and films during the said manipulations is avoided.

My invention consists in making the said lifters in metal or other suitable material, preferably flat, or ribbon like, in the form of loops, having a suitable handle or finger hole to lift them up. In use the lifters are used in pairs, one being held in each hand and engaged in two diagonally opposite corners of the plate, and held with a slight pressure towards each other, the plate by their aid being then manipulated in the ordinary way. Papers and films are first wetted and laid on a piece of glass, the lifters being then used as for plates. To keep the paper or film from rising at the corners where the lifters are not placed I use an elastic loop, passing over the paper or film at the said corners and then going under the plate.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 16 ..	North London	Wellington Hall, Islington, N.
.. 16 ..	Bolton Photo	The Studio, Deansgate-lane, Bolton.
.. 17 ..	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
.. 17 ..	Surrey	
.. 17 ..	Hyde	
.. 17 ..	Manchester Camera Club	Victoria Hotel.
.. 17 ..	Richmond's Photo. Club	5, St. Andrew-square.
.. 17 ..	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
.. 18 ..	London and Provincial	Masons' Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 4.—Mr. T. Bolas in the chair.

Mr. F. W. Hare showed the framework and screen for lantern exhibitions to which he had referred at the previous meeting. It was made from lengths of bamboo, each measuring about four feet, fitted together by screw ferrules, which were so truly constructed as to give great strength and solidity to the long rods when jointed together. The frame was in shape something like a Japanese fan, the standards of which were, to complete their rigidity, attached by a fine cord to a screw eye fixed in the floor. When this could not be done, a pail or coal scuttle filled so as to have weight answered the purpose of an attachment to which to anchor the cord. The stands were fixed at varying distances, according to the length of lantern required, which was regulated by the size of the screen to be used, from about seven feet to eleven or twelve feet. The whole screen could be fixed vertically or tilted to suit the lantern when the latter had to be inclined. The frame was, moreover, available as a frame for a background, and if two such frames were set up in a similar manner connected by means of pins, over which canvas or other material was stretched in place as required, a portable studio was formed. The whole appliance when packed up made a parcel about four feet in length by eight inches in diameter.

The CHAIRMAN thought it a very good idea to be able to tilt the screen as required.

Mr. T. E. FREDERICKS thought the ability to fix the screen at any required angle without the longer of its going over was the principal point about it.

Mr. A. COWAN showed some illustrations of the effect of supplementary exposures on gelatine plates. He had in the first place accidentally done what Mr. Debenham and Mr. Burton had done and shown some years since, and had been induced to follow the matter up. He now showed two same-number exposures, one of which, having had a supplementary exposure of about half a second to a gas flame at a distance of about eight feet, gave indications of sun-exposures quite double that of the other. He also showed three reproduced negatives printed from the same transparency. One of these negatives had been exposed for four seconds, which appeared to be about the proper time; a second one, exposed for half that time, was decidedly under exposed; whilst a third, also exposed for half the time, but treated to supplementary exposure, came as almost undistinguishable from the first one. The manner of giving the supplementary exposure in this case was as follows:—The negative was developed in the ordinary way until all the detail that could be so obtained was already out. The screen of the dark-room lantern was then removed and the development continued under the open gaslight. In this way it was easy to give just as much supplementary exposure as required, and to save a negative that was not known to be under-exposed until it showed itself to be so in development.

Mr. W. E. DEBENHAM said that a member of the Association, he thought it was Mr. Pringle, had mentioned a very similar proceeding for saving under-exposed negatives at about the time when the possibility of obtaining additional detail in that way was the subject of dispute.

Mr. F. P. CEMBRANO said that to allow the light from the uncovered lantern to fall upon a plate that showed under-exposure was a resource that he had adopted.

Mr. P. E. EVERETT then read a paper on *Pictorial Definition*, in defence of the position taken up by Dr. Emerson, which he illustrated by reference to photogravures in the set presented to the Association; and in the paper Dr. Emerson's leading statements were quoted and enforced. He had, he said, brought the subject forward in the hope of removing prejudices, and to call attention to the claims of the new school. Fuzziness he considered an improper term to apply to naturalistic focussing. Dr. Emerson opposed fuzziness, by which he understood destruction of structure. We ought to aim at reproducing in a photograph the impression made through the eye upon the mind, and the defects of sight must be taken into account and similar defects reproduced in the photograph. These defects included dispersion, spherical aberration, astigmatism, and turbidity. The human eye is not alone turbid from the want of clearness of the media of which it is composed, but there is also fluorescence, or the property of becoming faintly luminous under the influence of violet and blue light. Further, there is the blind spot, the necessity for focussing for different distances, and the limited area of the *fovea centralis*, in consequence of which only a small portion of the subject is seen sharply. Human vision, too, is binocular, from which cause all objects except those in the direct field of vision are seen blurred and indistinct. Perspective was next dealt with, and divided into four parts. As in photography, objects of three dimensions have to be represented on a flat surface, this must be done by the use of two dimensions and shading. If the lens be stopped down until the whole is in sharp focus, how can the relief giving the idea of distance be obtained? In looking at such a picture we miss the charm of tone and atmosphere. In place of universal sharpness the naturalistic school advocates that only the principal object should be in focus, and that only as sharp as the eye perceives it in nature. The other planes of the picture should not be in focus, but defined just as we are conscious of them when we contemplate the scene with our eyes fixed on the principal object. The pictures in Dr. Emerson's portfolio were then referred to as exemplifying what had been said. No. 1. *The Hoppers*; not perfectly sharp, distant hop carts just as sharp as they should be. 2. *The Punter*; distance out of focus but without loss of structure. 3. *Gathering Mussels*; considered by Dr. Emerson to be focussed just as it should be; the mussel out of sharpest focus, middle distance and distance out of focus, yet correct. 4. *Barley Harvest*; barley and distance out of focus. 5. *Private of the Mere*; lilies in foreground only suggested, distance not sharp, yet correct. 6. *Misty Pasture*; considered to illustrate every naturalistic quality. 7. *Where Winds the Dike*; the whole deliberately out of focus, but by the judicious use of diaphragm, middle distance and distance truly rendered. 8. *Tank in the Punt*; same effect of focus, nothing sharp, not even the boys. 9. *Hammocks with Rocks*; same principles illustrated. 10. *Man Ploughing near Southwold*; picture illustrates the struggle of the farmer with the elements, and would alone suffice to stamp Dr. Emerson with the name of artist.

Mr. DEBENHAM understood that one leading contention of those who called themselves naturalistics was that the human eye saw only one plane with distinctness, other planes being out of focus, and that, therefore, the photographs to represent objects as seen by the eye should have only one plane sharp and others out of focus, as with the eye, and this was to be achieved by using a larger opening with the lens. He would ask Mr. Everett to mention some size of diaphragm, however approximately, with any lens, say one of twelve-inch focus, that would cause the out-of-focus objects in the photograph to have the same amount of indistinctness that they possessed on the human retina.

Mr. EVERETT would not be bound to any size. He would merely say that in a photograph which he produced, taken with a lens of sixteen-inch focus, the diaphragm had been half an inch in diameter.

Mr. DEBENHAM thought that that was a smaller diaphragm than was supposed to be indicated by the naturalistic contention, but he would still ask Mr. Everett, or any other member holding like views, if he still declined to reply, to give some idea of the size of the diaphragm, with any lens they might like to name, that would reproduce out-of-focus objects with the same indistinctness as that seen by the eye when focussed on a principal object.

As no reply was forthcoming, Mr. DEBENHAM said that if the diaphragm of the eye in a good light were taken as one-eighth of an inch in diameter, that should be the size of the diaphragm for any lens, whether of one inch focus or thirty inches, that would render the out-of-focus object of the same indistinctness as that due to the being seen out of focus by the eye. By equality of indistinctness he meant that any line or point in the object photographed should encroach as much upon an adjacent line or point in the one case as the other. The size of the diaphragm of the lens from any given standpoint was the one thing that regulated the amount of indistinctness due to being out of focus, and was independent of the length of focus of the lens itself.

Several members disputed this statement, and were sure that a lens of, say, thirty inches focus with a quarter of an inch stop would give a sharper picture than one of three or four inches focus with the same-sized diaphragm.

Mr. DEBENHAM had expected his statement to surprise many photographers, but it was a fact, nevertheless, that so far as bringing different planes into approximate focus that absolute size of the diaphragm was the regulating element, the standpoint being the same. Diaphragms of one-eighth or even a quarter of an inch being of size calculated with ordinary subjects to bring the subject into the condition of having that "sharpness all over" to which the naturalistics objected, he considered the claim to naturalism of photographs showing the want of detail of the out-of-focus planes, characteristic of their school, to be demolished. If on other grounds it was considered prettier or more beautiful to lose detail, that was a point that might be argued, but it was a misapplication of terms to apply the word natural to that effect.

Mr. HART, referring to one of Dr. Emerson's photographs, said that if he were photographing that scene he would use as small a diaphragm as would give him a reasonable chance of getting the subject without movement. He

would object to see the trees so fuzzy and so blurred as they were. He would try to get it so sharp that the normal eye could see anything in it as distinctly when looking for it as in the natural scene. He agreed with the last speaker.

Mr. A. Mackie said that he understood the discussion not to be as to whether we like sharp pictures, but whether Dr. Emerson had given proper reasons for putting things out of focus. Dr. Vogel had, many years since, given almost the same words as Emerson's. He thought Dr. Emerson's reasons were not sound. The turbidity of the eye, to the extent to which it existed, affected our vision of the photograph as well as of the reality. If, therefore, the photograph were rendered turbid to match the turbidity of the eye, that turbidity was doubled when looking at it.

Mr. Everett thought that a negative might be far sharper than the image on the eye. He thought the gist of the matter had been missed. They had been discussing it optically, whilst Dr. Emerson's contention was how to represent by black and white the impression produced by nature upon the human eye. If a picture was focussed sharp throughout, atmosphere was destroyed, the eye became distracted, and the picture failed. With the eye, only a very small angle of vision was included with any distinctness.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

September 5,—Mr. F. W. Edwards in the chair.

A practical demonstration by Mr. C. Hoddle of *Mounting and Finishing Photographs*, during which he showed how to prepare self-adhesive mounts, ormed the business of the evening.

LEYTONSTONE AND EPPING FOREST PHOTOGRAPHIC SOCIETY.

September 3.—At the monthly meeting of the above Society at the Fillebrook Lecture Hall, an interesting paper on *Instantaneous Photography* was read by Mr. H. W. Bennett [see page 582].

SHEFFIELD PHOTOGRAPHIC SOCIETY.

September 2,—Mr. B. J. Taylor in the chair.

Mr. Howson, the representative of the Britannia Works Company, Ilford, London, gave a practical demonstration of *Printing on Alpha Paper*. After exposing several prints varying lengths of time, he proceeded to develop the same, showing great latitude of exposure, and a various assortment of colours, and matt, smooth, or polished surface, similar to the ordinary silver prints.

LEWES PHOTOGRAPHIC SOCIETY.

September 2.—Annual meeting.—Mr. J. G. Braden presided.

The financial position of the Society proved to be very satisfactory, the balance sheet for the year showing a balance in hand of 11*l.* 10*s.* 3½*d.* There was a balance in hand from last year of 2*l.* 0*s.* 1*d.*, the subscriptions amounted to 11*l.* 5*s.*, and the balance from the photographic exhibition added to the funds of the Society the sum of 4*l.* 16*s.* 1*d.* The total expenditure for the year was 6*l.* 10*s.* 10½*d.*

The report and balance sheet were unanimously adopted.

Mr. J. G. Braden was re-elected President. Mr. J. Tunks was re-elected Vice-President. Mr. E. J. Bedford was again elected as Hon. Secretary. The Committee, consisting of Messrs. P. J. Morris, E. Miller, C. R. Wells, and G. J. Wightman, were re-elected; and Mr. Funnell was elected to fill the vacancy caused by the resignation of Mr. D. Blagrove, jun.

Mr. Potter (Brighton) was elected a member of the Society.

The Secretary reported that no entries had been received for the quarterly competition, which was considered to be due to the very unfavourable weather which had prevailed.

Mr. A. H. C. Corder will read a paper at the next monthly meeting on *Printing Processes*.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

SECURING CELLULOID FILMS IN THE DARK SLIDE.

To the Editor.

Sir,—I omitted to mention in my letter of last week one rather important point.

Should any one take my advice and remove the partition between the plates and substitute for it a layer of cotton wool, it would be well to get such wool or wadding at the chemists, where it would be purer and more springy; but to beware of getting the *medicated* cotton, as the phenic acid with which it is impregnated will infallibly fog the films.—I am, yours, &c.,

Ethel May.

STRIPPING PLATES.

To the Editor.

Sir,—With regard to the paragraph in current number of Journal *in re* stripping dry plates, there is no need at all for troubling the makers for any specially prepared plates, as *all* brands of dry plates in the market can be easily stripped either as films, or on glass by the method published by me some time ago. I have done some hundreds of negatives without a failure, and have taught clients who are now practising the method.

With the specially prepared plates the stripped film is so thin that it is very difficult to get the absolute contact requisite in photo-mechanical work; but with my method the film can be made as thick as required, and will give better results.

If at all acceptable, I shall have pleasure in giving the method *in extenso* in the forthcoming Almanac.—I am, yours, &c.,

W. T. Wilkinson.

P.S.—A little time ago, in the correspondence column, you said you were not aware that photo-litho paper was procurable in England. This is wrong. Winstone sells a paper made by Professor Husnik that is very largely used by photo-lithographers, and who, as a rule, try and keep the fact of its being procurable a secret.

[The account of the method for the Almanac will be very acceptable.—Ed.]

A WARNING.

To the Editor.

Sir,—I obtained two bottles of Beach's developer from a London dealer. On attempting to use it, after measuring the pyro solution, I proceeded to measure the alkaline solution in the same glass, with the result that a violent effervescence occurred. Further examination showed that the pyro solution had been made up with *sulphuric* instead of *sulphurous* acid. Such carelessness one would hardly expect from a much-advertising firm.

As to the origin of the name "Kodak"—in Persian it means a boy. Whether that has anything to do with the naming of the miniature camera I do not know.—I am, yours, &c.,

R. & S. S.

CAMERA CLUB EXHIBITION.

To the Editor.

Sir,—Would you kindly note that the sixth of the series of One-Man Photographic Exhibitions at the Camera Club will be open for private and press view on Monday, October 6th, at 7.30 p.m., and on and after Tuesday, October 7th, it will be open to visitors on presentation of card.

The exhibition will consist of photographs by Mr. Lyd Sawyer, of Newcastle-upon-Tyne, by whose kind co-operation we are able to exhibit a fully representative collection, including much new work prepared specially for this exhibition. The pictures will be on view for about two months.—I am, yours, &c.,

G. Davison, *Hon. Sec.*

Camera Club, 21, *Bedford-street, W.C., September* 10, 1890.

PHOTOGRAPHIC MANUFACTURERS' AND DEALERS' ASSOCIATION.

To the Editor.

Sir,—Herewith I beg to hand you a copy of the Rules and Articles of Association of the Photographic Manufacturers' and Dealers' Association of the United Kingdom, together with a notice to the trade, and should esteem it a favour if you could find room in the columns of the next issue of your valuable Journal for the insertion of the latter.—I am, yours, &c.,

Birt Acres, *Hon. Sec. pro tem.*

To Manufacturers of and Dealers in Photographic Materials.

Gentlemen,—The photographic trade having assumed very large dimensions during the last few years, it has been felt desirable that there should be a Society formed to specially protect the interests of the trade.

It is well known that many abuses have crept in, which can only be effectually dealt with by an organized Association, and many questions have arisen the mere discussion of which by such an Association would undoubtedly by of great advantage to the trade generally.

A meeting was held at Anderton's Hotel on July 29 last, at which the leading London and some provincial manufacturers and dealers were present, when it was unanimously resolved that a trade association should be formed, and for that purpose a Provisional Council, consisting of Messrs. George Houghton, Conrad Beck (R. & J. Beck), A. H. Harman (Britannia Works Co.), A. C. Edwards (B. J. Edwards & Co.), and W. H. Walker (Eastman Co.), were appointed to frame rules for the management of the proposed Association.

The Provisional Council having drawn up a set of rules, a further meeting was held on the 2nd inst., at which the proposed rules were adopted (subject to confirmation at the next general meeting), and the Association duly formed with the following membership:—

Adams & Co., Autotype Co., R. & J. Beck, Blackfriars Sensitising Co., Britannia Works Co., Henry Crouch, T. R. Dallmeyer, The Eastman Co., B. J. Edwards & Co.; Elliott & Son, Barnett; England Bros.; Jonathan Fallowfield; Hinton, Bedford Street; Holmes, Sadler, & Holmes, Manchester; George Houghton & Son; W. Lancaster, Birmingham; London Steroscopic Co.; Percy Lund & Co.; George Mason & Co., Glasgow; Mawson & Swan; Morgan & Kidd; Noakes & Son, Greenwich; W. W. Rouch & Co.; Ross & Co.; Otto Schölzig; James Swift & Son; R. W. Thomas & Co., Limited; William Tylar, Birmingham; Walter Tyler; W. Watson & Son; Wratten & Wainwright.

As it is desirable that the scope of the Association should be as broad as possible, I shall be pleased to forward to dealers or manufacturers, on application, a copy of the rules, together with form of application for membership.

The next general meeting will be held on Monday, the 22nd inst., at four p.m., at Anderton's Hotel, Fleet-street, London.—I am, yours, &c.,

BIRT ACRES, *Hon. Sec. pro tem.*

131, *Richmond road, Hackney, London, N.E.*

THE COMPANIES' ACTS, 1862 TO 1886.

MEMORANDUM OF ASSOCIATION OF THE PHOTOGRAPHIC MANUFACTURERS AND DEALERS' ASSOCIATION OF THE UNITED KINGDOM.

1. The name of the Association is "The Photographic Manufacturers' and Dealers' Association of the United Kingdom."

2. The registered office of the Association will be situate in England.

3. The objects for which the Association is formed are:—(1) To promote the interests of the trade generally. (2) To protect by means of the diffusion of information, exposure of the Association against persons whose character or circumstances render them unworthy of commercial credit, and to promote the prosecution in cases where the Council of Management of the Association think it, of fraudulent debtors. (3) To effect the payment of debts due to members of the Association, to minimise the expense and inconvenience and embarrassment of the estates of persons who being indebted to any of the members of the Association may become bankrupt, or have their affairs liquidated by arrangement or composition with their creditors, and for this purpose to employ the proper professional advice and assistance, and to obtain, wherever circumstances as well permit, the appointment of such officer or officers of the Association, or such other fit and proper persons as the Council of Management shall, from time to time appoint to be trustee or trustees, liquidator or liquidators, trustee or trustees of a deed of trust under the bankruptcy or arrangement or composition of such persons respectively. (4) To keep a register of all cases in which persons indebted to members of the Association may become bankrupt or may have their affairs liquidated by arrangement or composition with their creditors. (5) To effect as far as possible the formation of manufacturers of, and traders in, photographic appliances for promoting the general interests of the photographic trade, and to contribute to subscriptions. (6) To suggest and support measures for the protection of trade and the improvement of commercial law, more particularly having regard to the aforesaid trades and with their object to consult and co-operate with trading companies, chambers of commerce and other associations and public bodies in the United Kingdom, and also with the law officers of the crown, whenever thought desirable. (7) To co-operate or amalgamate with any other Association having similar objects and on terms from time to time, such Association as may be considered likely to promote the objects of the Association. (8) To promote the interests of the photographic trade by holding exhibitions of photographic apparatus and materials if thought desirable. (9) To do all other such lawful things as are incidental or conducive to the above objects.

4. The income and property of the Association whensoever derived, shall be applied solely towards the promotion of the objects of the Association, as set forth in this Memorandum of Association, and no portion thereof shall be paid or transferred, directly or indirectly, by way of dividend, bonus, or otherwise howsoever, by way of profit, to the members of the Association, provided that nothing herein shall prevent the payment, in good faith, of remuneration to any officer or servant of the Association, or to any member of the association, or other person, in return for any services actually rendered to the Association.

5. The liability [illegible] of the members is a condition on which a licence is granted by the Board of Trade to the Association, in pursuance of Section 23 of the Companies' Act, 1867.

6. If any question of the Association [illegible] be decided, by reason of any [illegible] or otherwise, not to be a member of the Association, [illegible] and liabilities of the Association, continued [illegible] to be a member, and of the sums, charges, and expenses of winding up the same, and for the adjustment of the rights of the contributories amongst themselves, such person or any of them, not exceeding fifty pounds, or in case of his having become insolvent, such other amount as may be required, in pursuance of the last preceding paragraph of this memorandum.

8. If upon the winding up or dissolution of the Association there remains, after the satisfaction of all its debts and liabilities, any property whatsoever, the same shall not be paid to or distributed among the members of the Association, but shall be given or transferred to some other institution or institutions having objects similar to the objects of the Association, to be determined by the members of the Association, at or before the time of dissolution, or in default thereof by such judge of the High Court of Justice as may have or assume jurisdiction in the matter.

We, the several persons whose names and addresses are subscribed, are desirous of being formed into an association, in pursuance of this Memorandum of Association.

ARTICLES OF ASSOCIATION OF THE PHOTOGRAPHIC MANUFACTURERS' AND DEALERS' ASSOCIATION OF THE UNITED KINGDOM.

It is agreed as follows:—

INTERPRETATION.

1. In these articles, unless there be something in the subject-matter or context repugnant thereto, words importing persons shall include corporations words importing the singular number shall include the plural number, words importing the plural number shall include the singular, words importing the masculine gender shall include the feminine, the word "month" shall mean a calendar month. The expression "the Association" shall mean The Photographic Manufacturers' and Dealers' Association of the United Kingdom, the word "Member" shall mean member of the Association, the word "Council" shall mean the Council of Management, and "Secretary" shall mean the paid Secretary for the time being of the Association; the expression "insolvent debtor" shall be deemed to refer only to insolvent persons indebted to a member or members of the Association, and carrying on business within the district of the Association as hereinafter defined, but shall include every person so indebted and carrying on business who shall become bankrupt or whose affairs shall be liquidated by arrangement or composition with his creditors, and the words "special resolution" shall mean such special resolution as is defined by the 51st section of the Companies' Act, 1862. These articles shall be construed with reference to the provisions of the Companies' Acts, 1862 to 1886, and terms used in these articles shall be taken as having the same respective meanings as they have when used in those Acts.

2. The Association is established for the purposes expressed in the Memorandum of Association.

3. The district of the Association shall be deemed to be the United Kingdom or such other smaller or larger district as the Association in general meeting shall from time to time determine, and the objects of the Association which are in their nature capable of being limited as to locality shall be limited to such district.

MEMBERS.

4. The Association shall be composed of merchants, manufacturers, and wholesale and retail traders, carrying on business within the district of the Association in the photographic trade and dependent or affiliated industries. But no person to be eligible for membership unless he is on the register to be kept by the Association as a bona fide manufacturer of or dealer in photographic appliances. The Council to have the power of deciding whose names shall be placed on such register.

5. For the purpose of registration, the number of members is declared not to exceed two hundred, but the Council may whenever they think fit register an increase of numbers.

6. The first members shall be the persons whose names are subscribed to the Memorandum of Association and the other persons who are hereinafter named as the first members of the Council.

7. An application to become a member shall be made in writing on the printed form of the Association, to the Secretary, and shall specify the name, occupation, and place of business of the applicant. If the applicant is approved of by two-thirds in number of the members of the Council present at a meeting of the Council, or by a sub-committee appointed for the purpose, he shall upon payment of the annual subscription payable by members, and of the entrance fee (if any) become and be enrolled as a member. A person may be elected as representing a firm or an incorporated company, and if elected, shall be entitled to the same annual subscription and entrance fee (if any) only as an individual member.

8. The amount of the annual subscription payable by members, and of the entrance fee (if any) to be paid on the admission of new members, shall be such sum as shall from time to time be fixed by the Committee, and until some other amount shall be so fixed the minimum annual subscription payable by members shall be 5s. 5s. per annum (without entrance fee) for members admitted during the first year. After the first year an entrance fee of 5s. 5s. to be charged in addition to the annual subscription.

9. Annual subscriptions shall be payable in advance. The first days of January, April, July, and October in every year shall be quarter days, from which the subscription may run, each member's subscription being considered as payable on the quarter-day immediately preceding the date of his enrolment as a member.

10. Any member may withdraw from the Association by giving written notice of his intention so to do to the Secretary, or leaving or sending such notice, addressed to the Secretary, at the registered office of the Association, and he shall thereupon cease to be a member.

11. If any member fail to pay his annual subscription within four weeks after it shall have fallen due, the Council may, if they think fit, cause the name of such member to be removed from the register of members, and thereupon he shall cease to be a member, but without prejudice to his liability for the amount of one year's subscription, or to his right of re-election.

12. Any member who shall become bankrupt, or whose affairs shall be liquidated by arrangement or composition with his creditors, shall, *ipso facto*,

cease to be a member, but shall be eligible as a member after he has obtained his order of discharge, or shall have paid the full amount of his composition.

13. Any member who shall cease to carry on business within the district of the Association shall, *ipso facto*, cease to be a member.

14. The Council, at a meeting of the Council, shall have power to expel any member (including any firm or incorporated company) from the Association, but for this purpose eight votes are required, provided always that in case of the expulsion of a member by the Council they shall forthwith give notice thereof to the member expelled, and such member may, within six days after the receipt of such notice, give to the Secretary notice of appeal to the Association in general meeting, and such appeal shall be to the first general meeting held after the expiration of such six days, as aforesaid, and may be either to a special general meeting or to an ordinary annual general meeting, and the Association in general meeting may confirm, reverse, or alter the decision of the Council. Any member expelled by the Council, who shall give such notice of appeal as aforesaid, shall be deemed to continue a member until the decision of the Association in general meeting shall have been made.

15. Persons who have ceased to be members, and the representatives of deceased members, shall have no interest in the property or funds of the Association.

Reports from and to Members.

16. Whenever a member shall receive information of the bankruptcy of any insolvent debtor, or of the presentation by him of a petition for liquidation of his affairs by arrangement or composition, or of any proposal for a private arrangement between such insolvent debtor and his creditors, the member receiving such information shall forthwith give notice thereof to the Secretary, who shall thereupon, in every case in which he shall deem it desirable, call a meeting of such of the members as shall be creditors of such insolvent debtor.

17. Every member is also expected to give to the Secretary immediate notice of all cases occurring, in the course of his business, of attempts to obtain goods on false pretences, or without ostensible means of payment, and generally of all matters which he may consider likely to affect the interests of the trade, or proper for the information and guidance of the Association.

18. The Secretary shall, when and as the Council shall think fit, send circulars and furnish verbal or written statements to the members containing such information as the Council may think proper to be communicated to the members, and such circulars and statements shall be considered strictly private and confidential, and shall not be communicated either verbally or in writing to any person not a member, and no member shall be entitled to recover damages or costs against the Association, or any officer or member thereof, arising out of any such circular or statement.

19. Any member who shall divulge the contents of any such circular, or communicate such statements to any person mentioned therein, or to any person other than a member, or who shall improperly threaten any person with exposure through the medium of the Association, shall be liable for all losses, damages, and other expenses sustained by the Association in consequence of such conduct, and shall also be liable to be expelled by a resolution passed by a majority of not less than two-thirds of the Council present at a meeting of the Council, and this without any appeal to the Association in general meeting. A member so expelled shall not be re-eligible as a member.

General Meetings of the Association.

20. The first meeting shall be held within four calendar months from the registration of the Association. A general meeting shall be held once in every year, and (subject to any special directions given by the Association in general meeting) shall be held in the month of September, and at such place as the Council may appoint, so nevertheless that the first general meeting shall be held within four months after the registration of the Memorandum and Articles of Association. The above-mentioned general meetings shall be deemed ordinary general meetings, and all other general meetings shall be deemed extraordinary general meetings.

21. The Council may, whenever they think fit, and they shall, upon a requisition in writing signed by at least ten members (a representative or representation of a firm or incorporated company being reckoned as one), and left at the registered office of the Association, convene an extraordinary general meeting. Such requisition shall state clearly the object or objects of the meeting. If the Council do not convene such meeting within 28 days from the day when the requisition shall have been left at the registered office aforesaid, the requisitionists may themselves convene such extraordinary general meeting.

22. At least 21 and not more than 28 days' notice shall be given of every general meeting (except an adjourned meeting), specifying the place, the day and the hour of meeting, and in case of special business the general nature of such business shall be given to the members in manner hereinafter mentioned, but the non-receipt of such notice by any member shall not invalidate the proceedings at any general meeting. An intimation shall be conveyed in the first notices convening every general meeting that if any member wishes to bring any subject before the general meeting he must give written notice to the Secretary within seven days of the date of notice convening such meeting, stating in full the nature of the subject he wishes to bring before such meeting; the Secretary shall thereupon immediately convene a meeting of the Council to determine whether such subject may be discussed at such meeting, and if they decide that such subject should be brought before the forthcoming general meeting, the Secretary shall thereupon send out a further notice to all the members intimating the nature of such additional special business at least seven days before the date of such general meeting. In the event of the Council deciding that the proposed subject was not suitable for discussion at a general meeting, the Secretary be requested to immediately inform the member making the application of the decision of the Council. The decision of the Council to be final.

23. All business at an extraordinary general meeting, and all business at an ordinary general meeting, except the consideration and passing of the accounts and of the ordinary report of the Council, and the election of officers, shall be deemed special business.

24. No business shall be transacted at any general meeting unless there be present at the commencement of the business not less than ten members.

25. If within thirty minutes from the time appointed for any meeting the required number of members be not present, the meeting, if convened upon the requisition of members, shall be dissolved; in any other case it shall stand adjourned to such day and such time and place as the members present shall appoint, and in default of appointment, to the same day in the next week at the same time and place.

26. The Chairman shall, upon the resolution of the meeting, adjourn the meeting from time to time and from place to place, and at any adjourned meeting the business of the meeting shall be transacted, whatever be the number of members present, but no business shall be transacted at an adjourned meeting except the business left unfinished at the meeting from which the adjournment took place.

27. The President, or one of the Vice-Presidents, shall preside as Chairman of every meeting of the Association. If there be no such Chairman, or if at any meeting he be not present within fifteen minutes after the time appointed for holding the meeting, then the members present may elect one of their number to be Chairman of such meeting.

28. Every question shall be decided by a show of hands, unless a majority of those present at the meeting shall resolve that the question under discussion be decided by ballot, in which case it shall be so decided. If a ballot be not required, and upon or immediately after such show of hands, a poll be demanded by at least five members, a poll shall be taken, but no poll shall be allowed on a question of adjournment of the meeting or of the appointment of a Chairman.

29. Minutes shall be made, in books provided for the purpose, of all resolutions and proceedings of general meetings.

30. A declaration by the Chairman of the meeting, whether after a poll or otherwise, that a resolution has been carried or rejected, and an entry to that effect in the book of proceedings of the Association, shall be sufficient evidence of the fact, without proof of the number or proportion of votes recorded in favour or against such resolution.

31. If a ballot or poll be demanded as aforesaid, the same shall be taken in such manner as the Chairman shall direct, and he shall have power to adjourn the meeting for any time not exceeding seven days, for the purposes of taking such ballot or poll, either before or after proceeding with any other business to be transacted at such meeting. The result of such poll shall be deemed to be the resolution of the Association in general meeting.

Votes of Members.

32. Every member shall be entitled to one vote, except that a firm shall have one vote only between them, but no member shall be entitled to vote at or attend any general meeting unless all moneys due from him to the Association have been paid.

33. A firm may vote by any one of its members.

34. Votes may be given by proxy, but such proxy must be given only to a member of the Association, and further, must be on a printed form supplied by the Association for that purpose, such proxy, duly signed by the member, to be handed to the Chairman at the commencement of such meeting.

35. In case of equality of votes the Chairman of the meeting shall have a casting vote in addition to his original vote.

President and Vice-Presidents.

36. There shall be a president and vice-presidents of the Association, who shall be *ex-officio* members of the Council. The vice-presidents shall be members of the Association, and shall not be more than five in number.

37. The first president of the Association shall be

38. A treasurer shall be chosen annually by the members at the annual general meeting, such treasurer to be *ex-officio* a member of the Council.

39. The first treasurer of the Association shall be

Council.

40. The Council, excluding *ex-officio* members, shall not exceed twelve in number.

41. The first members of the Council shall be

Rotation of the Vice-Presidents and the Council.

42. The president, the vice-presidents, and one half of the members of the Council shall respectively retire from office at the second and every subsequent ordinary general meeting of the Association.

43. The particular vice-presidents and members of the Council to retire shall be those who shall have been longest in office, reckoning from their appointment or last re-election, as the case may be, and as between several vice-presi-

dents or members of the Council who are on an equal footing in this respect, the retiring vice-president or vice-presidents, member or members of the Council shall, in default of agreement, be determined by ballot.

44. A retiring vice-president, treasurer, or member of the Council shall be re-eligible.

45. The Association may, from time to time, in general meeting, increase or reduce the number of the vice-presidents or Council, and may determine in what rotation such increased or reduced number is to go out of office.

46. At the general meeting at which any of the vice-presidents or members of the Council retire, the Association shall so soon as practicable fill up all vacancies then existing in the Council by electing a sufficient number of members for the purpose. Such election shall be by ballot.

47. Every member who intends to propose a candidate as vice-president, or to fill any vacancy in the Council at a general meeting, shall leave with the Secretary at least seven days before the day of election, a notice in writing stating the name of the member intended to be so proposed, and the name of his proposer and seconder, by whom such notice shall be signed.

48. The retiring treasurer, vice-presidents, or members of the Council, shall continue to act until their successors be appointed.

49. Any casual vacancy occurring in the Council may be filled up by the Council, but any person chosen to fill such vacancy shall retain office so long only as the vacating member of the Council would have retained the same if no vacancy had occurred.

50. The Association may, by a resolution passed by a majority of not less than two-thirds of the members present at an extraordinary general meeting, the notice of the object of which shall have been given, remove any member of the Council before the expiration of his period of office, and may, by an ordinary resolution in general meeting appoint another member in his stead. The member so appointed shall hold office during such time only as the removed member of the Council would have held office if he had not been removed.

Powers of Council.

51. The business of the Association shall be managed by the Council, who may exercise all such powers of the Association, and do all such things as are not hereby or by any statute for the time being in force, required to be exercised or done by the Association in general meeting, subject nevertheless to the regulations for the time being of the Association, and to the provisions of any such statute, provided always that no regulation made by the Association in general meeting shall invalidate any previous act of the Council which would have been valid if such regulation had not been made.

52. The Council shall from time to time appoint, and may from time to time remove, one or more officer or officers whose special duty it shall be to obtain, wherever circumstances will permit, and in cases where the appointment comes within the objects specified in the Memorandum of Association, the appointment of receiver or receivers, inspector or inspectors, trustee or trustees, of the estate of every insolvent debtor, and upon obtaining such appointment to wind up and distribute such estate as speedily and inexpensively as possible. The Secretary may be appointed to act as such officer or as one of such officers if more than one, and such officer or officers shall be paid such salary or salaries or other remunerations as the Council think fit, provided always that neither the Association nor the members of the Council in their character of members of the Council shall interfere with or control any such officer in the administration of the particular estate of which he shall have been appointed a receiver, inspector, or trustee, but in such administration he shall be solely under the control of the creditors of such estate, and the Court of Bankruptcy, in the same manner in every respect as if he was unconnected with the Association.

53. The Council may, from time to time, appoint and remove the bankers and solicitors of the Association, and may also, from time to time, appoint and remove such paid secretary, agents, and other officers and servants either for permanent, temporary, or special services, as they may think fit, and may (subject and without prejudice to the provisions of the fifty-third clause of these presents) determine their respective duties and powers, and fix their respective salaries or remuneration and wages.

54. The Council shall provide and keep a common seal for the Association, and may alter the same from time to time, provided the name of the Association be always inscribed thereupon.

55. A general register of insolvent debtors shall be kept by the Secretary, and such register shall contain the name and address of each insolvent debtor. Such register shall be kept at the office of the Association, and shall be open to members between the hours of ten a.m. and four p.m. on every day except Saturdays, Sundays, Christmas Day, Good Friday, and Bank Holidays.

56. The Council may, from time to time, make all such bye-laws as they may think expedient for the regulation of the affairs of the Association, not being inconsistent with the Memorandum and Articles of Association. Provided always that such bye-laws shall be submitted to the next general meeting (ordinary or extraordinary) of the Association which shall occur after the making of the same by the Council, and may be confirmed, revoked, or varied by such meeting, but until revoked or varied, and subject to any variations thereof, shall be in full force.

57. Subject to any determination of the Council to the contrary, it shall be the duty of the Secretary to collect the annual subscriptions, to keep the books and accounts of the Association, to render a statement of his accounts to the Council quarterly, or more often at discretion of the Council, to make a list of all members whose annual subscriptions shall be in arrear for one month and upwards, and to produce such list to the Committee.

58. All moneys received for the Association shall be paid to the bankers of the Association, to the credit of the Association, and the receipt of the Secretary for any annual subscriptions or other moneys payable to the Association shall be good discharges for the same.

59. All cheques drawn by or on behalf of the Company shall be signed by the Chairman of Council or Treasurer, and countersigned by the Secretary.

60. Every member of the Council, and every secretary and other officer shall be indemnified by the Association for all losses and expenses incurred by him in or about the discharge of his duty, except from such losses and expenses as occur from his wilful act, neglect, or default.

61. The Council for the time being may, notwithstanding any vacancy or vacancies in their body, exercise all the powers, and perform all the duties hereby conferred or imposed upon the Council.

Proceedings of the Council.

62. The Council may meet, adjourn, and otherwise regulate their meetings as they shall deem proper, and may from time to time determine the quorum necessary for the transaction of business, except for the expulsion of a member, and all powers and discretions hereby conferred upon the Council may be exercised by the members of the Council (being a quorum) present at any meeting of the Council.

63. Questions arising at any meeting of the Council shall be decided by a majority of votes. Each member of the Council present shall have one vote, and, in case of an equality of votes, the Chairman, in addition to his original vote, shall have a casting vote.

64. Any two members of the Council may summon or require the Secretary to summon a meeting of the Council.

65. The Council may elect a chairman of their meetings, and determine the period for which he is to hold office, but until a chairman be elected, or if at any meeting the Chairman be not present at the time appointed for holding the same, the members of the Council present shall choose one of their own number to be chairman of such meeting.

66. The Council may delegate any of their powers to a sub-committee of their body. Any such sub-committee shall, in exercise of the powers so delegated, conform to any regulations imposed upon them by the Council.

67. Any such sub-committee may meet and adjourn as they think proper, and the members thereof present at a meeting of such sub-committee shall elect one of their number to be chairman of such meeting. Questions at any meeting of a sub-committee shall be determined by a majority of votes of the members present, each of whom shall have one vote, and, in case of an equality of votes, the Chairman of the meeting shall have a casting vote, in addition to his original vote.

68. All acts done by the Council, or by any sub-committee as aforesaid, or by any person or persons acting as a member or members thereof respectively, shall notwithstanding it is afterwards discovered that there was some defect in the appointment of the Council or sub-committee, or any person or persons acting as aforesaid, or that they or any of them were disqualified) be as valid as if every such person had been duly appointed and was qualified to be a member of the Council or sub-committee.

69. The Council shall cause minutes to be made, in books provided for the purpose, of the names of the members of the Council present at all meetings of the Council, or of any sub-committee, and of all the resolutions and proceedings of such meetings respectively, and such minutes, if signed by any person purporting to be the chairman of such meetings respectively, shall be sufficient evidence (without further proof of the facts therein stated) of the regularity and validity of the proceedings therein recorded.

Accounts.

70. Once in every year, after the first general meeting, the accounts of the Association shall be audited by an auditor or auditors, who shall be appointed, and whose remuneration (if any) shall be fixed by the Association in general meeting. Any auditor shall on quitting office be re-eligible.

71. If at any general meeting an auditor be not appointed, or if a casual vacancy occur in the office of auditor, the Council shall appoint a person to act as auditor until the next general meeting of the Association, and shall fix his remuneration (if any) if the same should not have been fixed by the Association in general meeting.

72. The auditor or auditors shall be supplied with a copy of the balance sheet, and it shall be their duty to examine the same with the accounts and vouchers relating thereto, and to make of the Council and officers of the Association all proper inquiries in reference to the accounts and affairs of the Association.

Notices.

73. All notices to members may be served either personally or by leaving the same, or by sending them through the post in a pre-paid letter addressed to such members respectively at their respective registered places of abode or business, and every such notice left or posted as aforesaid shall be deemed to have been duly served on the day of leaving the same, or if sent by post on the day next following the day on which it shall be posted, and that although the person to whom it shall have been directed never received the same.

74. The Association shall be dissolved whenever a special resolution shall be passed that it is expedient that the same should be dissolved.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange cabinet portrait lens or half-plate wide-angle landscape lens for Booth's mitre cutter and clamps.—Address, W. R. Fairey, Harrold, Bedford.

Twelve months' British Journals up to date, in weekly numbers; wanted, quarter-plate portrait lens or exterior background.—Address, La Braham, 3, Broomknoll-street, Airdrie, N. B.

Will exchange a 10×8 camera with one single back and whole-plate lens (rectilinear) for a 12×10 camera with two or three double backs.—Address, E. Gregson, Photographer, Bedford-street, Halifax.

Fifty-six numbers (1889-90) of The British Journal of Photography, thirty-six numbers of the *Photographic News*, in exchange for photographic weights and scales or half-plate printing frames.—Address (by letter), W. Grey, 8, Kinghorn-street, Long-lane, E.C.

Half-plate, whole-plate, and 10×8 view and rectilinear, quarter and half-plate portrait lenses, by Ross, Dallmeyer, and Beck (all modern), offered in exchange for 15×12 lenses. Difference adjusted.—Address, Photo. Artist, Museum-parade, Matlock Bath.

Eighteen back-gear lathe castings, a beautiful model set, three-inch centres, two-feet gap bed, slide and hand rests, standards, &c.; also *Amateur Photographer* from commencement. Wanted, half-plate camera and lens in good condition. Approval.—Address, W. March, "Duke Hotel," Kempston, Bedford.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. Greenwood & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this* Journal, *including queries for "Answers" and "Exchanges," must be addressed to* "The Editor," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.

F. Dunsterville.—Received. Thanks.

C. A. S.—Thanks for the pictures; they are very interesting.

Col. Waterhouse (Calcutta).—Received: thanks. In our next.

F. J. Fletcher.—The person alluded to has got what he requires.

E. T.—Write to the Science and Art Department, South Kensington.

C. Lewis.—The yellow spots on the bromide pictures are due to carelessness in the fixing. Having said this, the remedy in future is obvious.

A. M. Boyle.—Judging by the prints enclosed, we should say that interiors ought to have had quite ten or twelve times the exposure given.

Our Black List. J. D. & S.—The party of whom you complained now writes us that he has sent on your pictures after keeping them five months. If you are satisfied we are not.

B. Hawes.—All the different makers of carbon tissue supply it in various colours. Send them a sample of the tint you desire, and if they do not have it in stock they will probably make it to order.

York.—The sample of cardboard sent is of a very common and cheap description. It is better suited for cut-out mounts than it is for mounting bromide pictures upon, on account of its uneven surface. Of its chemical qualities we could say nothing without a chemical examination.

W. G. Grimmett.—Apply to any dealer or chemist on your travels and you will receive every information. But a more desirable way is to carry a small lamp with you, and thus render yourself independent. The changing of plates can be readily effected in your own hotel bedroom.

G. Mansfield.—The article in question was taken from one of the American journals. A Japanese paper is sometimes used for etchings, but we do not know of an English source of supply. Grosvenor, Chater, & Co.'s, Cannon-street, E.C., is the most likely house we know to have it.

Tek Eff.—Without making a chemical examination and testing the mounts thoroughly, we cannot express an opinion; but if you find the surface of the card acid to test paper, and the enamel when scraped off and mixed with water also shows an acid reaction, and the water in which the body of the mount has been soaked acid as well, we should say the mounts are quite unfit for photographic purposes, whatever mountant be employed.

W. P. (Birmingham) inquires if wet plates can be developed with the same developer as dry plates (such as pyro or hydroquinone). If not, which developer we can recommend as good and cheap.—The developer for dry plates cannot be used for wet collodion. The following will be found good for general purposes:—Protosulphate of iron, 1 ounce; glacial acetic acid, 1 ounce; water, 25 ounces; with sufficient alcohol to cause the developer to flow easily.

X. Z. writes: "Will you be good enough to inform me through your 'Answers to Correspondents' what is the best form of battery to employ, and how many cells would be required, to deposit a coating of copper on a mould made from a gelatine relief, half-plate size?"—Either a Smee or a Daniels battery will be the best. The former we prefer, as it is most convenient in use. One cell is sufficient for general work, but the silver element should not be less in size than the surface to be coated.

J. Hindle complains that about twelve months ago he bought a camera and now discovers it is "full of pinholes." He asks how to remedy the evil.—Our correspondent does not say what kind of camera it is or where the pinholes are. We presume, however, that it is one with a bellows body, and the pinholes are in the bellows. If we are correct, the best plan will be to have a new bellows fitted to the camera, as most likely the present one is either worn out or was of inferior quality in the first instance.

Georgius.—The optical centre of a doublet depends upon the relative positions of the conjugate foci. In a symmetrical combination it is midway between the two lenses when the object to be photographed is the same distance from the lens as the image on the ground glass. As these vary, so does the point from which the focus must be measured. When the equivalent focus of a lens is spoken of, it usually means the distance between the ground glass and the optical centre when the object or subject is situated at a great distance.

R. R. Wilson says: "In the process of putting several Obernetter prints upon polished glass and starching a piece of paper upon them while damp I have unfortunately got some starch on to the film, and though I have obtained a splendid surface upon the finished print, the beauty is marred by clouds of starch. Soaking, or even putting again into the hypo, has not brought away the starch. Can you kindly suggest any means whereby I can remove the obstacle?"—It will be far less trouble to make fresh prints than to waste time in trying to remove the starch if it does not wash off easily.

Soft Pictures.—The blinds you have been using are of the right colour. Dark blue will answer if you wish to make a change. With a north light we see no advantage in having a double set of blinds. The width is not very important. Three feet six inches will do very well. For the side curtains, dark blue will be as good as anything. There is no necessity for the ground glass or the "draught-board blue paper." From what we remember of your former letter, you have a very complete arrangement of blinds already. Your failure, we suspect, arises from lack of skill in using them rather than anything else.

Gilbert inquires: "Would you kindly tell me the best way to ascertain about a patent for a shutter I have made? I wish to know if there is one like it in the market. Does it cost much to take out a patent? If it does, is there a way to get it registered cheaper?"—The only way to ascertain the different shutters in the market and their forms is to go round the trade and see the various kinds. By searching the records of the Patent Office you will learn what have been patented. The Government fees for a patent for four years are £4. If the patent is taken through a patent agent his charges will be additional. A photographic shutter cannot be registered.

T. C. W. says: "I have made several attempts to get a good negative of a tombstone. It is of a yellowish kind of granite, with the letters cut in and gilded. In all the negatives I have taken the lettering will not show distinctly; there is no contrast between the stone and the gold. I have tried it with orthochromatic plates and ordinary ones, both in strong sunlight and in a dull light. Can you give me any advice on the subject?"—Such objects are often very difficult to deal with. A similar case came under our notice a few years back, and this was how the difficulty was overcome:—Some common whiting was made into a stiff paste with water, the letters were then neatly filled in with the paste with a small palette knife. When dry the subject was photographed, and the inscription came excellently in white on a dark ground. After the negative had been secured the dried whiting was removed with a brush without injury to the gold.

R. C. P. says: "In recent numbers of the Journal you describe the preparation of nets for photo-mechanical work. The articles end with the films stripped: for what purpose I cannot conjecture. In my imperfect attempts at net negatives the films were left on the glass and placed in front of the sensitive plate. How they would be manipulated in the film form I do not well see. I should be much obliged if you could give me some indication of subsequent procedure in your replies to correspondents."—The method of use spoken of is suitable only when the compound "net" negative is made direct in the camera, in which case there is no necessity to strip at all. But there are many—very many—instances in which it is necessary to interpose a *film* carrying a grain between an ordinary negative and the sensitive film or surface that is to form the printing block. Our correspondent has apparently only attempted one method of arriving at the goal.

Among the papers read at the recent annual meeting of the Royal Archæological Institute at Gloucester was one on *A Survey of Pigeon Houses in Herefordshire and Gower*, by Mr. Alfred Watkins, of Hereford. The subject was fully illustrated by means of lantern photographs.

Photographic Club.—Subject for discussion, Wednesday, September 17, *Extemporised Modification of Cameras*; September 24, *Photographing Interiors*. Last outdoor meeting of the season, Saturday, September 20, Hampstead Heath. Meet at the Flagstaff at three. Tea at the "Bull and Bush" at half-past six.

The following may serve as a warning to others in the trade. The circumstances are briefly as follows:—A gentleman calls and makes sundry inquiries; whilst present the attendant has occasion to go into the adjoining dark room, and calls an assistant to take his place; the customer, availing himself of the change, takes up a hand camera, which he says belongs to him, and leaves the premises before suspicion is aroused.

Death of Mr. J. Solomon.—While going to press we learn with sorrow of the death of Mr. Solomon, formerly of 22, Red Lion-square, Holborn. He died in New York, where he has of late years resided, at an advanced age. In commerce Mr. Solomon was a man of probity and energy, and conducted his (at one time) very large business on terms of the strictest conscientiousness and punctuality. He retired from the active management of the business several years since, and, as we have said, went to New York to enjoy the *otium* he so well merited. We hope soon to be able to give some particulars of his career.

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ALUMINIUM IN PHOTOGRAPHY.

We will supplement Mr. H. N. Warren's *Brief Summary of the Various Methods for the Production of Aluminium from 1886 to 1890*, which we reprinted from the *Chemical News* a week or two since, by shortly glancing at some uses in photography to which that metal may conceivably be put. Most of our readers know that lens mounts are now occasionally made of aluminium, and we anticipate that in course of time, when its advantages over brass come to be more thoroughly understood, it will secure for this and other purposes a larger share of adoption. Recent improvements in the method of production have tended both to lower the cost and increase the quantity of aluminium manufactured.

Aluminium is one of the earth metals, and since it occurs freely in the state of silicate—every common brick containing from two to three pounds of metal—we know that the supply of the raw material is practically without limit, and that consequently it forms one of the most abundant elements in nature. The metal closely resembles silver in appearance, and is very malleable and ductile, but under proper treatment it becomes as hard as steel. It can be drawn into wire as fine as a spider's web, or beaten out like silver or gold leaf. It does not oxidise, being impervious to air or water, while sulphuretted hydrogen, nitric and sulphuric acids, do not affect it. It is, however, dissolved by hydrochloric acid. The relative specific gravity of aluminium being placed at 1, that of iron becomes 2·824; steel, 3·125; silver, 4·090; gold, 7·191; platinum, 8·410. The details of the method of its extraction, however chemically interesting, are outside our present scope.

This remarkable lightness of aluminium, its exquisite appearance, its strength, hardness, ductility, malleability, its non-liability to oxidise or blacken, and the extreme facility with which it can be worked, will suggest a variety of possible applications for it in photography. Besides lightening lens mounts and flanges, an appreciable amount of weight could be saved by employing it for the fittings of cameras and dark slides, and for those parts of instantaneous shutters that are made of metal. Although aluminium takes a very fine polish, and, moreover, retains it well, we presume that if its lightness of colour was an objection it could be easily painted or enamelled. It would be a long time before we got used to seeing the familiar yellow of brass replaced by a white substance with a bluish tinge.

A great deal of brass is often used in the fittings of tripod stands which could be replaced by a lighter metal like aluminium. As it does not oxidise, it seems as if it would be peculiarly useful for the sheaths of shutters, the slightest rusting of which sensibly interferes with the action of those instruments. Probably one of its alloys with copper, aluminium bronze would be of most service, as it has been found a valuable substitute for ordinary bronze and phosphor bronze, the latter of which has long been used for sheaths. For mounting focussing glasses and spirit levels, aluminium might advantageously replace brass.

As regards the chemical uses of aluminium compounds in photography, the alums have long found a place in the laboratory. The chloride is a deliquescent salt, very soluble in water, and, as was pointed out in these pages some little time ago, has claims for employment as a solvent of chloride of silver, and consequently as a fixing agent for albumen silver prints. Although the price of metallic aluminium has fallen from about three shillings to below one shilling per ounce, we have not observed a corresponding reduction in the price of the salts. Until that occurs it would be vain to think that aluminium chloride could possibly be largely employed in photography. In a recent wholesale list we saw it quoted at the prohibitive figure of five shillings per pound.

TONING BATHS.

In our last article upon this subject we devoted most of our attention to the "chloride of lime bath" and the "chloride of calcium bath," two solutions very different from one another, as we pointed out, though very frequently confused. Looking back to the very early days of the alkaline toning bath, we find carbonate of soda the most favoured of all the alkaline salts, and to this day it is still employed, though not in any way approaching to the same extent. The advantage of the carbonate is, that with a little hot water added at the time of mixing, the bath is ready for use in a few moments. But as very shortly after it has arrived at the best condition for toning, it rapidly loses power, and the gold very quickly becomes deposited, the solution within a day after mixing contains scarcely any dissolved gold. Here let us say that the mere "muddiness" of a gold bath is not to be taken as an indication that the bath is useless; all depends upon how much gold still remains dissolved. Some muddy baths are perfect in action. The tones from the carbonate of soda toning bath have perhaps less of the richness producible by solutions made from other formulæ.

Next in favour to the carbonate was the phosphate of soda, and it became at one time almost the only salt employed for mixing with the chloride of gold. It was generally understood that it gave warmer tones than the carbonate, and had the additional advantage of keeping in good order for a much longer period. Phosphate of soda was beyond compare the favourite bath twenty years ago, yet is rarely used at the present time; possibly it may be rediscovered, and credited with a great variety of powers.

The borax toning bath was the next popular fancy, and was a very useful salt for the purposes of the printer. By its means tones of a bluer tinge could be obtained; but the

solution rapidly changed, altered in toning power, and became useless through precipitation of the metal.

All the while these various salts were being tried, praised, and condemned, another was slowly gaining appreciation among a small number of careful printers who had tried the acetate of soda and been pleased with its action. The number of workers with the acetate toning bath slowly and gradually increased; they rarely gave it up, though all the other nostrums of the day were by turn in great vogue and thrown aside for ever. Year by year it grew into favour, till at the present day its use is so nearly universal that we should consider ourselves within the mark in saying ninety-five out of a hundred establishments invariably use the acetate toning bath, the remaining five using the chloride of lime and one or other of the particular fancies of the day. If we look for the cause of this preference, we have not far to seek. The salt is purchasable of a very uniform quality, it is usually free from free alkali, and, above all, the solution does not rapidly deteriorate When well and carefully made, it will be in as perfect a condition in a month's time after making as it was when first taken into use, and its properties for weeks together, so long as it is kept free from admixture with other chemicals, will be uniform and regular. This is a most important matter now that the standard of quality in photographic work is so much higher than it used to be, and is less frequently departed from. A printer who cannot depend upon his toning solution from day to day, and from week end to week end, cannot produce a sufficiently good average of work to meet the strong competition of the present day.

The acetate bath, however, is liable to one failing. Owing to the feebly alkaline reaction of acetate of soda it sometimes happens that the toning solution has an acid reaction to litmus paper, and when this is so the bath fails to act with the same freedom and to give the same richness of tone as one with an alkaline reaction. This is a very important point, and one too often neglected. Then, again, a bath originally alkaline becomes gradually acid by the continual additions from time to time, as the gold gets exhausted, of fresh plain solution of chloride of gold. It would seem to be an obvious truism that if a certain amount of acetate of soda be required for a particular quantity of gold solution to enable a good toning bath to be made, the same proportion of gold and acetate ought to be preserved throughout. Obviously this is not the case when fresh plain gold solution is added; equally obvious, therefore, whenever the chloride of gold is added, the due amount of acetate should accompany it. If this precaution were always attended to, there need be no difficulty in making an acetate toning bath up and keeping it perpetually in use by additions in this way. The acetate toning bath would have a greater reputation than ever, and would be looked upon, as it should be when properly prepared, as a bath capable, when properly used, of giving with ease a wide range of tones, and at the same time trustworthy in action and constant in its properties.

WET COLLODION PLATES FOR LANTERN SLIDES.

The first step towards the preparation of the plates is one that the modern worker of dry plates is usually spared, namely, cleaning the glass. When the latter is new, and has never been previously used for photographic purposes, the task is a sufficiently easy one, but when old glass is, as will frequently be the case, recleaned, a good deal of trouble is often experienced in getting rid of all traces of the chemicals employed, and even sometimes in destroying the previous image. This kind of trouble will be more particularly felt with plates that have been used with collodion than with gelatine, as in the former case silver intensification is more frequently resorted to, and it is this mode of treatment that more especially favours persistence of the image as well as chemical staining. It will be well, therefore, to take into consideration the circumstances connected with the glass before proceeding to clean it.

For new glass, all that is usually necessary is to rub the plate with a paste composed of whiting, or tripoli and water, and when dry to polish it off with a clean linen rag or chamois leather. A final polish with a soft silk handkerchief will finish the operation unless French chalk is to be used, as will be explained further on. In the case of old glass, the previous film must first be carefully and thoroughly removed and the plate rendered, at least apparently, absolutely clean, after which, some powerful chemical detergent must be applied to ensure the elimination of all danger from the previous use. For this purpose a mixture of equal parts of methylated spirit and water containing a little iodine in solution is an efficient agent. Carey Lea's detergent, consisting of an ounce each of sulphuric acid and bichromate of potash in a quart of water, is also good, or perhaps better still, a combination of the bichromate with hydrochloric acid. The detergent should be applied forcibly to both sides of the glass by means of a bit of rag or cloth fastened on the end of a stick, and after having been allowed to act for a minute or two, the glass must be very thoroughly washed to remove every trace of the cleaning agent, and then dried.

Considerable economy, both in time and labour, will accrue from operating upon a large number of plates at once; indeed, it is almost as much trouble to clean three or four glasses as to do as many dozen. If the plates are thoroughly dried and immediately wrapped up in half dozens or dozens, they will keep ready for use for a long time. In drying a large number of plates, it will be found useful to dip each one into very hot water just before finally wiping it, by which means it is not only more rapidly and thoroughly dried, but the towel does not require such frequent renewal. The final polishing should always be performed a short time before the plates are to be coated.

Between cleaning the glass and coating with emulsion some means must be adopted to ensure the proper adhesion of the film to the plate, without which the picture will almost inevitably become detached or torn during development. The means consist of the application of a "preliminary coating," as it is termed, of indiarubber dissolved in benzole or thin albumen over the whole surface of the plate, or the edges only may be "tipped" with a stronger solution of a similar character. The former plan is troublesome, and, moreover, objectionable, on the score that the emulsion itself and the developing solutions are not without action on the substratum. A two-grain solution of indiarubber or a 1 : 20 solution of albumen will answer for the substratum, or double that strength may be employed further for tipping the edges.

But by far the most satisfactory plan is to give the glass a final polish with finely powdered talc or French chalk, applied by sprinkling a little of the material on the glass, and *gently* rubbing it in with a soft handkerchief, finally dusting off the surplus with a stiff brush. This will cause the emulsion film to adhere firmly to the glass during development, and will at the same time assist in causing it to leave the glass *after drying*, if it be desired to transfer it.

The next operation is the application of the sensitive emulsion to the glass, technically known as "coating," a simple enough process to watch, but requiring some little skill to successfully perform. Before, however, describing this, we will mention the few pieces of apparatus it is desirable to have ready. These are, perhaps, not absolutely necessary, although they greatly promote comfort in working. For instance, it is perfectly easy to work with no extra appliances beyond an ordinary breakfast saucer, which forms a convenient sized dish in which to wash a lantern plate or apply the preservative, and a tin biscuit box as a drying chamber.

However, if a number of plates are to be prepared, it will be well to have a simple wooden rack in which to place the plates after coating and before washing, a large dish or other convenient vessel in which to wash them, or better still, one of the now popular metal washing troughs for negatives. The advantage of the latter is, that when the plates are to be "preserved" or "organified," the rack containing a dozen or more may be lifted bodily from the washing trough into another vessel containing the organifier, and the time and risk involved in handling each plate separately is thus saved. There is an opening for some enterprising dealer to place in the market a convenient little rack for lantern plates with suitable troughs for washing and organifying. Beyond these there is no necessity for any further apparatus, as the plates may be dried by simply placing them in a dark box or cupboard, or at night-time in the ordinary kitchen oven.

Let us suppose all is ready for coating. One of the cleaned glasses is taken and poised on the tips of the fingers of the left hand, and carefully dusted with a flat camel-hair brush. The bottle of emulsion—the contents carefully filtered, and the neck freed from dust or other particles—is then taken in the right, and a pool of emulsion sufficient to cover about three-quarters of the area of the plate poured into its centre. The glass is then gently inclined until the emulsion flows first into one corner, then gradually along the edge to the second, third, and fourth corners in succession, and the surplus is then poured from the last corner into the same, or, preferably, a *clean* bottle. The glass is then rocked from side to side for a few seconds until the emulsion ceases to drip, after which it may be placed in the rack to "set" thoroughly.

The operation of coating is difficult to describe, but extremely easy to perform after once seeing it done. Steadiness and freedom from hurry are the two essentials, and a few trials will enable the beginner to coat the plates up to the edges without spilling a drop of the liquid, or by going twice over the same portion of the plate.

Mention has been made of returning the surplus emulsion to a separate bottle instead of to the one from which it is poured. This is desirable on two grounds: in the first place, however carefully the plate may be dusted, it is impossible to prevent chance floating particles settling on the surface of either glass or emulsion while in the act of coating, and such particles, if returned with the surplus emulsion, will reappear on a subsequent plate to form a spot or "comet," or other objectionable irregularity. Again, while the emulsion is exposed on the surface of the plate, considerable evaporation is going on of the volatile ether, and consequently every plate that is coated and the surplus returned to the general stock bottle causes a change in the composition and the consistency of the emulsion, and each successive plate varies more or less from its predecessor. By pouring the surplus into a separate bottle, not only are all dust particles kept out of the coating bottle, but its contents remain constant in composition as long as there is enough to coat with. When the first bottle is exhausted, the thickened emulsion in the second may be thinned by the addition of a little ether and filtered back into the coating bottle and the operation of coating resumed.

After the plate has been coated it is allowed to remain in the setting rack for three or four minutes, or until every portion of the film is thoroughly set. If transferred too soon to the washing trough the portion of the plate from which the emulsion was poured will contain a far larger proportion of the solvents—especially ether—than the opposite corner, and the result will be great inequality in the sensitiveness and character of the two portions. If a long enough period be allowed to elapse to permit the whole of the ether to evaporate, the resulting film will be practically uniform throughout. Short of allowing the emulsion to become thoroughly dry, which at ordinary temperature requires a very long time, it is impossible to let the film set too long. No time need, however, be wasted as, say, half a dozen plates may be coated and placed in the setting rack, and as the seventh is placed in the rack the first is transferred to the washing trough; and so, as each successive plate is coated, another in rotation is moved into the tank. As no harm is done by allowing the films to set thoroughly, the rack may be filled and the whole transferred at once if the weather be not too hot.

The plates are permitted to remain in the washing tank at least long enough for the "greasy" appearance arising from the presence of alcohol on the film to disappear. When this stage is attained, and not before, the excess of bromide and other soluble matters may be considered to have been fairly removed, though not completely, and the plate is ready for exposure. But in order to secure the greatest sensitiveness when excess of bromide is present, and the best results at all times, it is desirable to continue the washing considerably beyond this point. It must be borne in mind that where excess of bromide is present the film is practically insensible in the camera; that is to say, if the plate be exposed before washing it is impossible to develop an image, though if after attempted development the plate is washed and re-exposed a good picture will be obtained. This shows the advantage, then, of very thorough washing under these conditions.

When excess of silver is present it is possible to impress an image on an unwashed plate, though it is seldom a satisfactory one, but before applying the developer it is absolutely necessary to wash thoroughly or the free silver will suffer reduction and cause dense fog. The same remark applies, too, when an organifier is used consisting of a reducing agent, such as tannin, gallic acid, or pyro; in fact, under no circumstances is there anything to gain but everything to lose by shirking the washing.

For these reasons we advise always that at least two changes of water be used after the first, and as long a soaking given as circumstances will permit. Then, especially, when an organifier is to be applied to a film that has contained free silver, let each plate be finished off singly under a tap or rose, or the rack dipped bodily into *hot* water for a minute or two. By this means all danger will be avoided.

Most emulsions, if made with suitable pyroxyline, are now ready either for exposure wet, or for drying without the application of an organifier; but frequently it is advisable to use such an addition for the purpose of modifying the colour of the image, or to increase sensitiveness. In such cases the plates are simply transferred bodily from the washing trough—after

draining slightly—into the organifier, and there allowed to remain at least two or three minutes, or until the film is thoroughly permeated. After this they are reared up to dry, or, if intended for use wet, may remain in the organifier until wanted.

Of the solutions used as organifiers we need only mention here such substances as tannin, coffee, gallic acid, pyro, honey, sugar, albumen, glycerine, gelatine, indeed almost anything of an organic and non-crystalline nature. One of the best organifiers is a fifteen-grain solution of tannin, with a few grains of sugar to each ounce; another, one ounce of freshly ground coffee and one ounce of sugar to a pint of boiling water, afterwards carefully filtered. For increasing the sensitiveness of the wet emulsion we must have recourse to alkaline stimulants; thus, thirty grains each of gelatine and glycerine dissolved in ten ounces of hot water, allowed to cool, and then half a drachm of strong ammonia added, forms a good accelerator. Or if the plates have to be kept some time—say an hour or two—five grains of washing soda may be substituted for the ammonia.

For drying, the plates should be reared up on end in a dark place, free from dust, the bottom edge resting on several thicknesses of blotting paper. They will dry spontaneously in a few hours, and should be protected from any *violent* current of air which would cause drying marks. Or it is convenient when working at night-time to finish off the plates in the kitchen oven if not too hot.

But the extreme convenience of the method of working lies in the use of the plates wet. If we are making a number of slides we invariably adopt this plan, allowing one plate to expose while we are developing the last. We commence work by coating a number of plates, which are allowed to remain in the washing trough or organifier, as the case may be, until wanted, when they are taken out one by one. In this manner more work can be got through than by any other plan we know.

In a final article we shall deal with the newest methods of development.

Autumn, so far as foliage is concerned, has put in an early appearance this year; so it has with regard to fogs. On Saturday, last week, there was so much fog on the Thames at London, that the passenger steamers had to suspend their traffic for some hours. In many parts the varying tints on the trees are already very delicate and beautiful, and the light, on the whole, excellent for rendering them. If photography could but produce an autumnal landscape in all its glory, what charming pictures might be obtained!

For rendering foliage with its autumnal beauty, plates] orthochromatised with eosine or erythrosine have sometimes been recommended; and there is no doubt, as the film is rendered more sensitive to the yellow ray, that more detail may be obtained with a given exposure than with ordinary plates. It is, however, a question with many if with orthochromatised plates the glorious variations in the tints are so well rendered as in a well-exposed plate of the ordinary kind, unless, indeed, the plates were specially treated to suit each subject, to do which would be extremely inconvenient.

A fortnight back we referred to the proposed Chemical Union, and the possible effect it might have on the price of some of the chemicals employed in photography. According to an evening contemporary, a meeting of the Union was held at Liverpool one day last week, and it is stated that only three persons were present, and nothing transpired as to their deliberations. If this be the state of affairs, it looks much as if the thing were falling through. As we stated before, any "ring" in chemicals would meet with formidable competition from the Continent. For example, we are given to understand that nitrate of silver is at the present time to be had from Germany at a lower price than it can be purchased from English manufacturers. Notwithstanding the high price of the metal, the manufacture of the nitrate at the English price carries a good profit to those who make it on a large scale, particularly when it is considered that a very large proportion of the salt is really a by-product from the operation of refining—parting gold from silver.

A very old and stale silly season joke of, we think, American origin has recently been resuscitated, and is "going the round." We refer to that of photographers keeping a stock of portraits of babies, from which fond parents can select those which they consider most like their own darlings, in the event of the artist failing to secure a photograph of the infantile sitter. The *canard* has been "dished up" in many different ways, and now it is not confined to babies alone, as it is asserted that stock portraits of brides are also kept on hand.

When are the "automatic photographic machines" going to make their appearance? is a question often asked whenever a few photographers are gathered together. The reply generally given is "When?" Most people thought they would have been in use long ere this, seeing that the whole of the capital had to be paid within two months after the allotment of the shares. The dull light of the winter months will not, we imagine, be conducive to successful automatic photography—particularly in such situations as automatic machines are usually placed. Some shareholders in the Company already seem anxious to dispose of their shares. Possibly they think they will realise a better price now than they will a few months hence.

One frequently sees an announcement of the extraordinary numbers of eggs imported into this country within a given period. It would be very interesting to know the proportion of them that is used for industrial purposes. It must, however, be very large indeed. Eggs are extensively used in many manufactures beyond that of photographic paper. The wholesale egg merchants now break eggs and sell the whites and yolks separately at so much per gallon. The largest consumers of the whites, in London, are those who albumenise paper. The yolks are principally used in the dressing of kid leather for gloves and similar uses, and not, as some imagine, by the pastry cooks. By thus dividing the egg, the merchants are enabled to supply both the albumen and the yolks at a much lower price than either could be obtained for if the eggs had to be purchased entire.

The Board of Customs, by order of the Treasury, has issued orders relaxing the stringency of the regulations for the examination of the baggage of passengers arriving in this country from foreign parts. From this time, the Customs officers may dispense with the examination of handbags, rugs, and parcels, simply satisfying themselves by examining a selected portion of any other luggage, according to the number of packages in the possession of the passenger. This arrangement will be hailed with satisfaction by every photographic tourist on the Continent.

At one of the meetings of the British Association last week, Professor Hummel read a paper dealing with the fast and fugitive coal-tar colours. In his paper the author dispelled the too prevalent idea that all coal-tar colours are fugitive. He mentioned that there were now some three hundred of these colours, of which thirty were extremely fast, while an equal number were moderately so. Out of the natural dye stuffs, the Professor said, ten might be taken as yielding fast colours; hence there were three times as many from coal tar.

It is pretty generally known that some colours when used as a dye are stable, but when used as a pigment are far from being so. Alizarine is a case in point. When this is used as a dye on woollen or cotton fabrics, it is undoubtedly permanent, as witness the Turkey red

colour, one of the most lasting of all dyes. But when alizarine is employed as a pigment, say in carbon tissue or in printing inks, it is certainly fugitive, as may be proved by exposing prints containing it to a strong light for a week or two. Some of the most unstable of the coal-tar colours are, perhaps, amongst the most valuable ones utilised in photography. We allude to the eosines employed in orthographic photography. These are amongst the most evanescent of all the coal-tar series.

THE PRESENT STATE OF THE CARBON PROCESS.

[A Communication to the London and Provincial Photographic Association.]

When the process of printing that depends upon the locking up of pigment in gelatine rendered insoluble by exposure to light, and that is generally known as the carbon process, was popularised, to a certain extent, by the improvements of Swan and of Johnson, great hopes were expressed that a process capable of yielding results good in themselves, and—what rendered it essentially desirable—results that are permanent would become generally adopted, at all events, for any work but that in which permanency was not much considered. Its use was, however, for a long time almost entirely limited to the reproduction of artistic and archæological designs, and to the purpose of producing such photographs as, being out of the convenient way of production by ordinary private photographic establishments, were naturally put out by them to houses who made a specialty of doing work for the profession. I refer particularly to enlargements, for which its use was pre-eminently selected. It was felt by photographers who desired to do justice to their customers that, where considerable sums were received for single pictures, on account very much of the artistic labour bestowed upon them, it was not fair to issue them on a basis liable to fade, and so render the work worthless.

For a long time, however, although there was a great increase in the amount of work done, there was nothing to indicate the likelihood of any general adoption of carbon printing, but about fourteen or fifteen years ago this consummation seemed more likely to come about, owing to the introduction of the process of double transfer from a glazed surface. Many photographers went in for this process, some even exclusively, for their ordinary portrait work. Of these latter I do not know of any who have kept to the path which they entered upon with so much hope and confidence. What is the reason? Or, perhaps more properly, what are the reasons? For one thing, it may be said that the process was more expensive and troublesome than silver printing, and that the public did not care enough about permanency to pay an extra charge for that quality. Others may say that platinum printing has come to the front, and that they prefer the results of the later process. We are not discussing platinum printing to-night, but I think it may be argued that, with both processes at their best, the carbon process will better register the gradations in the more transparent portions of the negative, and consequently will be freer from heaviness and want of luminosity of the shadows than platinum prints on a matt surface.

I think some real reasons for the decline of carbon printing amongst photographers and amateurs are to be found in certain defects to which prints by this process are frequently liable. The two failures most common in private hands are, perhaps, first, a want of richness and vigour in the blacks, unless negatives of extra density are used; and secondly, a liability to washing bare in the lighter half tones, by which the delicacy of gradation at the end of the scale is lost. A third common fault is a want of purity of the high light. If these defects were necessarily inherent in the process, it might not be worth while to say much about them; but such excellent results have been seen, and are so commonly produced by the houses who work for photographers, and who make a specialty of enlargements, that it may be supposed that the failings mentioned are due rather to a want of general knowledge of the means of guarding against them, than to a radical defect in the process itself. Perhaps the forthcoming discussion may do something towards making the way clearer.

W. E. Debenham.

MODERN METHODS OF ILLUSTRATION.

I.—The Phototype Process.

This series of articles has for its object the instruction of the readers of the magazine in the working details of practical methods, by which any amateur of a fair degree of manipulative skill may prepare printing blocks from his own negatives, and so find open to him a new and fascinating field for experimental work, one which may in some cases become profitable. I have the best of reasons for knowing that many of our American amateurs would gladly adventure upon this untried field, were they not deterred by fear of insurmountable difficulties. By most the photo-mechanical printing processes are thought to be so hedged in by difficulties and secrets as to make success impossible, except to those who have served a long apprenticeship to a practical process worker. That there are difficulties I am far from denying. That there are jealously guarded secrets is undoubtedly true, but neither the one nor the other need deter the earnest worker from trying his "'prentice hand" on some of the least difficult of the methods by which a photographic negative can be transformed into a printing block, suitable for the production of prints in permanent ink.

I have not ventured to write upon this branch of photographic work without sufficient practical acquaintance with the processes to be described to enable me to give reliable directions for their practice. As an enthusiast in photographic matters, and a firm believer in the maxim that, "What man has done, man may do," I have never allowed the existance of difficulties or secrets to deter me from the attempt to overcome the one and discover the latter. I have not always been successful.

"*Mais que voulez-vous?*" I have made some successes amid many failures, and it is of the successes I propose to speak in this series, omitting, for the sake of brevity, all historical allusions, and plunging at once *in medias res*, by a description of the phototype process, which is known by various other names—Albertype, collotype, photo-gelatine, and a host of others, all alike based upon the insolubilising effect which light has on a film of bichromated gelatine and the ink-repelling power of water.

Of all the reproduction methods the phototype renders the photographic effect most nearly, especially when the prints are made on fine coated paper; while for those who prefer more artistic effects, the affair is made by selecting a plain paper, either plate or the kind technically known as "gelatine plate," which may be had of most large dealers in paper. It is of all processes the best for the amateur's maiden efforts, since its practice on a small scale requires no expensive plant, and the prints can be made by the amateur himself in a simple letter-copying press if they are not larger than the whole-plate.

Formulæ for the sensitive mixture are "thick as leaves in Valombrosa," but the interest of my readers will be best consulted by giving only a few typical formulæ which actual practice has demonstrated to be capable of giving good results in amateur work which is not subjected to the severe tests required of the professional work. The amateur does not care for a plate capable of giving a large number of impressions, but he does care for one of moderately easy preparation which can be printed from without the need of an expensive press.

The following formula gives such a plate, and with care a hundred or more prints can be made from a single plate in an ordinary copying press:—Copper plates, similar to those used by etchers, form the support for the film. They should be at least two inches larger on every side than the negatives to be printed from. The edges are bevelled, and the corners rounded off with a file, and then carefully grained with a muller and fine emery. The graining must be done with care to avoid scratches, which would print black in the prints. After a thorough washing, to remove all traces of the emery, they are ready for the sensitive mixture, which is prepared as follows:—

Nelson's No. 1 gelatine	180 grains.
Water	3 ounces.

The gelatine is first soaked in the water for fifteen minutes, and then dissolved in a water bath with gentle heat. When the gelatine is dissolved in one ounce of Coignet's *colle de peau*, a diaphanous glue made from hides and cartilages is added gradually in small pieces. When this is dissolved, ninety grains of bichromate of potash finely powdered are added to the solution, which is to be well stirred until the bichromate is completely dissolved. Three or four drops of ammonia are then added, and the mixture filtered warm through flannel.

The coating is done as in the case of gelatine plates. The copper plate is dusted with a soft brush, carefully levelled, and flooded with sufficient of the bichromated solution to make a fairly thick film when dry. To facilitate the spreading of the emulsion, a little warm water is first poured over the plate and well drained off. The coating need not be done by ruby light, as the plates are not very sensitive until dry. Weak white light is perfectly safe. I usually do my coating at night by gaslight. As many plates are coated as the drying box will accommodate. When the last plate is coated, the first one is examined for air bells. If any are found, as is usually the case, the plate is heated over a spirit lamp until the gelatine runs completely over the plate, which is then

placed in the drying box or stove. Each plate is subjected to the same treatment.

The drying box for an amateur phototypist need not be the elaborate affair required for commercial work. All that is required is that it be provided with a number of shelves or racks which can be accurately levelled and capable of being heated. It must have efficient means of ventilation, and if the plates are dried in an ordinary room in daylight, it must be made light-tight. As I coat and dry my own plates at night, my drying box is simply a square kitchen utensil known as a steamer. It has a number of metallic racks for holding tin dishes, and these are replaced by a few wooden crosspieces, in which are screwed several binding screws known to every electrician. By means of these screws a plate is easily levelled. The temperature of the box must be kept at one hundred degrees, and the plates will dry in about two hours. The door of the box must not be opened too frequently, or unequal drying will leave marks on the plates. When dry, the plates will keep in good condition for a few days if kept away from the light in a dry place. Plates two or three days old work better with thick negatives.

The best negatives for the phototype process, for half-tone work at least, are those which are called soft and harmonious, but any negative which will give a good silver print without "dodging" will make a good phototype block. If the amateur desires his prints to be unreversed, he must use reversed negatives. Those who use the new Eastman film will find it easy to convert them into reversed negatives by placing them in the printing frame with the film side next to the glass front. Those who use the dry plate will have to make first a positive by contact printing or in the camera, and from this make a reversed negative in the camera by photographing the glass positive with the film turned away from the lens. Still another way is to make a good silver print from the negative, and then to photograph this on Eastman's transferotype paper; this, when dried on a piece of plate glass and deprived of its paper backing, will give a reversed negative.

As I am writing only for amateurs, I say nothing about making a negative from a silver print by the wet collodion process, and then stripping the collodion film from its support in order to reverse it on a piece of plate glass. I am not altogether in the habit of using reversed negatives for merely experimental work. "A rose by any other name would smell as sweet," and a reversed landscape print has its share of beauty. Ordinary negatives can be used for first experiments. In order to secure absolute contact between the copper plate and the glass negative, a strong, deep printing frame with screw pressure must be used. It must have a thick plate-glass front, and the screws must be well screwed home Danger of breaking the negative is diminished if the middle screws are tightened first. The exposure is best made in diffused light, to avoid excessive relief in the block. The time can be learned only from experience As an average, under negatives of moderate density, half an hour is about right. A bichromated film requires about double the exposure necessary to make a silver print. When taken from the frame the image should be distinctly visible, but not too pronounced, in brown on a yellow ground. When taken from the printing frame the phototype plate is immersed in cold water for three minutes, rendered perfectly surface dry with a piece of soft linen, after which it is ready for the printing press.

The advantage of this method for the amateur experimenter is that no expensive plant is necessary, and that the plate is easily inked up, owing to the absence of any strong relief. It is not, however, well adapted for printing a large number of impressions from a single plate.

When large numbers are to be run, a different method must be adopted, as will be described later, when the details of inking-up and printing have been discussed. W. H. Burbank.

—*American Amateur Photographer.*

THE PHOTOGRAPHERS' ASSOCIATION OF AMERICA.

The Convention of 1891 will be held at Buffalo, N.Y., under the presidency of Mr. George H. Hastings, of Boston, Mass.; Mr. W. C. Davis, New York, being secretary. The four following papers, with others, were read at the recent Convention at Washington:—

TYPES OF BEAUTY.

By Thomas Wilson.

It would be eminently proper for some scientist before some such Congress to show what photography has done for science, to show what assistance and aid it has given. But it would be foreign from my purpose to do so. I am not insensible, however, of the benefits given by photography to science. In astronomy, Professor Langley, the head of our institution, would concede the great indebtedness of his science to photography. Next after original research and discovery is the necessity for a record thereof; the latter almost equalling the former in importance. Photography makes the record, and is entitled to a fair share of the credit for discovery. The lists of similar credits might be extended to a wonderful length. I leave it to your own knowledge and remembrance without attempting to enumerate. It has been of great benefit and use in the study of the races of man, and as a proof thereof, I do but call to your remembrance as I show the great album of Prince Roland Bonaparte containing the photographs, two of each specimen, a full-face and a profile view of each subject, in the various countries which he visited, from Lapland in the north-east to French Guiana in the south-west.

I am not a photographer. I am interested in the science of anthropology, or rather in a small proportion thereof, and I am to speak to-day upon the subjects of types or styles.

Anthropology is the natural history of mankind, and the types of which I am to speak are those of human kind. The attempts at the classification of mankind are numberless. They began early and have continued late. One ingenious scientist made a classification which comprised as many as sixty-two different races of men. We all remember how, in our younger days, the standard classification showed five races: the Caucasian or white, the Mongolian or yellow, the Ethiopian or black, the Malay, and the Copper-coloured. In the present day the two latter have been dropped, and now the grand divisions consist only of white, yellow, and black.

But there have been divers other schemes and systems of classification, and, if you please, I will speak for a few moments in giving a description of the various types of mankind as at present classified by different scientists. After that of colour, just mentioned, is that type or race of mankind classified according to the shape of his head. It is called the cophalic index, and, not to use abstruse scientific terms, may be determined by the proportionate length and width of the head; the long, short, and medium heads.

Anthropologic Types.

By Cophalic Index.
- Dolicocophalic, Hermann Welcker.
- Mosocophalic, Broca.
- Brachycophalic, „

By Form of Hair.
- Ulotrichos (woolly hair) and Lissootriches, or Leiotriches (smooth hair), — Huckel and Muller.

By Dental Index.
- Microdont, 42, Mosodont, 42 and 44, Mogadont, above 44, — Professor Flower.

By Unity of Characteristics.
- Leptorrhine, Mesorrhine, Platyrrhine, — Professor Topinard.

In determining the characteristics of the various types of mankind, it becomes necessary to have living specimens, and here it is that photography can aid anthropology. One of the great anthropologists of this century in Paris has been making a collection of the various types of mankind, and he does it by means of photographs. He has discovered, or thinks he has, that the type or origin, the race to which the party originally belonged, is better preserved among women than men, at least that the evidences and characteristics are better preserved among women than among men. So he has made his collection from among women, and to make it more attractive and worthy, he declared it to be his intention to choose only the beautiful women for his types. Therefore, his is a collection of types or standards of beauty, and this is made by a series of photographs.

We have the declaration of the Holy Scriptures that "man is but little lower than the angels." Man has been conceded to be the highest representative of the animal kingdom. Some of the ancient philosophers considered that man and woman, male and female, would constitute but one being in the future world; that man was the representative of strength and wisdom, while woman was the representative of love and beauty. I agree with the ancient philosophers, and I commend the ancient artists. Throughout all time artists have chosen woman as their standard type of beauty. Most truly she is, for, judging by our standard and looked at with our eyes, we cannot but declare that whatever else the Creator of the world and the Maker of all things might do, He certainly has not made anything more beautiful, more lovely, more charming, more attractive, more to be worshipped on earth, than a beautiful woman.

But here is the opportunity for the anthropologist to call to the aid of our science the profession of photography; and not now, but

at some future time, when all the signs are favourable, I propose to appeal to the photographers for selection and contribution for a photographic type of that representative woman whom they consider the most beautiful: that is, to obtain from each one his standard of female beauty. And this collection shall pass into this great museum in which you now hold your meetings, and stand in future years as the standard types of the photographic beauties of the nineteenth century

DEVELOPING.

By G. Cramer.

During the past year there has been little change in the methods of development. Pyro still stands as the favourite, although several substitutes have been used and suggested.

Eikonogen has advanced into favour, many of the dry plate makers giving eikonogen formula for use with their plates. I have used it with great success in short exposures, and my experience with it is that you can afford to give one-third less exposure than for pyro, and I feel sure that one cause of the complaint, that sufficient intensity cannot be obtained with eikonogen, arises from over-exposed plates and new developers, for a plate exposed for pyro development will be over-exposed if developed with freshly mixed eikonogen. This was proved to my entire satisfaction upon some Eastman films exposed in a No. 2 Kodak on Decoration Day, when the light was very bad for snap-shutter exposures.

The first twenty exposures were developed with the potash pyro developers known as Hoover's developer, a developer which I have handled most successfully upon all kinds of exposures, but they proved so hopelessly under-exposed that I put the other part of the roll aside, thinking it was not worth the trouble to develop them: but Dr. Weigal, one of the members of our Camera Club (an ardent experimentalist), brought me some eikonogen developer he had mixed, and I developed the rest of the films, and got at least one-third more out of them than I got on the first twenty with pyro development, and some of them (all things considered) making good printing negatives. Dr. Weigal's formula for mixing the eikonogen developer is:—Forty-eight grains of eikonogen dissolved in *hot* water, add to that two ounces each of a solution of sulphate of soda (hydrometer test, 40) and carbonate of soda (hydrometer test, 45), then add enough water to make up eight ounces in all. For over-exposure this developer can be restrained with bromide of potassium the same as pyro. For snap shutter exposures this is the best developer I know.

The potash pyro developer (Hoover's) I have referred to is too well known to need the formula being given more, but I would again call attention to the method of using the sulphate of soda. In the majority of formulæ it is divided between the pyro solutions and the potash or soda solutions. This is wrong in both theory and practice. If it requires four atoms of sulphate of soda to one atom of pyro to get the best effect from both, then it stands to reason that the whole of the sulphate should go into the pyro solution; if you could always be sure of using exactly the same amount of each solution, then it might be divided, but even then there would be no advantage in dividing it, but where different exposures and subjects require, first, more soda and then more pyro, the balance of four to one is being continually upset.

Why is it that so few photographers on this side of the Atlantic use liquor ammonia as accelerator instead of potash or soda? There are a few—and those few among the best-known names who produce high-class work—who do use it, but they are the exceptions.

The deposit caused by ammonia is exceedingly fine, the softness and gradation everything that can be wished, and you can get more out of a given exposure by ammonia than by any other alkali; but few photographers like the colour of the deposit, which is greenish grey, and they are generally deceived by the apparent thinness of the negative; but I think if photographers would only get over the idea that they want their dry plate negatives to approach as near as possible in colour to a wet plate, they would find many advantages in the use of ammonia. For copies for enlarging upon bromide papers, there is nothing can beat an ammonia-developed negative.

If photographers want a wet plate colour and effect, why do they neglect the oxalate developer? Many German and French photographers of the highest rank have used oxalate from the first, and still continue to use it. With a full-bodied plate, that is, one rich in silver bromide, and particularly one which contains a small proportion of oxide of silver, the oxalate developer gives fine results, and the old wet plate man can delight his eyes with a negative which very nearly resembles a wet collodion plate. In many cases I have been able to use oxalate upon a plate that with pyro has been hopelessly spoiled by green fog.

THE AUTOMATIC OPERATION OF PHOTOGRAPHIC APPARATUS.

By D. P. Todd.

The need of automatic instruments has been more keenly felt in the prosecution of eclipse research than in any other department of scientific investigation where photography is an adjunct. I refer, of course, to the work which goes on during the total phase of a solar eclipse, which is usually only two or three hundred seconds in duration: when the great variety of special problems necessitates a variety of instruments correspondingly great; and when the startling phenomena of the critical moments often occasion the hand to fail in executing a well-rehearsed programme.

At the last total eclipse, visible in Angola on December 22, 1889, a novel combination of apparatus was for the first time brought into operation, and although clouds prevailed during totality, thus precluding the possibility of photographing the solar corona, the working of the apparatus was so successful that a description of it will not be without interest, in view of its possibilities in eclipse work in the future.

In equipping the U.S. Eclipse Expedition to West Africa, I recognised three essentials: (1) A great variety of instruments; (2) large scale pictures of the corona: (3) the necessity of perfect clockwork. I saw no better way to meet these conditions than by constructing an equatorial mounting sufficiently capacious to accommodate all the photographic apparatus. Accordingly a split polar axis was built of six-inch wrought iron tubes, about eleven feet long, and placed two feet apart. The whole was mounted English fashion, on massive cast-iron supports, capped with brass bearings. This was built by Mr. Saegmueller, of Washington, and I was fortunate in obtaining from him the loan of a very perfect and powerful clockwork to drive it. This latter was in process of construction for the great equatorial refractor of the Denver Observatory, and I found its centrifugal governor, a triple-twist flexible steel spindle, to perform with the highest accuracy. Also, the means provided by Mr. Saegmueller for adjusting the polar axis into parallelism with the earth's axis proved to be very neat; and the adjustment was readily made so close that, with an hour's run of the clock, the declination error on the plate did not exceed twenty seconds.

On this axis was mounted all the photographic apparatus for the total eclipse, and a high-power directing telescope to verify the pointing of the whole.

This comprised the following apparatus:—

(1) Professor Pickering's reversing-layer spectroscope for photographing a spectrum trail for fifteen seconds both before and after second and third contacts.

(2) Five photographic telescopes: the first a Clark 150–8 doublet, twelve exposures, two being through a Carbutt orthochromatising screen; the second a Dallmeyer 38–6 portrait lens, sixteen exposures: the third a Dallmeyer 24–6 portrait lens, four exposures; and the the fourth a Ross 12–5 portrait lens, eighteen exposures; and the fifth a Gundlach 22–375 aplanatic orthoscope, with one specially prepared plate for the extreme outer corona, and other circum-solar objects.

(3) Two catoptric telescopes by Brashear, with twenty-five exposures for each; the first having the ratio 33–8 with the central three inches of the mirror sacrificed to the plate holder, while in the second, 7 23, the entire aperture was made available by setting the plate holder at one side of the tube, and tilting the mirror slightly, as in the Herschelian form of mounting.

(4) Five dioptric telescopes, with objectives uncorrected for the actinic rays, the first a Clark-Merz 96 6·4 objective, twenty-five exposures, of which five were made with the full aperture, and five each with apertures of 5, 4, 3 and 2 inches; the second a Schroeder 22–6 triple objective, one hundred exposures; the third a Clark 72–5 telescope, with the sun's image enlarged to 4·5 inches diameter, four exposures; the fourth a Spencer 30–4 objective, eighteen exposures, divided among apertures varying from 1 to 4 inches; the fifth a Clark 40–375 objective, twenty-five exposures. This latter instrument was intended to provide pictures precisely comparable with those of the eclipse of 1889, January 1, taken by Mr. Barnard, and accordingly the aperture of the objective was capped down to 1·75 inches.

(5) Two flint-glass spectroscopes, and one quartz spectroscope.

(6) Two duplex cameras for photographing the polarisation of the corona.

(7) A duplex telescope of 75 inches focal length for coronal photometry.

The finder, or directing telescope, was a 7½-inch Clark refractor, with a high-power eyepiece.

In all, the apparatus mounted upon the polar axis embraced two mirrors and twenty-three objectives.

The operation of it by hand, as ordinarily, would of course have

been impossible. My experience during the eclipse in Japan, two years previously, had suggested the desirability of automatic operation of all eclipse apparatus; and as a result of much experimentation with different electric and pneumatic devices, I finally ventured to adopt the pneumatic valve system covered by the letters patent of Mr. Merritt Gally.

By means of this unique and ingenious system, which has been largely employed in the automatic playing of musical instruments, a very small current of exhaust air, say of one-tenth inch diameter, is made to control an exhaust current very many times greater in volume.

A system of forty-eight such valves offered no difficulties of construction whatever, and was built in ten days' time under the immediate personal supervision of the inventor. The tubes leading from the valve ports were of half inch diameter. The control currents were governed by a succession of one-tenth inch apertures punched in a strip of paper about nine inches wide and seven feet long. This I wound upon the barrel of an ordinary chronograph, so that it would unwind at a perfectly uniform rate when the chronograph was set going. As the paper left the barrel it passed over the "tracker," and was re-wound upon a take-up roller. The whole was mounted over an exhaust organ bellows, strongly built, and with springs of triple tension. This combined apparatus made a perfect pneumatic commutator, having forty-eight air currents in perfect control. In order to set any current in motion, it was only necessary to puncture the control sheet at a point whose x was equal to the time, and whose y corresponded to the number of the air-port in the "tracker."

From the commutator, half inch lead pipes were run to the position of the different mechanical devices which were to come into action during totality. Here they were connected with small pneumatic bellows of the ordinary V-pattern.

Each bellows, then, was so connected by appropriate mechanical movements, that its collapsing thrust should perform the various sorts of work required, whether the operation of an exposing shutter, the revolution of a nicol, the variation of available aperture, or the shifting of a photographic plate.

In such a variety of apparatus it was impossible that one form of mechanical movement should suffice for the whole. The requirements of some of the instruments were best met by shutters which the pneumatic bellows held open against the action of a spring during the full length of the exposure; while others required that alternate actions of the pneumatic should open and close the shutter or exposing slide. This was easy enough; but the problem of changing the sensitised plates for new exposures turned out to be much more difficult, especially where a large number of exposures was required.

Where the plates were small, and the exposures few, a sliding plate holder was found to work best; here it was only necessary to fasten a ratchet to the back of the plate holder, and then attach a pawl to the vibrating side of the bellows. But some of the plates were of the size 17 × 20 inches, and they could not be advantageously managed in this way. I finally hit upon the idea of attaching them to a revolving crate or barrel, set in motion on its axis by means of a small weight fastened to a cord wound upon a pulley or wheel at one end. The whole was then rigged escapement fashion, with detents equal to the number of plates, and each detent so adjusted that when at rest its corresponding plate lay in the focal plane of the objective. A very small pneumatic then sufficed as a pallet, or as a trigger to set off the mechanical device on the conclusion of each exposure. This simple movement was found to be sure of action, easy of construction, and to require a minimum of time for shifting the plates.

Also, the capacities of other devices for shifting plates were tried. At the focus of one of the smaller instruments a plate was set in a small frame sliding laterally in a frame of twice its own dimensions, and this latter again sliding longitudinally in a shallow box of twice the dimension of the outer frame. By means of three pneumatic bellows, appropriately set and fitted with ratchet movements, every part of the sensitive plate was brought to the centre of the focal plane, and the exposure duly made.

For the reflectors, it was found best to employ an endless chain or belt of plates, double hinged together by means of continuous flexible tapes.

In order to test the utmost capacity of the automatic apparatus, and at the same time to furnish a large series of pictures of the same corona with a given instrument, a quick-acting lens was rigged with a long plate barrel, sliding automatically forth and back in a frame rigidly attached to the tube. The barrel had ten plate-strips upon it, and the ratchet movements gave ten exposures for each strip. In this manner one hundred exposures, from a half second to two seconds long, were readily obtained with a single instrument.

In order to avoid the construction of a camera box for each telescope, I adopted the plan of mounting the polar axis near the middle of a large Ducker portable house, one end of which had a removeable roof, while the other formed a dark room. The spaces between all the instruments in the axis were readily stopped, and a partition athwart the house was built up underneath the axis, and down from the rafters of the house. It was then a simple matter to connect the partition with a wooden frame around the exterior of the polar axis by means of heavy, opaque cloth secured to the partition and the frame, with sufficient slack to allow the necessary motion of the polar axis and all the instruments mounted on it.

It may be further stated that substantially all this apparatus was devised, constructed, and tested at sea, during the voyage of the U.S.S. *Pensacola* from New York to St. Paul de Loanda.

Notwithstanding the evident impossibility of securing any pictures of the corona, as a thick cloud stood nearly stationary over the sun at the time of totality, the pneumatic commutator was brought into operation, and the control chronograph set going fifteen seconds before the predicted time of second contact. The duration of totality was 190 seconds, and over 300 exposures were made. The automatic movements of exposing shutters and the other apparatus in the uncovered portion of the house were apparent; while in the absence of pictures on the plates, the accurate registration of the moveable plate holders was rendered certain by the subsequent examination of marks so placed upon the slides and revolving barrels as to disclose any failure of the mechanism to act.

After many months of experimentation it may now be said that the automatic operation of a large amount of photographic apparatus simultaneously has been carried beyond the experimental stage. Many of the mechanical applications which operated successfully at Cape Ledo might evidently be covered by letters patent, but their use will not be so restricted. The simplicity and directness of the methods employed leave little to be desired, while the moderate expense of the apparatus puts it within easy reach. Of course, the equal facility of its application to the automatic working of every sort of physical apparatus will not escape notice.

RETOUCHING.

By D. L. Hurd.

The little talk I shall make here on the subject of working the negative will occupy but a few minutes. My purpose is simply to say a few words on what I consider the natural office of retouching, with some reference to the enormities with which it stands charged as practised to-day.

I am glad that the journals have lately been giving this matter a wider attention, and that the management of this Association has thought it well to bring it here for discussion.

Some of us remember when this baby was born, twenty odd years ago, and how much it was thought to add to the resources of portrait photography. It was held as a secret in the town of Boston for a little time after its advent, and pilgrimages were made by ambitious men from outlying towns with a view to discovering the methods whereby such phenomenal work was produced. One asked to be allowed to measure the angle of the skylight, and another returned to his own city and proclaimed that he had captured the idea. His watchful eye had, during his call, caught sight of blue mosquito netting under the skylight, and he reasoned that the meshes corresponded to the stipple that appeared upon the print. This conjecture, it afterwards transpired, was not correct.

Awhile back I was present at a club supper where a gentleman read a paper on Lying. The gentleman was a lawyer, and it must naturally occur to you that he would possess great familiarity with his subject. He considered lying under three heads: the natural liar, the artistic liar, and the d—d liar. For convenience of illustration, and because of the close analogy of the subject, I shall make the same classification.

Natural retouching may be said to be such corrective work as will be unobtrusive, supplementing only the shortcomings incident to the process. Photography does not always render a face as we see it; and in order to bring the picture to as close a representation of life as possible, more or less work is required to be done; and this needs no excuse. For instance, either from a slight under-exposure or heedless development your image lacks that soft blending of lights and shadows seen in nature; the lines are hard, and a general exaggeration of the defects of the face is the result. It may be said that the most direct and effective way to remedy this is to make another negative. But there are often reasons why you had better not; you may have secured such a fine pose, and withal so pleasing and

unconscious an expression (which has eluded you in every plate but that), that it makes one weary to think of renewed attempts. Perhaps the proofs have been shown, and the sitter will have that and no other. Clearly, then, you must make the most of that negative; you must coax the shadows down, soften hard outlines, and try to make the flesh presentable. It is hardly necessary to say that when you have done your best, if you commend it to the sitter it must be with some mental reservations regarding technical value. Still, retouching has helped you out, and made respectable what otherwise would have been wholly bad. Or supposing the exposure and development had left nothing to be desired, perhaps the skin of the subject has appeared upon the plate as an exaggeration of blemishes; or patches of colour have assumed the form of depression. Such work as will correct this is surely called for. Or, again, your sitter has a face full of angularities, which no lighting under heaven (unless accompanied by an over-exposure that will make it flat) can quite keep down to natural limits. Then the pencil is your friend again. Many people sitting in a light stronger than that to which they are accustomed will scowl a little. The expression can often be made wholly right by a little judicious softening of the lines in the lower part of the forehead. Perhaps the whites of the eyes in the photograph may appear darker than in nature by reason of a tinge of yellowness, often noticed in persons of bilious habit, or the same result may be had from a congested state of the minute blood vessels. Then it is very easy to bring back the relative whiteness by a few touches of your pencil.

Other illustrations of what may be called natural retouching will naturally suggest themselves to you.

Artistic retouching embraces all this and a good deal more: when elaborately done, the entire face and even a part of the drapery has been carefully worked over, and modelling of the face has been conscientiously preserved, the lights and shadows blended, the skin brought to a soft, textury appearance, a tendency to fatness, when present, has been corrected, a high light strengthened here and there to give a little more pronounced effect, and a general bringing of the face into tone and value has been accomplished. I need not say that a negative worked in this way can only be done by an artist.

D—d retouching (if so emphatic an adjective may be used in this presence) aptly describes the treatment that a tremendous majority of all the negatives made in these days receive.

It is of the most heroic character; and when the artist in banged hair has concluded her labours, nothing remains of the original negative but the outline. She proceeds in free and easy defiance of all the laws that govern the production of natural objects of light and shade. All the characteristics of the face go down before her ruthless pencil; wrinkles disappear, depressions are made to rise up; delicate tracings of muscles are obliterated; and when all is done the eyes and mouth are the only features that remain intact; and they are so out of value with all that surrounds them that they appear like floating islands in a spherical sea of polished marble. I do not blame the retoucher—she works up to what is required of her, and what she is praised for doing, but this is the photographic portraiture of to-day. The highest ambition of the negative worker is to finish to a smoothness that rivals porcelain; no thought or care for the modelling or all that subtle quality of rendering so vital to the likeness; no feeling for portrait effects—only a phrensy for a smooth mechanical surface and a struggle for rotundity. It is useless to remark how worthless such photographs are in the eyes of all people of artistic feeling, or even to those who seek a likeness, or how degrading it is to photography! Nothing contributes more to remove us from a recognition as artists, about which there has been such a senseless clamour for the last few years.

The baneful effect of this ignorant and ridiculous work is recognised, I think, by all our best photographers. Adam Salamon, as far back as 1874 (when this monster was but a tadpole) deplored the practice of retouching. Kajlander, the great Parisian photographic artist, writes: "I think the practice of retouching the negative a sad thing for photography. It is impossible for even very capable artists to rival or improve the delicate, almost mysterious gradations of the photograph. I consider a touched photograph spoiled for every purpose." You will notice that he does not qualify these statements at all, or admit that retouching may be employed in any case.

The President of this Association writes, in a recent contribution to a year-book: "How often do we make negatives so nearly perfect, and so closely approaching our fancy, that but a few touches seem necessary to complete them; and we feel that if only those few touches could be properly made they would certainly be a 'joy for ever.' But, alas! they have only to go through the retoucher's hands to became a lasting reproach."

H. P. Robinson, than whom there is no better authority on either side of the Atlantic, says: "A great deal has been said against retouching, and very little in favour of it; yet it is practised to such an extent and carried so far that individual likeness is almost abolished. Highly touched portraits used to remind us of waxworks or marble, but it has now passed that stage of untruth."

It seems to me that the best men on the other side of the water are more outspoken on this matter than photographers here, and as far as my opportunities enable me to judge the evil has been greatly mitigated there.

Perhaps the worst feature of all is that the great mass of people here, old and young, want this bastard work. They have become educated up, or down, to it, and cry out a truthful, legitimate representation: *Away with it!* Particularly is this the case with persons past middle life. The unaccountable feeling seems to possess them that to grow old is shameful, and they clamour for photographs that give them young-old faces. He who panders most to this wretched vanity will be exalted in the market-place and by the fireside.

Well, what shall we do? The public have elected that a shining puff-ball is the *ne plus ultra* of photographic art; and the artistic world has decided that there is nothing so common and debased as portraits by photography. He who refuses to conform to the standard set up by the public will have to forego their orders. I know whereof I affirm, for I have tried it.

Still, there is a cloud in the sky, which if no bigger than a man's hand now, is going to overcast the heavens by-and-by, and the parched and wearied soul of the true photographer will be made glad by the refreshing rain of appreciation. Already there are many people who are sick of this miserable misrepresentation, and the number might be greatly increased if men of the better class would drop their weak-kneed policy and work for the best results instead of the most profits in the immediate present. Truth will prevail in photography as in all else.

I do not wish to be understood as inveighing against retouching, for we all know it is a great help when properly employed. Yet I am of the opinion that, taken as a whole, the photographs made in this country for the last ten years would have been infinitely better had retouching been unknown.

To the conscientious photographer, he who seeks to give present and permanent value to portrait work, the question of working the negative is a more serious and perplexing one.

ON THE REVERSAL OF THE NEGATIVE PHOTOGRAPHIC IMAGE BY THIO-CARBAMIDES.

Colonel Waterhouse has favoured us with revised advance sheets of the following article, which is written for the *Journal of the Photographic Society of India*.

In the early part of last month, while carrying out some experiments to find a preservative for eikonogen, I discovered that phenyl-thio-carbamide (phenyl-sulpho-urea), added in a very minute quantity to the ordinary eikonogen developer, possessed the remarkable property of more or less completely transforming the negative photographic image into a positive, and that thus I was able to produce at will more or less perfect positive pictures in place of negative ones, under otherwise quite normal conditions of exposure in the camera and of development.

Later experiments have shown that allyl-thio-carbamide, or thio-sinamine, possesses the same property, perhaps in a stronger degree, and reverses the images developed with pyrogallol and hydroquinone, as also those developed with eikonogen. Thio-carbamide, or sulph-urea, also produces reversal with the eikonogen developer, but not so markedly as the two alcoholic thio-carbamides. Carbamide, or urea, appears to cause no reversal with the eikonogen developer; and this observation, if confirmed by further investigation with other developers, would tend to show that sulphur has an active part in bringing about the reversal.

I have also found that the phenyl and allyl-thio-carbamides, when applied to precipitated bromide or chloride of silver, or to gelatine dry plate films containing them, have no visible action upon them; but if an alkali be added, a powerful darkening and reducing action is set up, even in the dark and entirely without the action of light. With the iodide this action is not so strong.

Thio-carbamide with alkali gives off ammonia and darkens and reduces the silver haloids; and a strong solution of it is capable of darkening a gelatine plate in the dark even without alkali.

Urea, even with alkali, does not visibly darken a gelatine dry plate film, nor darken or reduce the silver haloids in the absence of light.

So far as I can ascertain, these peculiar actions of the thio-carbamides, in reversing the photographic image and in darkening and reducing the silver haloids in the absence of light, have not before been noticed.

The thio-carbamides of the alcoholic series are formed by the action of ammonia on the so-called "mustard oils," or thio-carbamides. *Phenyl-thio-carbamide*, formed from phenylic mustard oil, has, according to Watts, the formula $CS\left\langle\begin{matrix}NH\,C_6H_5\\HN_2\end{matrix}\right.$

It is a crystalline substance very slightly soluble in cold, more easily in boiling, water and in alcohol. Watts further remarks that when boiled with nitrate of silver it exchanges its sulphur for oxygen and is converted into phenyl-carbamide.

Applied by itself in solution to an ordinary gelatine dry plate containing bromide or bromo-iodide of silver, it has no visible reducing action, and, indeed, appears to act as a restrainer of development; but mixed with an alkali, such as sodium or potassium carbonate, it very powerfully darkens the film, even without the action of light. When fixed, the darkened part of the plate is of a deep yellowish olive colour, and is harder and less absorbent of water than the unaltered part of the film. The darkening action is the same on a gelatino-chloride of silver film, though I have not succeeded in obtaining the reversal of the image on chloride films developed with eikonogen as noted below.

The alkaline solution of this thio-carbamide also darkens and reduces pure bromide of silver in the dark; and if the darkened precipitate be treated with nitric acid, it clears in colour, and by the addition of muriatic acid to the clear fluid, chloride of silver will be precipitated. Eikonogen developer added to the darkened precipitate blackens it, and if, after washing the latter, nitric acid be added only a very little unaltered bromide is left, together with a flocculent brown insoluble deposit.

Weak solutions of phenyl-thio-carbamide act more effectively in reversing the image than strong ones, and with the eikonogen developer the best proportion seems to be about twenty to twenty-five parts of the watery saturated solution in 100 parts of the mixed developer; and as a saturated solution in water, even at the comparatively high temperature we now have in Calcutta, seems to hold an almost inappreciable quantity of the salt, the proportion actually contained in the developer must be exceedingly small.

The eikonogen developer I have usually employed is that recommended by Dr. Nichol, which was given in the June number of the *Journal*, and contains sulphite of soda.

A.

Eikonogen	5 parts.
Sodium sulphite	10 „
Water	100 „

I have not found that the presence of this salt interferes, as might have been expected, with the reversal, and am inclined to think that its presence in moderate quantity is beneficial, though good reversals may be obtained with plain eikonogen and carbonate of soda.

B.

Sodium carbonate (cryst.)	8 parts.
Water	100 „

One part each of A and B to two parts of water.

The addition of a small quantity of potassium bromide (from ·5 to 1 part of a 10 per cent. solution to about 100 of developer) seems to aid in the reversal of the lights. In some cases a trace of ammonia also seems to be beneficial in aiding the complete reversal.

So far, I have not found phenyl-thio-carbamide to have the same action of reversing the image when used with ferrous oxalate, pyrogallol, or hydroquinone developers as it has with eikonogen. With ferrous oxalate I have obtained traces of reversal. Applied in different strengths to an exposed dry bromide plate and developed with pyrogallol (Britannia formula), it acted as a powerful restrainer. It did so also with ordinary pyro-ammonia and bromide, and stained the plates a deep yellow. With the hydroquinone developer its action was quite different, and it appeared to be a powerful accelerator, reduction taking place over the touched parts, which in fact were fogged all over before the normal image was developed. No signs of reversal were obtained with this developer, but it is probable that with further investigation it will be found to reverse, as it does with thio-sinamine.

It may be here noted that different makes of plates show different capabilities of reversal, and so far as my experiments have gone, Wratten's "Ordinary" and "Instantaneous" plates have given the best results; but, possibly, variations in the quantity of thio-carbamide and of bromide will have to be made for different makes of plates.

Apropos of this, I may remark that now that dry plates are so invaluable and so largely used for scientific researches of all kinds, it would be a great convenience, at any rate to distant workers, if dry plate makers could indicate on their dry plate packages the nature and proportions of the haloid salts used in the emulsion.

Thio-sinamine, or *Allyl-thio-carbamide*, according to Watts, has the formula $CS\left\langle\begin{matrix}NH\,C_3H_5\\NH_2\end{matrix}\right.$ and is prepared by treating allyl-thio-carbamide, or the essential oil of black mustard, with ammonia. It is more soluble in cold water than the phenyl-thio-carbamide, and is also soluble in alcohol. In some of my experiments I have used an almost saturated solution of the thio-carbamide formed by adding four parts of the strongest liquid ammonia to one part of the ordinary essential oil of mustard obtained from the druggist. As soon as the ammonia has taken up as much of the oil as it will, the solution may be decanted off and the ammonia allowed to evaporate. Of the solution thus prepared, about one part in 100 of the mixed eikonogen developer as above is sufficient to produce reversal on development; a little bromide may be added, and a slight trace of ammonia seems beneficial.

This solution has rather an unpleasantly strong smell of old cheese and garlic, and it is advisable to evaporate it and obtain the thio-sinamine in a crystalline and odourless form, in which it may also be purchased in Europe. Of the saturated solution of the crystals from half to one part in 100 parts of the developer is enough.

The reversing action of the thio-sinamine seems to be stronger than with the phenyl-thio-carbamide, and it gives clearer whites. The colour of the images produced with it with eikonogen alone, without bromide or ammonia, is a beautiful rich chocolate brown verging to purple. It has given a very fair reversal with pyrogallol developer containing sulphite, though it did not do so with a pyro-ammonia developer prepared according to the "Britannia" formula with nitric acid and a considerable quantity of bromide. With Thomas's hydroquinone developer it also did not reverse the image, but with a developer prepared with—

Hydroquinone	1 part,
Sodium sulphite	2 parts,
Carbonate of soda (cryst.)	10 „
Water	70 „

I obtained very clear reversals in copying, though I was not so successful in a landscape with considerable contrast between the sky and foreground. With eikonogen also, the thio-sinamine seems to work best with sulphite.

Applied to pure precipitated bromide of silver in the dark, thio-sinamine does not darken it, but seems to enter into combination with it, forming a soft, pasty mass, and, if in sufficient quantity, dissolves it. Carbonate of soda solution darkens the soft mass at once, and the solution treated with dilute muriatic acid gives off a smell of sulphuretted hydrogen; nitric acid partly and slowly restores the colour. With muriatic acid the nitric acid solution gives chloride of silver. A very peculiar smell was evolved by the mixed acids. Eikonogen developer added to the darkened precipitate, after treatment with soda, turned it quite black. Nitric acid caused effervescence, and made the precipitate lighter in colour. It appeared to be a mixture of yellow bromide, and a black substance with a little flocculent deposit. Muriatic acid added to the nitric acid solution gave a copious precipitate of silver chloride.

The alkaline solution applied to chloride of silver also darkens it very strongly. Nitric acid does not clear the precipitate much, but the solution gave a copious precipitate of chloride with muriatic acid. The action generally is much the same as with the bromide.

With silver iodide, thio-sinamine also forms a soft, waxy mass, and dissolves it. Carbonate of soda only very slightly discolours the mass with the dirty yellow appearance of a sulphur compound of silver. Nitric acid set up a strong effervescence and nitrous fumes, and restored the iodide to its original colour. The acid solution gave no precipitate with muriatic acid, but the same peculiar smell as above.

COLONEL J. WATERHOUSE, B.S.C.

(*To be continued.*)

SOME EXPERIENCE.

IN our old "copy-books" we used to write something about "experience teaches." Ever since I have had a modest gallery of my own, now many years, I have found that copy-book statement very true. I have attempted, as far as possible, to let experience teach me, and I have not been particular in regard to who furnished it. Indeed, some of my most valuable lessons have been paid for out of other people's pockets. I

learned that it is not safe to try new and untried methods in one's regular line of work. This was paid for by an old friend of mine years ago. He was doing a large and prosperous business, which I am glad to say has doubled many times since then. We often laugh over the incident now when talking of new methods and their working in practice. It was no laughing matter at that time, however.

Some one gave my friend a new formula for a silvering solution. It was said to be better than any of those in use at the time, giving richer tones, printing more quickly, and being in every way a great improvement. I have forgotten just what the formula was, but remember that there was a pretty large proportion of glycerine in it. I was much interested and would have made up a bath, but the one in use was new and was working well. After much discussion he decided to try the thing, and made up his solution, using a little over fifteen pounds of silver for the purpose. It was a pretty costly bath, for silver was at a premium, and the bill was something over $250. How he worked on that solution! It would silver the paper all right, but it would strip the albumen from the paper every time. We studied over the matter, but that did not prevent the bath becoming loaded with albumen. Working with it was quite out of the question. The next thing was to make a new bath and save the silver in the old. He made the new bath after his old formula, and went to work to boil down the one that had given so much trouble. A gas stove—Bunsen—and a big evaporating dish worked very well. He had filled up for the last time and left dish and burner in charge of one of the family, while we went down town together. When we came back an hour or so later we met fire engines near the place and found on going in that there had been a fire with a tremendous blaze. The solution had suddenly blazed up furiously. Every one was frightened, and they had to send out an alarm, for the whole place was likely to go. The firemen made short work of it.

The next question was, Where was the silver? Had it gone up in smoke, or down into the ground in the water? Flooring and shelves were charred, the dish burned. As it did not appear that much water had been used, we hoped that in the ashes, the dirt, or the floor, some of the silver could be found. But not a trace of silver could the assayer find in anything that was sent, and he had samples of boards, dirt, shelves, and flooring.

It was fortunate for me that I did not have to pay the piper on that occasion. It would have made me bankrupt. But I learned the lesson just as well. I resolved that I would not make large experiments unless I had the money to pay for their failure.

But I danced once and paid my own piper in a smaller way not long after. I thought I could practise a little economy. I bought a lot of Anthony's cotton, but saw a chance to make something on the ether and did so. In fact, I got the latter article at a considerable discount. I went ahead with my collodion, but it turned out acid, and I had no end of trouble. I got hot in the collar and went up to headquarters one day and asked for Mr. Henry Anthony. There I proceeded to say what I thought of that cotton. I was pretty cross, and my pocket had suffered a little at just the time when I expected to make something. My work was hindered, and I was far from happy. Mr. Anthony was not excited; he rather sympathised with such troubles, cooled me off a little, and got at a good many more of the facts than I intended he should. Then he suggested testing things, and in the end I had to confess to the quality of that ether. I had honestly supposed the cotton was at fault, but when I took back a sample of ether which he gave me, and turned out from the cotton a collodion with which I could not honestly find any fault, I was willing to "own up" the next time I met him. Though I had let my red haired temper blaze up like a roman candle, he was good-natured about it, and when I confessed, smilingly suggested that if I got caught again it would be with my eyes open. I did not get caught on that dodge again.

There is another "racket," as Roche would say, that I stumbled upon the other day. A small dealer was in my place the other day, and among other things said he would like my Atwood alcohol bottles. Would buy them if I did not want them. I was sweet, for I thought I might pick up an idea or get some experience. So I did it. It seems that he got the bottles when he could, and then went and had them filled with common alcohol. Said it was just as good, cost less, &c. He was rather bitter on the Anthonys, because "they were so stiff." Would not fill the bottles with common stuff. But he had other places where he could get all he wanted, where people were not so particular. He was very pleasant, let out a number of his little secrets, and promised to come around and see me later. Thought we could do something together. But I didn't sell him any empty Atwood bottles. I didn't have any just then—to sell.

One of my friends, a while ago, thought he could do a nice thing by taking some iodide of ammonia which was offered to him at a low rate It was "away below Anthony's figures," and he said he thought it was just as good. Perhaps it was, but I heard a good many of his complaints, and it looked to me as though his iodide cost him fully fifty per cent. more than the market price of the best article that money will buy. His saving, supposing he had got a good article, was not quite worth the risk.

Some little time ago I undertook to make some blue prints for an engineer. Business was very slack with me for some time last year, and anything was welcome. I tried the ordinary blue paper that the engineering supply houses sell. But my customer wanted something better, as his work was fine, and so I began to prepare my own paper. This was easy work at first. Then I had a flat failure. I spoiled sheet after sheet, and as the paper was of a fine quality the matter began to look serious. I was buying experience and was paying too much for it. I went through every step of the process and failed to find the trouble. I spoiled four quires of paper experimenting, and then sent for a new lot of chemicals from the house of your publishers. I made good paper after that, but I am puzzled to know where my trouble lay. I knew the old ferricyanide was impure and not fit to use, and yet I made some good paper with it. But I also know that the same dirty stuff cost me all the profit on the job. All I have to show for my work is a pile of paper that will not print with three weeks' exposure to a bright sun, and a large addition to my experience. The latter I put down as so much capital.

Four years ago a dry plate maker who is now a neighbour of mine had an experience that cost him every cent he had in the world. When he began business again it was on the ground floor. He knows more about chemistry than he did then, and a deal more about selling dry plates. It is generally understood around here that he was pinched a little by competition, but was making money fast. His plates had a fine reputation, and he was holding the market against an opposition firm, as they were cutting a little on quality.

The good plates that he was making were pretty costly, and he was trying to meet a small break in prices. With a manufacturer's instinct he began to buy close on the raw materials. I think his first investment was in some bromides, which he got far below the American market. There was enough in it to make the temptation a strong one. It was a trap and he walked into it. The emulsions fell off in quality as the new stock replaced the old. The plates did not keep. Batch after batch of emulsion was spoiled. And while this was going on there was some tinkering with a cheaper grade of gelatine. Before he could recover the quality, the plates in the market showed every fault a plate could have. They came back from every dealer and from every user. He had simply to take them in and return the money and stop.

He sometimes sends me a few boxes of plates that are not quite up to the standard; but of one thing I am pretty certain—it is not the fault of the chemicals.

I said I did not make a mistake again about collodion. But hypo took me in last fall. The offer of a cask at one and a half cents was too much for me. I was nearly out; the sample was a little dirty, but the hypo was plain. The price was lower than I had ever paid. I cannot complain of that hypo. It was cheap and good. But that dirt came high. I think we made the same kind every time we swept the floors. Of course I filtered the stuff; it is such a pleasure to filter hypo. But I did hate to pay for that dirt. It was such "ornary" dirt. It would go through a filter like distilled water. I would not have cared if the cask had been filled half and half. But it was three pounds of dirt and two of hypo. But then I was perhaps a little prejudiced. I do not want common, cheap, dirty hypo. I am paying market prices for the best article I can find.

I would like to preach a little sermon about some card stock that came into our town two years ago, and about which the local photographers are grumbling yet, but I am afraid you have had enough from a

—*Anthony's Bulletin.* SMALL GALLERY.

TECHNOLOGICAL EXAMINATIONS AT THE CITY AND GUILDS OF LONDON INSTITUTE.

We have received the programme for Session 1890-91, from which we give the examination subjects:—

PHOTOGRAPHY.

Ordinary Grade.

1. The characteristic properties of pyroxyline for the manufacture of collodion, and the various substances employed for the purpose, as well as the solvents, such as ether, alcohol, wood, naphtha, &c. Different qualities of collodion.

2. The wet process, dry plate processes with the silver bath, gelatine and collodion emulsion processes, and the principles involved in each.
3. The theory of development by the acid and alkaline methods. The theory of intensification.
4. Printing in silver and other metals, toning and fixing; printing in carbon.
5. The collotype and powder processes. Photo-lithography.
6. General principles of portrait and landscape lenses. The principles of construction of cameras.
7. The various apparatus in ordinary use by photographers.

Honours Grade.

In the Honours Examination more difficult questions will be set in the above subjects, and, in addition, a knowledge will be required of—
1. The Daguerreotype process, the calotype process.
2. Woodburytype, stannotype, vitrified enamels.
3. Special applications of photography to engraving; typography.
4. Special applications of photography to astronomical and microscopical purposes, as well as for recording meteorological and other observations.

Full Technological Certificate.—A Provisional Certificate will be granted of the results of the above examination. For the full Technological Certificate in the Ordinary Grade, the candidate who is not otherwise qualified (see Regulations 36, 37, and 38) will also be required to have passed the Science and Art Department's Examination in the Elementary Stage at least, and for the full Certificate in the Honours Grade in the Advanced Stage at least, in *two* of the following science subjects:—
I. Practical, Plane, and Solid Geometry.
VIII. Light and Heat.
X. Inorganic Chemistry.
XI. Organic Chemistry.

The offices of the institute are Gresham College, London, E.C.

TESTING THE NEW ZEISS OBJECTIVES.

Zeiss adopts a special method of numbering his diaphragms. Each one has the expression $\frac{\text{aperture}}{\text{focus}}$, and, in addition, a certain number stamped upon it. This number is obtained as follows:—A diaphragm one-hundredth—*i.e.*, one which is equivalent to one-hundredth—of the full aperture is taken as the base of the system. The numbers 2, 4, 8, &c., then give the relative intensity, and consequently, by inversion, the time of exposure required with each of the diaphragms employed. Though this method of numeration is of value on account of its enabling the exposures to be easily ascertained, it would perhaps be still better to provide the diaphragms with numbers directly corresponding to the exposure. All the diaphragms belonging to an objective are moveably attached to a spindle running through the handle, and thus cannot easily be lost. In all the objectives visual and chemical focus coincide.

A.—Triplet Apochromatic, No. 4, by Carl Zeiss Jena:—

Focus	190 mm.
Aperture of largest diaphragm	28 mm.
Effective aperture	30 mm.

The construction of the lens has been described at length in the published specification, where the various constants of the lens are also given, and are consequently omitted here.

The tests which were made have given the following results:—

Number of Diaphragm in decimal system.	Circle of accurate focus.	Effective angle.	Field covered.	Alteration of focussing screen for each diaphragm as compared with full aperture.	Depth to which accurate definition reaches in metres from the objective.
No.	CM.		CM.		M.
4	10	29½°	5·7 × 7·8	—	15
8	12	35°	7·5 × 9·5	—	10
32	17	48°	10·5 × 13	—	7
64	20	55½°	12 × 15·5	—	5
128	24	64½°	15 × 18·5	—	4
256	30	75½°	18 × 25	—	4
512	36	86½°	21 × 28	—	2

As may be seen from the table, the objective can be focussed under all circumstances without diaphragm, consequently it is only necessary when stopping down to pay attention to sharpness of definition at the edge of the field. The objective is in reality a wide-angle, and gives with decreasing diaphragm a remarkably wide field, in which the two sides of the image considerably exceed in their dimensions the focal length. The depth of definition is extraordinary.

In order to ascertain how far the triplet was suitable for enlargement, a mirror-plate, 13 × 18, carefully divided into centimetres, and in certain places into millimetres, was employed instead of a negative. The enlargement amounted to five and a fifth. In this instance, too, I only made use of three diaphragms, namely, those corresponding to the decimal enumeration 4, 18, and 32, or to the "standard" numeration 2·5, 5, and 20. The results were as follows:—

Relative time of exposure.	Circle of accurate definition.	Effective angle.	Image (shape of).
	CM.		
4	56	26½°	35 × 44
8	60	28½°	35·7 × 49
32	62	30½°	38·5 × 48·5

This is a highly satisfactory result. Curiously enough, the diaphragms seem to exercise but very little influence.

B.—Doublet Anastigmat, No. 102, by Carl Zeiss Jena:—

Focus	225 mm.
Aperture of largest diaphragm	32· ,,
Effective aperture	31·3 ,,

We have here the interesting case of the effective aperture being smaller than that of the largest diaphragm, *i.e.*, the largest diaphragm is bigger than need be. The explanation of this is that the back lens is so much smaller than the front one. This objective consists of three lenses, of which the back lens is composed of three separate lenses cemented together. The construction both of this objective and of the two following anastigmates has been described in the patents, and may consequently be omitted here. The objective under discussion, like all the new wide-angles, is very short.

The tests gave the following results:—

Number of diaphragm in decimal system.	Circle of accurate focus.	Effective angle.	Field covered.	Alteration of focussing screen for each diaphragm as compared with full aperture.	Depth to which accurate definition reaches in metres from the objective.
No.	CM.		CM.		M.
5·2	15	37°	9·5 × 11·5	—	10
8	16	39°	10 × 12·5	—	9
16	21	50°	13 × 16·5	—	5
32	26	60°	16 × 29·5	—	4
128	32	71°	20 × 25	—	3
256	39	82°	24 × 30·5	—	2

This objective, as well as the triplet, can be focussed under all circumstances without diaphragm, more particularly as the depth of definition is very exceptional, surpassing that of the triplet very considerably, and it also surpasses it in the width of angle—considering its perfect astigmatism—which it embraces. From diaphragm No. 32 on, the delicacy of definition is quite extraordinary, and the field is illuminated with beautiful regularity.

The tests in enlarging were conducted in the same way as for the triplet, except that the enlargement was three and three-tenths. The results were:—

Relative time of exposure.	Circle of accurate definition.	Effective angle.	Image (shape of).
	CM.		
4	55	26°	34 × 42
8	66	31°	41 × 51½
32	79	36°	49 × 62

This instrument is thus excellently adapted for enlargements.

The very flat image obtained with the anastigmates is very noticeable. There is no need for compensation between the centre and the edges. It even appears that the centre of the field, instead of being concave, is convex. The sharpness up to the edge of many excellent objectives is due to the fact that the foreground and sides of the object are closer to the instrument, and so equalise the curvature of the image. Nothing of this kind is observable with the Zeiss objectives. Their delineation is plane throughout.

The very small extent to which the objectives project in front renders it difficult to attach instantaneous shutters. But, on the other hand, as none of them project into the interior of the camera, it is easy to arrange the shutter inside. The shortness of both the objectives renders it, as in the case of the antiplanates, difficult to arrange the shutter in the middle.

—*Photographische Nachrichten.* Dr. Stolze.

(*To be continued.*)

Foreign Notes and News.

The eternal rivalry between Berlin and Vienna makes itself felt, as we have often had occasion to point out, in the photographic world as well as in the political. Herr Ch. Scolik, his *Photographische Rundschau*, and all his works, appear to be *anathema maranatha* in the eyes of the *Photographische Mittheilungen*. The former periodical has lately been publishing some correspondence from Herr Schumann tending to discredit the yellow sensitiveness of eosine silver plates. This Professor Vogel, as their inventor and perfector, very naturally resents, and he comes down upon Messrs Schumann and Scolik in his usual trenchant, not to say sledge-hammer style.

Herr Schumann appears to have stated that the sensitiveness of the plates for yellow, so far from being ten times greater than their sensitiveness for blue, was not greater at all, and he insinuates that the relative blue and yellow sensitiveness only appears what it is stated to be on making use of the small spectrograph specially made and supplied by Dr. Vogel himself. The instrument, says Herr Schumann, is made of flint glass, and exercises such an absorptive effect on the blue rays as to act already as a colour filter, and so give rise to the results observed.

Professor Vogel indignantly resents such an insinuation as being only worthy of people like Herr Scolik (!), and is surprised at Herr Schumann (a savant of recognised standing) for introducing such suggestions into a scientific discussion. He then goes on to point out that the relative sensitiveness of the plates has always been tested by him with the large standard instrument of the Berlin Royal Academy, but that nevertheless his small instrument has given good and reliable results, both in the hands of Captain Waterhouse and others.

There is not much doubt that we may side with Dr. Vogel in this somewhat acrimonious controversy, more especially as we fail to see how, if Herr Schumann's contention that Vogel's small spectrograph absorbs so much of the blue rays as to act as a filter be correct, it can be of any use for spectral observations whatever.

The ever-increasing value of photography as a handmaiden and assistant of the other sciences has seldom received more brilliant illustration than has been afforded by the exhibition held in connexion with the recent Medical Congress at Berlin.

Photography was employed to illustrate almost every branch of modern surgery and medicine. Space, however, compels us to refrain from doing more than mentioning a few of the more interesting exhibits. Such, for example, were those of Dr. Max Kohler, of Vienna, illustrating cases of the fortunately rare disease, elephantiasis, and a child destitute of brain (we are not told whether the behaviour of this individual showed any marked differences from that of other of his compeers who have not been detected as suffering from a similar deprivation), also of pathological alterations of shape owing to diseased joints, as well as cures effected in these cases by suitable treatment. Dr. Max Kohler also showed a number illustrating the different steps of various operations.

Interesting also were Professor Babes' views of artificial tetanus induced in animals, and Dr. Veit's photographs of normal and pathological anatomical preparations. And the astonishing capacity for dislocation and contortion which the human body can attain to was well illustrated by Dr. Virchow's views of contortionists and sword swallowers.

Of perhaps wider interest, however, were the views of the first medical university clinic, by Professor Leyden. They represent the whole history of a hospital, almost every type of disease, and views of persons recovering, and of others at the point of death, as well as some hospital *genre* scenes, which we are told are not wanting in æsthetic charm. (Heaven save the mark!)

We have to chronicle the recent death of Herr H. Goltzsch. The deceased gentleman was one of those amateurs who have done more than most professionals to promote the progress of the art science. As will be remembered by our readers, his principal attention was for many years directed to improving the stereoscope. Not only was Herr Goltzsch an able photographer, but a man of wide culture generally, and a musician of very considerable attainments.

A request was recently addressed to the editor of the *Photographische Mittheilungen* to furnish a list of literature in French relative to improvements in orthochromatic photography since 1887. The editor replied that the French literature on the subject was very fragmentary. It is satisfactory to find that he referred his correspondent to the English journals as containing full and reliable information.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,189.—"Improvements relating to Films for Use in Photography." V. Planchon.—*Dated September* 9, 1890.

No. 14,199.—"Improvements in Photographic Cameras." J. J. Fosser and T. Naylor.—*Dated September* 9, 1890.

No. 14,301.—"A Photographic Cutting or Trimming Plate or Gauge made of Metal." C. Harris.—*Dated September* 11, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 22 ...	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 23 ...	Great Britain (Technical).....	5A, Pall Mall East.
,, 23 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 24 ...	Burnley	Bank Chambers, Hargreaves-street.
,, 24 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 25 ...	Burton-on-Trent	The Institute, Union-street.
,, 25 ...	Halifax Photographic Club	Mechanics' Hall.
,, 25 ...	Liverpool Amateur	St. George's-crescent North.
,, 25 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 25 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

September 11,—Mr. A. Mackie in the chair.

Mr. J. J. Brigmshaw showed a magnesium flash lamp to which was attached a reservoir for holding a stock of powder. On pressing a spring after making a flash the lamp was recharged with the powder and ready for use again. He also showed a cord arrangement for attachment to the legs of a tripod stand. By tightening the cord the legs could be so fixed at any desired inclination that they would not slide asunder, even on a marble floor.

Mr. F. A. Bridge showed some large photographs of Belgian scenery taken by Mr. Mace and printed by a photo-mechanical process. Photography appeared to be even more general in Belgium than here. During the passing of the procession of Notre Dame on August 15 no fewer than fifty cameras were at work.

The subject for the evening—*Carbon Printing*—was introduced by a short paper on *The Present State of the Carbon Process* (see page 597), by Mr. W. E. Debenham.

Mr. H. M. Smith inquired whether it would be possible to make enlargements direct upon carbon tissue from the original negative.

Mr. Debenham said that some years ago Mr. John Stuart, of Glasgow, and, he thought, one or two others, made enlargements upon albumen paper direct, and therefore, as carbon tissue was something like four times as sensitive as albumen paper, it should be possible to produce them in like manner.

Mr. P. Everett complained that in the double transfer process he found some of the image left on the transfer paper. This caused a loss of detail in the lights where it occurred.

Mr. Debenham said that when collodion was used to transfer with, of course this source of failure did not arise.

The Chairman had noted that there was always a film over the high lights. For some purposes, particularly for photographing on opal glass, there was nothing to approach the carbon process.

Mr. A. Cowan's experience was that transparencies could be made better by the carbon than by any other process.

The Chairman said that if sensitive tissue was kept in the vapour of ammonia it would remain good for weeks, but it took three or four times as long to print. Perhaps this slowness would go off if the tissue were first placed where the ammonia that had been absorbed would be dissipated.

Mr. C. E. Atkins was elected a member.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

September 2.—General meeting.—The President (Mr. J. Traill Taylor) in the chair.

Mr. Hedley Smith, of the Eastman Company, gave a lecture on *Hand Cameras and Film Photography*. Mr. Smith gave a brief history of the development of hand cameras, and pointed out that the great demand for these cameras on the part of the public had led to manufacturers, dealers, and amateurs turning their attention to the perfection of the instrument, and congratulated the Society on the fact that one of their own members (Mr. Parfitt) had invented one of the finest hand cameras extant, viz., the "Quadrant." Mr. Smith, too, prophesied that the use of films must in the end supersede glass for all outdoor work. He drew attention to the fact that many, after making the attempt, give up the use of hand cameras simply because they will not bestow the same attention upon exposure and development that they do upon the ordinary camera work, under the mistaken notion that everything has been done for them, and that the work with these cameras is perfectly mechanical [illegible], in proof of the fact that hand cameras were capable of producing

artistic and perfect work, he cited the names of several artists who had produced pictures which were greatly admired for their composition and perfect finish. The lecturer then proceeded to exhibit several of the latest Kodak cameras, and entered into details of the various parts, showing how portability, lens, shutter, diaphragms, and films had all been brought to the highest state of perfection compatible with making this camera a commercial success by the combined inventive powers of many minds. Mr. Smith stated that no plates could compare with films for speed, and showed some excellent enlargements made from film negatives made in the Kodak, and brought a most interesting and instructive lecture to a close by the development of several of the films which he had brought with him.

A discussion then took place upon various points arising out of the demonstration, Mr. J. DOUGLAS asking if the films came out flat when dry after development.

Mr. SMITH said simply put them under pressure.

The PRESIDENT inquired if there was not a dearth of films at present.

Mr. SMITH answered that the simple fact was that until the American and English Companies had enlarged their premises, which they were now doing, they were for the present unable to meet the demand of the public for films, although the output was over 1000*l.* per week.

The PRESIDENT having asked the members to discuss the fact that films were more rapid than glass,

Mr. F. W. HART said they were not in a position at present to state positively the reason for this fact as the data were all so uncertain.

Mr. A. MACKIE pointed out several additions which he thought might be added to hand cameras to make them more generally useful, such as rising front, swing back, &c.

Mr. SMITH showed how these improvements were gradually being attached to the cameras as experience showed the best and most convenient way of attaching them without destroying that portability which was so great a *desideratum*.

Rev. E. HEALY expressed his liking for the old paper films of the Eastman Company, and exhibited several beautiful pictures taken upon these films.

The PRESIDENT then announced that an interesting programme had been arranged up to Christmas, and stated that the next meeting would be a technical evening.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

SEPTEMBER 8,—Mr. J. Humphries (President) in the chair.

After the usual preliminaries had been disposed of, the PRESIDENT announced that, with a view to making the Club of greater service to its individual members, it had been decided to act on a suggestion which had been made, that articles which members (only) desired to dispose of might have a description of them placed upon the notice board in the Club Room if sent to the Secretary, the usual commission of five per cent. being charged on sales effected.

The SECRETARY then read the following (contributed) paper on *Collotype Plate Making*:—I do not wish to trespass on your valuable time with a long paper, but to give plain instructions, formulæ, and show results, so that any of you interested in photo-mechanical printing can go home and try it for yourselves without being confused with unnecessary matter. The first thing is some good plate glass ground with emery, such as the piece here shown. It is very simple. I take two pieces and put a little emery moistened with water between them and rub them round and round till I get as fine a grain as possible, and then well wash and clean with spirits and ammonia, when they are ready for the first coating, which is made as follows:—

Four ale or porter	30 ounces.
Silicate of soda	3 ,,

This is carefully filtered, and a little poured on the plate and spread over with the palm of the hand, then put in a rack or stand on blotting paper to drain; no heat is necessary. They ought to be done overnight, ready for next day, when, after a good washing under the tap, at the same time rubbing with a soft sponge, and again dried, they are ready for the second coating, which I make as follows:—

Coignet's gelatine	5 ounces.
Nelson's sheet gelatine	2 ,,

Soak in eighty ounces of water, then dissolve, and add bichromate of ammonia, two ounces, dissolved in ten ounces of water to which has been added half an ounce of liquid ammonia. The plates, which have been previously described, are carefully levelled in the drying oven, and the temperature raised to about 100°, when they are carefully coated with the second preparation, just described, and dried at a temperature of 150°, when the gas or hot water is turned off, and they are allowed to cool gradually. They ought not to be used till next day, and they will keep good for about one week, after that time they become insoluble. The plates at this stage should be like the one here shown. The next operation is to expose under a reversed negative, either wet or dry plates; but I have never seen a dry plate negative yet that can compare with a wet collodion one, although I have had nearly twenty-five years' experience. The exposure to light is difficult to describe; the best way is to use an actinometer, and give about the same time as you would for a silver print from the same negative; but a few trials will be of more service than a book full of instructions. After the plate is exposed sufficiently, take off the backing and expose the back to light for five or ten minutes, according to the subject; this helps to bind the film to the glass, and prevents too much relief. The plate is now put into water and allowed to soak till all the unaltered bichromate is washed out, then give a good rinse under the tap, well clean the back, and put away to dry spontaneously. They should not be used at once, but allowed to get thoroughly hard. The plate, after being put under the tap and dried with a cloth, is soaked with a mixture of glycerine, forty ounces; saltpetre, two ounces; ammonia, seven ounces; for about five minutes, and dried again with a cloth, and is then ready for the printing, which can either be done in a hand press or by steam. The ink is very much like lithographic, and the machine the same. I should like to have had a small press here this evening to show the printing, but, as I could not manage that, I have brought you plates in various stages of preparation and prints for your inspection. I do not pretend to anything new, but I have tried to show you how collotype is worked, and the foregoing is exactly how it is worked every day by one of the largest firms in the world. I shall be happy to explain anything that I have not made quite clear, and answer any questions you may please to put to me.

The contributor of this paper, who kindly attended to explain anything which might be desired, unfortunately had to leave before the paper had been finished, the PRESIDENT therefore announced that the Secretary would, as far as possible, answer any questions which might be put to him with regard to the process.

Mr. CHERRY said that in the specimen plates now placed before them for inspection, in the different stages of preparation there was one which he understood was ready to be inked up and printed from, but, from an examination of it, he failed to see how it could be possible to obtain any print from it, as there was scarcely any relief perceptible, and the image almost impossible to be seen except when so held that the light was reflected, and therefore the ink would spread equally all over and block up the lights; and he should like to have the process explained more fully after the plate had been exposed behind the negative.

The SECRETARY: The inability to appreciate the manner in which a print is made from such a plate arises from a misconception of the basis upon which the process is worked, as it does not depend upon the relief for the lights, but when the prepared gelatine is exposed behind the negative the light penetrating through that made it insoluble in those places and incapable of absorbing the hygroscopic substance with which it was afterwards flooded, which was done to cause those parts which had not been exposed to the light to repel the fatty ink; thus, the parts which had absorbed most moisture would not receive any, while to that which was less moist more ink would attach, and in the parts most exposed to light the ink would attach itself thickly, forming deep shadows in the prints.

Mr. FORBES wished to know whether all those shown were collotype prints, or whether some which he pointed out were not on albumenised paper.

The SECRETARY: Those prints are all produced by the collotype process, the glossy surface being produced after printing.

Mr. PITHER: I notice that while some of these prints have an entirely matt surface others have a finished glazed surface, and I should like to have an explanation of the manner in which this is produced.

The SECRETARY: It is obtained by what is known as the water varnish; that is, a solution is made of borax in water, and shellac is then dissolved in it, the paper is then floated on this, which gives it the prepared face.

On Monday, September 22, Mr. C. Beadle will give a demonstration of *Lantern Slide Making*. It will be remembered that this gentleman took the first prize for lantern slides at the competition held in December last. If time should permit, there will be a short discussion upon *The Merits of Retouching* on the same evening. Visitors are invited to attend.

Gentlemen wishing to join should send their names to the Secretary, Mr. George R. Martin, Harringay-park Granary, Green Lanes.

BRIGHTON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 9,—Mr. J. P. Slingsby Roberts in the chair.

Mr. A. H. WEBLING read a paper on *Exposure*, on which a discussion ensued.

The new dark room was also open for inspection, and met with general approval.

The meetings of this Society are now held in the spacious arch, No. 40B, King's-road.

MANCHESTER PHOTOGRAPHIC SOCIETY.

SEPTEMBER 11,—Mr. T. Chilton presided.

After the usual routine business, and the election of Auditors and new members, a new patented hand camera was exhibited by the maker, Mr. Bebbington. Considerable ingenuity has been displayed in its construction, the principal features being a provision for using a ground-glass focussing screen, separate dark slides of Barnett's or any other make, or an Eastman roll holder, or plates from a reservoir in the body of the camera containing twelve or more plates; either of these systems can be carried in the pocket or a bag, and placed in the camera in daylight. A rack and pinion for focussing and Kershaw shutter were provided.

Mr. J. SCHOFIELD delivered a brief but interesting lecture on *Enlarging*, in which he described the construction of an inexpensive portable dark box for use in the open air or in a room, for enlarging to 24×18 or reducing for lantern slides. All details of dimensions and quantities were given, his lecture being illustrated by rapid sketches on the blackboard. For the illumination of the negative, either daylight, limelight, magnesium, gas, or oil could be used; but, as amateurs generally preferred artificial light to daylight, preference must be given to the limelight for negatives up to half-plate, beyond that solar light is advisable on account of the large size of the condensers that would be necessary. Compressed gas in bottles was recommended as yielding the best results with the least trouble. For small negatives and vignettes a good oil lantern will give excellent results from not over-dense negatives placed one inch in front of a piece of flashed opal (not "pot opal"), which latter should be about four inches from the light. Mr. Schofield referred to the simple rule given in the 1889 ALMANAC by Mr. J. Traill Taylor, whereby the relative positions of the negative, lens, and enlargement for any given size could be readily ascertained. The development of bromide enlargements can be accomplished by various means, but the iron oxalate was recommended for black and blue-black tones, while with some papers purple-brown tones can be obtained; it is also very suitable for opals. A thin, clear negative should be used with artificial light, but dense negatives full of half tone will give good results by daylight, while extremely thin negatives should be backed with a weak yellow varnish, and gaslight used as an illuminant. After fixing in hypo (three ounces to twenty of water) and washing, the high lights can be improved by immersing the enlargement for two or three minutes in a weak sulphuric acid bath (one ounce to eighty ounces of water); wash for an hour afterwards. The lecture

was brought to a close by a successful enlargement of a half-plate negative to 15 × 12, the apparatus used being Hume's improved cantilever enlarging lantern. It was provided with nine-inch condensers and a really good objective of the portrait-combination class, yielding a sharp definition with a large stop.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

TOMBSTONE PHOTOGRAPHY.

To the EDITOR.

SIR,—In answer to correspondents in THE BRITISH JOURNAL OF PHOTOGRAPHY last week, you advise to fill in the gilt letters of granite tombstone with whiting made into a paste with water and then put in with a palette knife.

Now I have often used whiting for the purpose, but *dry* instead of in a paste. My plan is this: I take a small knob of whiting, place it in palm of right hand and pass it over the line of letters to be filled, using considerable pressure, enough in fact to crush the whiting as it goes into every crevice of the letters. In this manner a knob of whiting as large as a good size apple will fill in a great quantity of letters. You have then only to pass a cloth gently over the surface to remove any dust and take the photograph. I may here state that over-exposure is to be carefully avoided with this class of work. When taken, cut a piece of wood chisel shaped, and hook out the whiting without injuring the gilding, which a knife would be apt to do. Then a dust with the cloth completes it, leaving it without a trace of anything having been done to it. This is all quickly done and should not be omitted. In one case, where it was forgotten, the first shower of rain carried the whiting in streaks, and a complaint was made that some injury had been attempted.

If the gilt letters are in white or light stone then use in same way a knob of lark chrome, which will come out dark and not stain or discolour the stone as black would do. Do not forget, however, to remove it when done with.

The letters that are filled in with lead cannot be done in this way, and as when newly done with white stone they photograph indistinctly, the best thing that can be done is to water the stone with a watering pot just previous to exposure. This darkens the letters a little, and be sure to rather under expose than otherwise. I may add that the chrome in dry lumps can be bought at oil and colour shops.—I am, yours, &c.,

96, *Harwood road, Fulham, S.W., September* 15, 1890. A. H. BOOL.

INSTANTANEOUS PHOTOGRAPHY.—A CORRECTION.

To the EDITOR.

SIR,—In your report of my paper on "Instantaneous Photography" in your last issue, the words "fig. 1" and "fig. 2," appearing in the wrong part of the text, render the illustrations very unintelligible.

"Fig. 1" should appear in place of "fig. 2," near the end of page 583, and "fig. 2" should be on page 584, paragraph 8, after the words, "An improved pattern that I have recently designed."

Page 584, paragraph 10, the words, "acting *on* a brake," should read "acting *as* a brake." In the second column, page 584, paragraph 2, "otherwise the shutter would be a very difficult matter," &c., should read "otherwise the shutter would be very large and heavy, and it would be a very difficult matter," &c.—I am, yours, &c., HENRY W. BENNETT.

10 *& 11, Bedford-street, Strand, London, W.C.*

EDINBURGH PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—Will you please allow me through your columns to remind intending exhibitors at this exhibition that all applications for space should be in my hands not later than the end of the current month? I shall be happy to forward the official form of application to any who may not have already received it on applying to me at 180, Dalkeith road, Edinburgh.—I am, yours, &c., T. BARCLAY, *Secretary.*

Edinburgh, September 12, 1890.

A WARNING.

To the EDITOR.

SIR,—I note in current number of JOURNAL a note of warning *re* Beach's developer, in which R. & S. S. says that "*sulphuric* had been used instead of *sulphurous* acid. Such carelessness one would hardly expect from a much advertising firm." Your correspondent cannot be aware of the fact that *sulphurous* acid gradually absorbs oxygen from the air, and becomes converted into dilute *sulphuric* acid, in fact, *sulphuric* acid is formed during the solution of the gas in the water. A solution of *sulphurous* acid gas perfectly free from *sulphuric* acid would be a chemical curiosity. I have just tested a *fresh* sample of *sulphurous* acid, and find it effervesces strongly on the addition of a carbonate. I fail to see where the carelessness comes in, and can only say, "Don't try to kod-all."—I am, yours, &c.,

September 15, 1890. WOOD'S WASHER.

PHOTO-ENGRAVERS' UNION.

To the EDITOR.

SIR,—My failure to keep up the weekly letters started in your issue of a fortnight ago was largely caused by the fact that our work in the cause of unionism has already borne fruit, and that I have been occupied in correspondence with the founder of an organization for workers in the photo-zinco trade.

A meeting will in all probability be held on Wednesday next, September 24, at which the Union will be definitely formed, temporary officers elected, &c.; but for full particulars of the place of meeting and proposed conditions of membership, intending members should write to the *pro tem.* Secretary, A. Anning, 5, Park Grove-road, West Green-road, Tottenham. I call upon all men engaged in the manufacture of photo-mechanical blocks to apply at once, and become enrolled in this workmen's trade protection society.—I am, yours, &c., ARTHUR FIELD.

Maidstone, September 17, 1890.

THE MAGIC LANTERN FOR LECTURE ILLUSTRATION.

To the EDITOR.

SIR,—In the journal of the Royal Microscopical Society for August last appears the following:—"An interesting paper by Mr. Bothamley in the *Photographic Quarterly* reminds us of the important part now played in education by the optical lantern, which in the memory of so many among us was a mere toy for the entertainment of juvenile parties. The initiation and growth of the system is mainly due to Professor Miall, of the Yorkshire College, Leeds, in which important institution almost every department has its lantern, and such widely different subjects as biology and engineering, ancient history and textile industries, are alike illustrated by this convenient means. In the biology lectures, the lantern is said to have well-nigh banished the microscope, thereby effecting a great saving both in cost and time. The production of lantern slides is found to be most easily and rapidly done by photography. Original objects, drawings, large photographs, illustrations in text-books, can all be reproduced in the same way. At the Yorkshire College the number of slides required by the various departments is so large that the whole time of a special photographic assistant is occupied with their production, although the work is much facilitated by the ingenious copying camera devised by Professor Barr and Stroud. But perhaps the most remarkable fact in connexion with this subject is Professor Miall's discovery of how the lantern may be used in illustrating lectures in a room illuminated by daylight."

Here are many points of great interest on which our friends in Leeds might enlighten us, such as details about "the ingenious copying camera," the plates used, and mode of development, also the mode of using the lantern in daylight. Any hints about these things would much interest many of your readers, as well as—Yours, &c., J. NEWTON.

Liverpool.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange oil painting (*Head of Our Saviour*) by Guido, handsomely framed, and oil painting (Snowpiece) by Morland, for No. 3 Universal lens by Ross, or rapid rectilinear, 10 × 8, and camera.—Address, J. NICHOLS, Thoroughfare, Woodbridge, Suffolk.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

BICHROMATE (Southampton).—No key to the Convention Group has been or will be issued this year.

C. DREW.—Zinc vessels are not suitable for alum solutions. The alum would quickly destroy the zinc.

LIVERPOOL.—Aniline dyes may be obtained from any of the drysalters or dealers in dyers' materials.

H. F. LONG.—The articles which have recently appeared in these pages afford admirable instructions in retouching.

CHRONOMETRIC.—Such classes as those you inquire about are held at the Polytechnic Institution, Regent-street, where you can obtain prospectuses.

C. W. BAKER.—We do not consider that it would pay to make your own nitrate of silver, seeing that your consumption of it is so limited. If it were larger the case would be different.

G. H. A.—The cause of the halation is the reflection of light from the back of the plate, and is generally most pronounced in negatives with strong contrasts, which necessitate a prolonged exposure. If the plates are backed the trouble is seldom met with.

A. Searle.—The engravings are copyright, and the owners of them, we know, will not allow photographs to be made from them. We may at once tell you that all recently published engravings are copyright. Hogarth's pictures you may copy to your heart's content.

G. C. Giles.—The only method of knowing if the pink tint on albumenised paper is permanent or not is to expose a piece to light, covering up a portion of it. A week or two's exposure to sunlight will settle the question. In most instances a day or so is sufficient.

F. B.—By employing a double condenser of eight inches diameter there will be no necessity for having the other plano-convex lens. Place the condensers, not flat sides together as in your drawing, but convex surfaces next each other. Either of the objectives may be employed.

Experimentalist.—Better get a manual on electrotyping. We cannot spare space in this column to give instructions on this subject, even when the process is required for depositing copper on gelatine. To give anything like useful information would require several pages of this Journal.

F. H. I.—Although we are no advocates of "cutting prices," there is no reason why you should not fix your charges at what you please, notwithstanding what you term "the censures and wrath of my fellow professionals." We think, however, you have considerably over-stated the prices now charged for good enlargements.

O. A. C.—If the glaze of the earthenware dishes is cracked and discoloured in the manner described, they would not be reliable for washing prints in. Evidently they have been used for silver solution, which has penetrated the glaze, and when prints lie on the bottom of the dishes this may come to the surface and cause map-like markings. We have seen several instances of this.

A. Rogers.—If the apprentice behaves in the way you state he had better be taken before a magistrate, who will deal with him; but his complaint that you are not properly teaching him the business, and for which he has paid a premium, will also be dealt with at the same time. You are bound to fully instruct him in the business quite as much as he is compelled to obey your lawful commands. In this matter he can take the initiative as well as you.

H. H. puts the following queries: "1. I want to enlarge, and have a Ross' triplet, a Dallmeyer's rapid rectilinear, and a cheap quarter-plate portrait lens; which is the best to use?—2. Should the lens point towards the picture to be enlarged or the enlargement?"—1. As our correspondent does not say the focal length of the triplet and rectilinear lenses, or the size of the negatives he wishes to enlarge from, we cannot say which is the best for the purpose. All will answer if they be capable of taking a negative the size of that to be enlarged.—2. The posterior of the lens should be next the negative in the enlarging.

W. Hicks writes as follows: "Could you let me have information regarding the Factory Act as applied to photographers? The Factory Inspector called at my place on Saturday at five p.m., and has threatened to prosecute me unless I give all the girls in my employment a half holiday. Now I should like to know if the Act only applies to those who are engaged in the sedentary part of the business, such as retouchers and spotters, and not to those at the printing, who are continually in the open air."—The Factory and Workshops Act is very stringent upon this point. No females or young persons are to be employed after two o'clock on Saturdays. If you write to the Home Office (Factories Department), Whitehall-place, you can obtain an abstract of the Act.

G. B. Bradshaw & Co. write: "We enclose you sample of mounts which, although we have tried all kinds of mountants, we cannot get the prints to stick down. As soon as they are put through the burnisher they come clean from the mount, and also when not burnished they peel off. As we have a good number of them, we should be pleased if we could use them up. The blank mount enclosed has had a print on, so you will see how clean it has come from it. Any assistance you could give us would be greatly esteemed."—The surface of the mounts appears to be highly repellent of aqueous solutions, but not so much so of alcoholic ones. We should recommend you to try a solution of a soft kind of gelatine in which a good proportion of methylated spirit is made to take the place of water. This will no doubt get you out of the difficulty.

Quandary says: "I shall be glad if you can suggest the cause of the streak on the enclosed print which was wanted for crystoleum. While it was waiting to be called for I placed it on a piece of glass and placed two pieces of glass over it so that they came together in the middle of the print; over that I placed a sheet of thick rubber, and put the whole on a board and into the copying press. I cannot imagine that all this has anything to do with the cause of the streak, and consequently I am afraid that other prints in customers' hands may go wrong."—The streak in question is a yellow mark of fading extending across the print. It is evidently caused by some sulphurous exhalation from the indiarubber, which we assume was vulcanised, reaching the print at the junction of the two pieces of glass, while the other portions were protected.

Printer writes as follows: "May I ask you if you can give me any clue as to the cause of the yellow spots in the enclosed photographs? I have for several years used the same paper and treated the prints in exactly the same way, but never until recently experienced anything of the kind. The enclosed prints are none of them more than twelve months old, and some much less. The fixing bath employed has been three ounces of hypo to one pint of water; time, fifteen minutes; the prints then being washed in four changes of water of five minutes each, and then allowed to soak all night, and in the morning mounted with fresh starch paste. I do not think the mounts can be at fault, as the same has happened with two different makers' mounts."—The spots *and fading* are easily accounted for by the washing, or, rather, the lack of it. Four changes of water and an *all-night soaking* will never render prints permanent. More *complete* washing is necessary.

Yorks.—It is very unlikely that the nitrate of silver was adulterated. If it was obtained from the source mentioned we are sure it was not. The failure must be sought for in another direction.

F. R. Fisher writes:—"A short time ago I developed a somewhat fully exposed plate and obtained a weak negative. The plate was put to one side in the dish and covered with the developer, and the gas was turned on. After about ten minutes the plate was taken out, and on examination I found that the negative had been converted into a positive. Whether this conversion could be repeated at will, or whether it was one of those freaks of eccentricity which the photographic process delights to display, I have not had time to test by further experiment. Certainly the facts were as given, and the exposure to which the plate had been subjected was not sufficient to cause reversal of the image in the usual manner. If the experiment can be performed at will, might not a convenient method of obtaining reversed negatives be made available?"—There is nothing extraordinary in the matter. It was the gas that produced the reverse action of light. The same result can be obtained at will by working under similar conditions.

Canada writes:—"Will you please inform me how to mount carbon prints. I find it very difficult. I collodionise plates after rubbing with French chalk, mount, develop as per *Autotype Guide*, but do not know how to mount on ordinary *carte-de-visite* and cabinet mounts so as to retain the glossy surface. I have tried, after stripping them off, using final support by damping them and cards, but cannot get them to stick to mounts, although I damped cards by placing in wet blotting paper, and used gelatine as mountant. Will you please assist me?"—The best method of mounting the prints on ordinary mounts, so as to retain the gloss, is to apply the transfer paper in the usual way and then to put them between blotting paper, under pressure, for an hour or two. In the meantime the mounts are put between damp blotting paper until they are quite damp and limp. Then they are attached to the back of the transfer paper with gelatine, and again put under pressure until the mountant has thoroughly set. Afterwards the whole is allowed to dry spontaneously. The prints are then stripped from the glass and trimmed.

Walter says: "We are very puzzled as to some spots (of which I enclose print as sample) which have appeared on our prints lately. All our dishes have been revarnished with shellac varnish, thoroughly cleaned; and our hypo solution has been varied both to very strong and weak as well; and we have made sure the prints have been thoroughly fixed; but these spots appear after some time in the washing water. Our washer, a zinc one, enamelled white inside, has been thoroughly cleaned, and the water is the same we have used always; but we never had any trouble with them until lately, just after the arrival of a new barrel of hypo (from a well-known house), to which cause our printers attribute it, declaring the hypo is impure. To all appearances it is very clean, and the crystals very clear; but we trust you may be able to unravel the mystery for us. The spots show up much more after mounting, and are of a greenish-yellow tint."—We scarcely imagine the hyposulphite of soda is at fault, but of this, of course, we cannot be sure. The best way, as this is suspected, will be to obtain some from another source, and see if the spots make their appearance with that. We should rather suspect floating particles of pernicious matter settling on the prints in some stage of the work, or air bells imprisoned between the prints during fixation, than the hypo. Still, that may be at fault.

Photographic Club.—Subject for discussion, Wednesday, September 24, *Photographing Interiors;* October 12, *Printing Clouds in Lantern Slides.*

Holborn Camera Club.—On Friday (to-day) Mr. Baker will tell us *How He Spent His Holidays in Derbyshire and Yorkshire*, illustrated by about sixty lantern slides.

Messrs. York & Son send us their twenty-first Annual Supplemental Catalogue of lantern slides, lecture sets, &c., which includes, among many other things, Stanley's Emin Pasha Relief Expedition, the Isle of Man and its legends, and views of Jamaica, Trinidad, and Barbadoes. This firm has now adopted a trade mark by which their productions can be recognised, and themselves protected from piracy.

We understand that the manufacturers of the Pizzighelli platinotype paper have been compelled to raise the price of their productions about one-third, owing to the scarcity and consequent high price of metallic platinum. Another kind of paper, by the same manufacturers—Dr. Hesekiel's "Thula"—which gives a silver image toned with platinum, has been placed on the market. This latter is a printing-out paper. Mr. Rudowsky is the wholesale agent.

Waterloo Plates.—Mr. Bonne (41, Eastcheap, E.C.) has introduced in his commercial handling of the Waterloo plates a feature of which no one will feel occasion to complain, viz., one uniform price for all grades of rapidity of a given size plate, this price being the exceedingly moderate one so long associated with the slow brands. We have tried them, especially the most rapid of the series, and have found that in every instance they bear out in an excellent manner all that is claimed for them.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1586. Vol. XXXVII.—SEPTEMBER 26, 1890.

THE EXPANSION OF PAPER IN PHOTO-MECHANICAL PROCESSES.

In an article a fortnight back we treated the subject of the expansion of paper when wetted. The principal object then was to point out that the distortion sometimes seen in portraits does not arise, as some suppose, from the simple expansion of the paper, but from its being afterwards stretched in the operation of mounting. Although, as we proved then, the normal expansion is so trifling as not to produce any visible alteration in a portrait, yet it may be, and often is, sufficient to give rise to much trouble in other kinds of work; for example, in chromo-lithography, where several printings in the different colours have to be made on the same paper from damp stones, while accurate register is still imperative; or again, in photo-mechanical processes, when a transfer has to be made on paper and the work has to be done to scale.

In the present article we shall indicate how, in some of the mechanical processes the expansion of the paper is prevented, and in others compensated for. It may as well be mentioned here that most papers, after being thoroughly wetted and then allowed to dry, contract to smaller dimensions than they occupied in the first instance. The greatest trouble from distension arises when a plan or map has to be reproduced to a given scale, and wet paper has to be used in some of the operations.

It has just been stated that the expansion of the paper in some processes has to be prevented. This is how it is accomplished at L'Institut Cartographique Militaire in the production of the Belgian military maps. It may first be explained that the process there employed is one of photogravure. A carbon print is developed on a copper plate, and after drying, the gelatine surface is rendered conductive of electricity, and an electrotype made from it, which forms the printing plate. It is very manifest that if the carbon tissue were wetted in the ordinary manner, both the paper and its gelatinous coating would become expanded considerably by the time it was in the right condition to squeegee down upon the metal plate. The method adopted to avoid this is very ingenious. The dry tissue is laid on the copper plate, and upon the back of this is placed some four or five sheets of dry blotting paper, and over these several sheets of wet paper. The whole is then quickly put into a powerful hydraulic press, and subjected to very heavy pressure for an hour or two. The image is afterwards developed in the usual way. The *rationale* of the method is this:—When the pressure is applied, the water from the wet paper is forced through the dry and then wets the tissue; but by the time this occurs the pressure upon it is so great that expansion is effectually prevented. Hence, when the image is developed, which is done in the ordinary manner, it is the exact size it is in the negative.

The English maps are produced by photo-zincography, in which process an image in fatty ink has to be obtained on paper, and then transferred to the zinc plate, and this has to be done with the paper in a moist condition. As it may be useful to experimentalists in photo-lithography and analogous processes where paper transfers are necessary, and the work has to be done to exact scale, we will now explain how the trouble of the distension of the paper is met at the Ordnance Survey Office, Southampton, where all our maps are produced.

The transfers are made as follows:—Paper is coated with gelatine containing bichromate of potash and dried. It is then exposed under the negative and afterwards coated with transfer ink. The image is now developed in hot water and the paper dried. It has then to be damped to transfer the image to the zinc plate, when of course it will expand again. Here is how this is compensated for. In the first instance the negative is made to a slightly smaller scale than the finished map is to be, the reduction being less than would be made up by the maximum expansion of the paper. The dry transfer is placed in a damping-book and is carefully gauged from time to time, and as soon as it has expanded to the desired proportions it is immediately laid down on the zinc plate and passed through the press. Hence the fatty image is transferred to the metal before the paper has reached the fullest distension of which it is capable. By this means the greatest possible accuracy is secured which would not always be the case if the negative were made so much smaller than the finished map that the full expansion of the paper had to be relied upon, as this is by no means uniform, even in sheets from the same batch.

WET COLLODION PLATES FOR LANTERN SLIDES.

Before proceeding to the question of development, a few words may perhaps be said on the subject of exposure. To those who have been accustomed only to the use of gelatine plates for this purpose the exposures required by collodion emulsion plates will seem inconveniently long, even when used wet and with an alkaline accelerator; but in reality, if a systematic method of working be adopted, the length of exposure will not be felt. Even supposing a single slide only has to be made, despite the shorter exposure needful with a gelatine plate, the time occupied in exposure and development would be at least as long with gelatine as with collodion; while if the calculation be extended to the completion or drying of the slide, the advantage would be very greatly in favour of the latter. But when a number of slides are to be made at one time the advantage is, from the first, decidedly on the side of collodion if the

method suggested in our last article be adopted. Thus, half a dozen or a dozen plates having been coated and placed in readiness on the washing trough, the first exposure having been made, occupying from one to five minutes or more, according to light and optical conditions, before developing that plate a second one is placed in the camera and left to expose whilst the first is being developed. The development is extremely rapid as compared with gelatine plates, and as there is very great latitude both in exposure and development it is very easy indeed to so adapt the two operations to one another that no time shall be wasted, and the only expenditure in that direction will be in the development and changing of the negatives. In the case of gelatine there is the much longer time required for development, as well as that occupied in changing, while the exposure must be timed separately; so that in actual practice the collodion method will be found to possess the advantage in rapidity, at least where daylight is employed.

As regards the time required, it is absolutely impossible to lay down any more definite rule than that of exposing sufficiently. With gelatine plates the tendency is, perhaps, in the direction of over-exposure in transparency work; but with collodion, in consequence of the great latitude it offers, over-exposure is, within reasonable bounds, scarcely possible, while the reverse is fatal. There is one other point, too, that practice will emphasise, namely, that in a varying light the difference with collodion will be infinitely greater than with gelatine. For instance, in the varying light of a late autumn or winter day, especially towards afternoon, the exposures required with gelatine may be doubled or trebled within a very few minutes; while under similar circumstances with collodion, probably ten times the difference would exist.

The difference is not so great when the alkaline accelerator is employed as when the plates are used dry or simply washed; if they be immersed in an orthochromatising solution before exposure the abnormal variation disappears entirely, and the plates become nearly as rapid as gelatine in a bad light. This is important, as much of the lantern slide work is done in the months of the year when the light is very variable, or even by artificial light, in which case, except with orthochromatised plates, the exposures become very tedious.

We are now speaking of reduction in the camera, but if contact printing is the method to be adopted, the exposures are far from prolonged, but the plates must then either be dried, or other means adopted to prevent absolute contact and consequent injury of the wet film. This is easily and quickly attained by first well draining the plate and then laying on it one of the paper masks used in mounting the finished slide; this separates the two surfaces sufficiently to prevent injury, and the loss of sharpness, even when the exposure is made in close proximity to a gas flame, is beyond detection. If any fear exist of such loss, the exposure may be made at as great a distance as possible from a burning strand of magnesium.

So far as the development of the wet and dry plates respectively is concerned there is no difference in treatment, except that the latter must be first wetted with methylated spirit and then well washed in order to soften the film and permit the developing solution to penetrate. The following remarks will therefore apply equally to any condition of plate.

We have available the usual choice of solutions, viz., alkaline, pyro, hydroquinone, eikonogen, ferrous oxalate, and, in addition, pyro and silver, or "acid" development. The last is almost entirely unknown in connexion with gelatine, and then only for the purpose of intensification, though it was the system universally employed before the introduction of the alkaline developer. It depends upon the reducing action of a solution of pyrogallol, or of ferrous sulphate in the presence of a restraining acid, upon free nitrate of silver, either added to the developer in the case of emulsion plates, or derived from the surface of the plate in the ordinary "bath" process. The image differs from that produced by the alkaline methods in that it consists of silver deposited *on* the film from the developer, while by the latter methods the silver is reduced *in* the film, and from the film itself. For our purpose the iron developer is scarcely suitable, as for some reason or other it does not work "kindly" upon emulsion films, and at the best gives an unpleasant colour, necessitating special toning.

Pyro and silver, on the other hand, restrained with acetic acid, give the most beautiful images obtained by any form of development, combining in the highest degree vigour, delicacy, and purity, while the tone ranges through various shades of brown and purple, according to taste. Unfortunately, however, the exposure required when this developer is used requires to be at least four or five times as long as will suffice with alkaline pyro, and therefore it is only when a particularly good light is available that it can be used conveniently. However, for the benefit of those who appreciate "quality" we append details. Let the following solutions be made:—

A.

Pyrogallic acid	15	grains.
Glacial acetic acid	½	ounce.
Water	20	ounces.

B.

Nitrate of silver	60	grains.
Acetic acid	1	drachm.
Water	2	ounces.

The solution A will keep good for several days, and B may be kept indefinitely. In use take, for a lantern slide, say, from ninety minims to two drachms of A, and having rinsed the plate under the tap to cause the developer to flow evenly, pour it on to the surface, returning it to the developing glass two or three times in order to mix it thoroughly with the water already on the plate. Next drop into the developing glass a single drop of B, pour in A and mix, then return once more to the plate and keep in motion until the image appears. This takes some time, but it must not be hastened, as upon its *gradual* formation depends much of its beauty and delicacy. When the picture commences to appear, it proceeds rapidly if the exposure has been sufficient; if not, there is no help but patience, and the addition of more A. It must be borne in mind that the longer the exposure the more must be used of B in order to get a vigorous deposit of silver on the shadows before the lights begin to veil; in case of under-exposure the proportion of B must be kept down for the reverse reason, namely, to allow the details in the high lights to appear before the shadows become opaque. It is also well to bear in mind that, *cæteris paribus*, the smaller the proportion of B the warmer and more delicate will be the tone and character of the image, and *vice versâ*.

It is better in all cases to apply the pyro solution alone first, in order to get equality of action; but this is especially necessary when the plates have been prepared with the alkaline accelerator, as any alkali remaining in the film will then be neutralised by the acetic acid, and all danger of its acting upon the silver in the developer prevented.

Where the characteristic qualities of this form of development are desired without the increase of exposure, a nearly equal result is obtainable by first developing a thin image by means of alkaline pyro, and subsequently bringing up the intensity by means of the acid silver method. In this case the pyro solution should preferably contain citric acid instead of acetic, say one grain of citric acid to each ounce of solution. After thoroughly washing the plate when the first development is complete—that is, when the finer details of the high lights are just visible—the pyro solution must be applied with the same precautions as already described, in order to destroy the last signs of alkali.

Of the various alkaline methods, that in which pyro is the active agent is far away the best where range of tone is desired. Hydroquinone and eikonogen are useful where only black tones, or those approaching black, are sought for, and with these the best form of alkali is perhaps carbonate of soda. In using hydroquinone we strongly recommend that the use of bromide as a restrainer be altogether eschewed, except in the case of very great over-exposure, on account of the strong tendency it has to produce harshness of result. Eikonogon is useful when it is necessary to curtail the exposure as much as possible, as it possesses great energy without any tendency to abnormal veil in the absence of bromide. In the event of a too thin image, the fault is easily remedied with pyro and silver, and, indeed, where the richness of the silver-developed image is desired in conjunction with black tones, eikonogen is the agent to employ.

But where rich browns and purples are preferred, our old friend pyro stands unsurpassed, whether employed as the single developer, or to be followed by silver intensification. For merely originating the image, to be subsequently strengthened with silver, a two-grain solution of pyro, and another containing five grains of carbonate of ammonia and one grain of bromide of potassium in each ounce, the two solutions to be mixed in equal parts for use. For completing the development, the strength of the respective solutions may be six grains of pyro and ten grains of carbonate of ammonia, the bromide being in this case better kept in separate solution, ten grains to the ounce. This combination will produce a great variety of tones depending on the relative length of exposure and rapidity of development, a comparatively long exposure and quick development giving warmth and redness of tone, while brown or black tones follow short exposures.

Beyond remarking that collodion films will not bear the same amount of alkali without fogging that gelatine will, there is nothing that specially distinguishes their treatment from that usual with gelatine, so we may here leave the subject in the hands of those who choose to try this charming process for the production of transparencies or opal pictures.

We stated a few weeks ago that experiments had been made with the Gassner dry battery, showing that it could be entirely recuperated when worn out by passing through it the current from a Bunsen battery, the Gassner cell playing the *rôle* of a storage battery. The same experimenter (Mr. G. E. Bonney), writing in the *English Mechanic*, now states that he has been testing the power of this battery for other purposes than ringing bells and working telegraph instruments. As there are few studios where one or more electric batteries for bell-ringing or signalling are not in use, it will be interesting to their owners to see what is said about putting such cells to other uses.

Mr. Bonney made a battery of four of the Gassner cells, and found that he could obtain enough current to light a two and a half candle power electric light (six-volt). He, however, would recommend nine cells (in series) for a ten-volt lamp, and he points out their advantages—freedom from smell, impossibility of spilling with them, and requiring no attention. Of course, such a lamp would not give near sufficient light to illuminate a dark room, but it might be useful in many other ways.

Handicapped as the photographer is by the insurance companies, everything that can help in lessening fire dangers is of value: hence, in connexion with electricity, we may call attention to a form of electric gas-lighter which may not be known to all our readers—Clarke's patent. A two years' experience of its usefulness in a position where it has had tenfold more use than would have been required for its normal purpose, enables us to state that it is a thoroughly effective, trustworthy little instrument. A small cylinder is held in the hand, and a narrow nickel tube about fifteen inches projects from it. "Press a button" on the cylinder once or twice, a series of wheels is heard to rotate, a number of sparks appear at the partially open end of the tube, and they will at once "light the gas" when placed above the burner with the gas turned on.

We have several times of late been asked by persons engaged in retouching whether the work was likely to injure the eyes, our queries' fears having been raised by noticing black specs in front of their eyes, great alarm having been expressed in some cases. We may at once say that there is in this particular peculiarity of vision not necessarily the slightest cause for trouble. It is common to all ages and both sexes, and is understood by surgeons to be a perfectly innocuous phenomenon, the cause simply being slight opaque particles in the humour of the eye which throw shadows on the retina, and so cause the effect described.

The greater danger to be apprehended by retouchers is the straining unknowingly of the accommodation of the eye too severely. Every photographer knows the effect of a diaphragm in a photographic lens, how it makes objects really out of focus appear sharp and distinct on the focussing screen. In retouching, the eye is provided by nature with a very small diaphragm, which enables the worker to see details of his negative when his eye is fairly close to it, though ordinary print could not be read at that distance. The brighter the light the smaller the diaphragm (or, in other words, the pupil of the eye), such is the wonderful character of this natural diaphragm, and so the retoucher may wield his pencil at a distance at which he could not see distinctly if he were working, say, on a piece of drawing paper, and thus he daily strains its power. The older a man gets the further from his eyes does he need to hold an object to see it distinctly. But if he obtain a pair of spectacles he can see plainly, although he bring the object nearer again; the stronger the glass the nearer. So with retouchers, when their eyes feel strained, if they work too close to the negative let them wear spectacles. It is, unfortunately, so often said, "Don't use spectacles, you'll get so used to them that you cannot do without them;" but the remark is absurd. If spectacles are once needed it cannot be expected that the eyes will of themselves go back to their original condition, but it is false to imagine that optical aid will cause the eyes to change more rapidly than when such aid is not made use of, and equally false is it to believe that carefully selected spectacles will injure the vision.

We have been instrumental in persuading several artist friends to take to spectacles for close work, and greatly now do they express themselves obliged to us. But it is very singular how great and unreasoning is the prejudice against the use of "glasses," which, when suitably chosen, are of the utmost value in preserving the eyes from the daily strain that is injurious. Let every one remember, and a photographer should appreciate this more than many others, that the spectacle lens is used not to magnify or diminish—that is a mere accident of their use—but to cause the rays of light from an object to alter their convergence or divergence, and so enable a correct focus to be obtained, though the lens of the eye won't quick "rack out" far enough.

IN BELGIUM WITH A CAMERA.

It may possibly surprise some of our readers who reside near the Metropolis to be informed that a visit may be made to the famous ancient cities on the other side of the North Sea at a less expenditure of time, worry, and money than to most of the more northerly cities, towns, and watering places of England, and most certainly to any part of Scotland or Ireland. One can stick to business all day in London, take a late tea or an early supper, and having found himself at the Liverpool-street Station of the Great Eastern Railway at eight o'clock, can enter the express train which starts for Harwich at that hour. Being economically disposed, he can, for twenty-four shillings, obtain a second-class return ticket, good for two months, from London to Antwerp or Rotterdam, the ticket for either destination being available for return by the other, and to whichever port he proceeds he is there by about nine o'clock next morning, refreshed and ready for the work of the day, for the passage across has been made while he was asleep in a comfortable bed, and breakfast can, if desired, be had on board while the steamer is making its way up either of the two placid rivers—the Scheldt for Antwerp, or the Maas for Rotterdam.

The morning was slightly misty as we went up the Maas, otherwise several effective pictures might have been obtained from the deck of the steamer. Getting on shore at nine o'clock, we were at once plunged *in medias res*. Rotterdam is a second Venice as regards canals, for there seems to be one for every two or three streets, and the scenes along these are admirable from the pictorial point of view. In some, numbers of boats are moored, in others large craft. Along these canals the wharves are occupied by a busy throng. Not only along the canal and river wharves, but in almost every little back street are to be found pictures on every hand. Up one street and down another we (our *compagnon de voyage* being Mr. F. A. Bridge) go, noting especially the cleanly habits of the Dutch, for in the lower class of streets especially there was scarcely a door outside of which was not to be found some one scrubbing away at the wash-tub, doorstep, or pavement. We do not phrenologically know the locality of the organ of cleanliness, but wherever situated the Dutch evidently have it developed in an abnormal degree. Be this as it may, one who is armed with a hand camera can here secure as many pictures as he chooses illustrative of Dutch maritime and domestic life and character, and this without putting himself to any trouble. Rotterdam is decidedly compact; no spaces here seem to be "wasted" by gardens, but street adjoins street as if under strong compression, canals of course intervening. The population is about 200,000. Owing to the multiplicity of the bridges, views can be taken up and down the canals and wharves with great facility by placing the camera on the side-paths of the bridges, thus not only getting good views, but getting rid of the boys, who here, as elsewhere, persist in endeavouring to stand in front of the camera.

Every visitor to Rotterdam goes to the Groote Market to see the statute of the illustrious Erasmus, who was born here in 1467, and to Boyman's Museum, where are to be seen many pictures by the Dutch masters, although Rotterdam is less fortunate than the Hague and Amsterdam in having a collection of these. In 1864 this museum was burnt down, and upwards of 300 pictures, besides drawings and engravings, were destroyed. But there are still over 350 paintings to be seen. Numerous towns, whose names are familiar, are situated at no great distance from Rotterdam, and may easily be visited. Thus Schiedam, with its 220 distilleries, three miles; Delft, celebrated for its potteries, nine and a half miles; the Hague, so long the political capital and the favourite residence of the Dutch princes, with 144,000 inhabitants, and said to possess the broadest streets, finest houses, most imposing squares, and most valuable works of art in Holland, is but fourteen miles distant; while Leyden, Utrecht, Haarlem, and Amsterdam, are all also within two hours' travelling. A photographic tourist in that quarter might devote many days to the pursuit of his art, work actively, and yet feel that he had left much work behind him.

After spending the greater portion of the day of arrival in Rotterdam, we proceeded by train to Antwerp. This city is by far the most important seaport on the east of the North Sea, for it serves as an outlet for the commerce of Germany as well as that of Belgium. Its population is estimated at 240,000, and is still rapidly increasing. It covers seven square miles within the ramparts, which have been recently greatly extended, allowing the town to expand to six times its former size.

It is very difficult to indicate in what direction a photographer should make his assault on this city. There is so much shipping that a day spent along the wharves and quays on the Scheldt—where are to be found representatives of everything that floats, from the finest ocean steam liners downwards—is quickly passed among them ere one is aware of it, while the large and quaint old squares surrounded by lofty and ornate buildings would demand several days to do them justice, lenses including wide-angles being absolutely necessary for this class of work. Then, again, the busy scenes enacted in these squares, most of which are markets up to a certain hour of the day, when the people from the country crowd them with their produce, conveyed, in numerous instances, in carts drawn by large dogs, afford ample employment for hand cameras and snap shots.

The Cathedral of Nôtre Dame is of course the architectural *pièce de resistance* of Antwerp, and the Antwerpians can be quite excused for indulging in rhapsodies over it. Its tower is 402 feet high (we borrow these and other figures from Bædeker's Guide-book). It has a chime of ninety-nine bells, ranging from the smallest of fifteen inches in circumference to the largest weighing eight tons; and we can speak from personal experience of the wonderful effect produced when one wakes up dreamily at five o'clock in the morning and hears the air full of the soft melody of their chimes—the carillon acting independent of human hands. On one side of the Cathedral is the "Place Verte," a large square adorned with a statue of Rubens, for we need scarcely inform photographers, who are supposed to be conversant with art, that Peter Paul Rubens flourished in Antwerp, and that his great works, *The Descent from the Cross*, *The Elevation of the Cross*, *The Assumption*, and other masterpieces, are to be seen in the Cathedral. The Antwerpians are pardonably proud of Rubens, even to the extent of having his head carved upon their meerschaum pipes; proud also are they of Anthony Van Dyck, who was born there. But the Netherlands, with all that surrounding country, has produced painters of whom the world is proud, such as Teniers, Rembrandt, Cuyp, Jan Steen, *et multis aliis*. To return to the churches in Antwerp: there are several there which internally are, in themselves and their decorations, pictorial and statuesque masterpieces of art. They are all amenable to the camera after service has concluded, a small fee securing the concession.

Photography in Antwerp occupies a high position. One may, however, traverse its streets and inspect its shop windows without seeing anything that suggests the existence of what the Americans term a stock house, and may arrive at the conclusion that there is no photographic store in the place, and this even when passing the shop of Louis Van Neck, who, amid the multiplicity of the drugs and drug paraphernalia displayed in his goodly window in 10, Rue Klapdorp, shows but little that is photographic; but let him ascend the stairs inside and proceed as we did to the upper rooms, and he will be perfectly astounded at the immensity and great variety of his stock. We saw cameras—studio, field, and detective—of the most ingenious construction; lenses of every make, and in greater variety than we had ever previously seen in one place; while as for instantaneous shutters, there was not one even of the most modern device—whether English, Belgian, French, German, or American—which was not there to be found. This great variety also applied to stands, dry plates, mounts, paper, dishes, chemicals. Remarking to Mr. Van Neck upon the very heavy stock he carried, he observed that the stock in his establishment in Brussels was still greater. Brussels being no great distance from Antwerp (twenty-seven miles), Van Neck devotes certain alternate days in the week to each, and thus keeps himself in touch with the amateurs and professionals of both cities. At the time of our visit he had thirty hands employed in his factory in the suburbs of Antwerp, mainly in the construction of a hand camera of great ingenuity he has recently introduced; while on his premises in Rue Klapdorp he had a workshop devoted exclusively to the repairing of damaged apparatus—a feature that might well be more extensively imitated in this country than it seems to be. The hand camera to which we have alluded is one of great elegance and efficiency; its finder is the same size as the plate, subject to slight

reduction of the margin, and the image is made upon it by the same lens by which the picture is taken, hence the perfect coincidence of both. The eye is kept upon the finder, and focussing effected up to the last moment, when upon touching the trigger the mirror of the finder flies aside for an instant, permitting the plate to become impressed. Messrs. Watson & Sons also are making Van Neck's cameras, under license, in this country. As *souvenirs* of our visit we received from Mr Van Neck several instantaneous views which he had taken. Some of these are of whole-plate dimensions, and one of them—a religious procession through the streets of Antwerp—is a wonderfully excellent piece of work, for the figures are of large size, and are so sharp as to depict the emotions on the faces of the numerous priests present, and the detail of the lace on their vestments.

The catalogue of lenses, shutters, plates, cameras, and apparatus issued by Van Neck is very large, and, unlike those in this country, contains a number of photographs, instantaneous and otherwise, illustrative of their capacity. Of these we counted twelve full-page collotypes. This catalogue, which also contains many woodcuts of apparatus, is sold at two francs. We tender our thanks to Mr. Van Neck for many courtesies received during our visit, including introductions to several leading amateurs of Antwerp.

Talking of photographic amateurs, they are numerous in Antwerp, and if we are to judge by those whose acquaintance we made, they are of a high class as regards intelligence. M. Victor Selb, with whose name we had long been familiar, showed us several charming stereoscopic views, both transparencies and paper prints, which he had recently taken. In trimming his stereoscopic pictures M. Selb prefers to leave more subject in each than is necessary to the formation of a pair that will coalesce in every part in the stereoscope, but he effects unification by mats placed in the stereoscope itself, by which the superfluous portions at the ends are prevented from reaching the eye. He considered that photographers make a mistake in not employing, more frequently than they did, lenses of long focus for instantaneous views. He himself often used a lens of eighteen inches focus for this purpose, and in proof of the good effect obtained he gave us a view of boats and shipping on the river in which everything is depicted on a large scale, exceedingly sharp and full of detail, and in that harmony of drawing which results from the camera being placed at a considerable distance from the nearest object in the foreground. M. Selb had snapped his shutter when a steamer in the middle distance advancing from the side had projected itself half way across the plate, which is about whole-plate size, and such is the sharpness that every bit of cordage and the faces of those on deck are distinctly seen by aid of a magnifying glass.

In the large photo-collotype establishment of M. Jos. Maes (who is President of the Antwerp Section of the Belgian Society) we saw an immense collection of those art reproductions for which some parts of the Continent are so famed. In the press room are three large steam-power presses of elaborate construction. Photographing in a variety of branches is here carried on, but, so far as we saw, photo-collotype in half tone seemed to have the predominance. Through the courtesy of M. Maes we are in possession of *souvenirs* of his work, of dimensions suitable for being framed. Among these are the *Hotel de Ville d'Anvers*, or Antwerp Town Hall; the *Statue of Peter Paul Rubens*, and the *Tower of the Cathedral*. Concerning the last, Charles V. used to say that this elegant specimen of gothic architecture ought to be preserved in a case, and Napoleon is said to have compared it to a piece of Mechlin lace (Baedeker). We have, in an humble way, tried to give effect to the suggestion of Charles V., and have placed our copy of it in a glazed frame.

A detailed description of one singularly ingenious camera we saw at Van Neck's is being prepared for the forthcoming ALMANAC.

Although of late special provision has been made with reference to photographic plates, most people have felt some little anxiety about getting their exposed plates safely through the Customs House, from the fear that they might yet fall into the hands of some over-officious underling. But owing to recent instructions the Custom-house troubles in this country to the traveller who arrives from abroad have been reduced to a minimum, and no attention is now paid to a few cigars, more or less, or a litre bottle of something stronger than water.

ON THE REVERSAL OF THE NEGATIVE PHOTOGRAPHIC IMAGE BY THIO-CARBAMIDES.*

THESE compounds of thio-sinamine with the haloid salts of silver seem very curious, and might be worth investigation by a more experienced chemist.

Thio-carbamide, or *Sulph-urea*, $CS\langle^{NH_2}_{NH_2}$, which may be prepared by heating well-dried sulpho-cyanate of ammonium in a flask in an oil bath for two hours at a temperature of 170°C. (338° Fahr.), forms long, silky needles which are very soluble in water. Its reactions with the silver haloids are peculiar, and somewhat resemble those of thio-sinamine.

With silver bromide it sets into a pasty mass, and does not discolour it. Carbonate of soda added liberates ammonia, darkens the bromide, and, from the smell, some sulphide of ammonium seems to be formed. Muriatic acid precipitates chloride with the nitric acid solution. Eikonogen developer blackens the bromide darkened with soda. The black precipitate is only partially soluble in nitric acid, and the clear solution gives chloride with muriatic acid.

With silver chloride it also forms a pasty mass, and there is the same evolution of ammonia and darkening with soda; a metallic deposit of a yellow colour is sometimes deposited on the glass vessel. Weak nitric acid has little action, but strong acid causes brisk effervescence and evolution of nitrous fumes, but does not readily dissolve the precipitate on the glass, nor entirely restore the white colour of the chloride. Muriatic acid added to the nitric acid solution precipitates chloride. Eikonogen developer blackens the darkened deposit at once. Nitric acid causes great effervescence with nitrous fumes, and partially restores white chloride; the solution precipitates chloride with muriatic acid.

With silver iodide, thio-carbamide also sets in a pasty mass, which does not darken alone. Carbonate of soda gives off ammonia, but does not darken the iodide so strongly as the bromide and chloride, nor is any mirror formed on the glass. Nitric acid removes the darkened coat, but muriatic acid produces very little chloride with the acid solution.

Eikonogen does not blacken or darken the alkaline precipitate much. Nitric acid clears the iodide, but the solution gives but little chloride with muriatic acid. This would seem to show that the iodide is not strongly reduced, even by treatment with eikonogen.

Applied in a *strong* solution to a gelatino-bromide film, I have found it darkens the haloid salt of silver in the dark even without alkali, though this does not agree with its behaviour on the precipitated bromide. When added in very small quantities to the eikonogen developer it also causes reversal of the image, but in larger quantities it stops reversal. Its action generally seems much more irregular than that of the other thio-carbamides, and I have not yet been able to fully investigate it. It seems difficult to prepare the salt entirely free from the ordinary sulphocyanate of ammonia, and to this some of the irregular action may be due. With the hydroquinone developer given above it produces reversal on Wratten's "Ordinary" plates, and appears to be a very powerful accelerator both with this developer and with eikonogen.

I have also made a cursory examination of the effects of the simple *Carbamide*, or *Urea*, which differs from thio-carbamide in containing oxygen in place of sulphur, its formula being $CO\langle^{NH_2}_{NH_2}$.

A ten per cent. solution of urea produces no visible effect on silver bromide in the dark. Carbonate of soda added gives off no ammonia, but rather a smell of caustic alkali, and did not darken the bromide. Nitric acid dissolves no silver in the dark. With eikonogen the alkaline bromide was reduced at once to a dark grey. Nitric acid cleared off darkened product, and the solution gave an abundant precipitate of chloride with muriatic acid. With silver chloride treated in the same way, carbonate of soda gives off no ammonia, but the same alkaline smell, and causes no darkening of the chloride. With eikonogen the alkaline chloride turned grey at once, nitric acid cleared, and muriatic acid gave a plentiful precipitate of chloride.

With the iodide very little visible change was effected by the soda solution or by eikonogen, though the latter turned it of a greenish yellow.

Applied to an ordinary gelatine dry plate, a ten per cent. solution did not *visibly* darken the film either by itself or with carbonate of soda.†

Urea used with the eikonogen developer shows no tendency to cause reversal, whether used in the same small proportions as the thio-

* Concluded from page 602.

† The experiments on the darkening and reducing action of all these thio-carbamides and urea on the silver haloids have given somewhat variable results, and require further investigation. There can, however, be no doubt of a *reducing* action taking place without the aid of light.

carbamides or in larger ones. I have not yet tried it with other developers. As remarked before, this would seem to indicate that sulphur exerts a very important influence in causing the reversal. It may be noted, however, that sulphocyanate of ammonium added to the eikonogen developer, though it produces a curious silvery metallic surface on the plate, shows no tendency to reversal; nor does hydrosulphate of ammonia, nor hyposulphite of soda. Mustard oil is itself somewhat soluble in water, and phenyl mustard oil (phenyl-thiocarbamide) slightly so when boiled. Mustard oil, with or without sulphite, seemed to act as a strong restrainer, the images being clear and weak, with no sign whatever of reversal. The phenyl-thiocarbamide gave a good dense image with no abnormal effect whatever.

Alloxan, which is produced by the action of strong nitric acid on uric acid, proved a strong restrainer, and gave no sign of reversal when added to the eikonogen developer; indeed, its action seemed beneficial, as also did that of bichromate of potash, which equally showed no tendency to produce reversal.

I have not yet had an opportunity of investigating the action of the spectrum with reference to the reversal of the image with these thio-carbamides, but from a trial made with a small direct-vision spectrograph on Wratten's plates developed with eikonogen containing thio-sinamine, it was found that reversal took place only in the ultra violet from the H lines onwards; the blue and other rays towards the less refrangible end remained unreversed. With orthochromatic plates the same result was obtained. The addition of bromide to the developer was a great advantage in promoting the reversal and obtaining clear definition. Further trials with the diffraction spectrum appear to show that the reversal is almost entirely a matter of exposure, and may be obtained in any part of the spectrum.

The peculiar feature in these reversals with the thio-carbamides is that the camera exposures are perfectly normal. Over-exposure prevents reversal, and the best results are obtained by somewhat under-exposing. Views with bright sky and dark foregrounds, or other subjects with strong contrasts of light and shade, are most difficult to obtain fully reversed. In copying, it is not so difficult to obtain perfect reversal, though the lights leave much to be desired in clearness. I have tried various clearing agents, but so far without success, though further trial will probably give better results. The addition of bromide to the developer aids in keeping the lights clear, but in excess it attacks the lighter half tones.

With the phenyl and allyl-thio-carbamides, in some cases, the image first of all developes quite normally and then gradually changes, the shadows becoming dark and the lights paler, so as to show a positive image before fixing. In others, especially if a large proportion of the thio-carbamide is used, the image comes up foggy all over, and the reversal only appears on fixing. The reversing effect is most noticeable on the unexposed edges of the plate protected by the rabbet of the carrier, and these generally develop into a strong dark border round the plate. Some of the images obtained have a beautiful rich effect, though not always perfect in the reversal nor clear in the lights.

On the whole, the best results have been obtained with the allyl-thio-carbamide, or thio-sinamine, and it seems likely that it will work well with hydroquinone, at any rate for copying. The images obtained with it are dense and full of detail, and quite different to the weak, grey, reversed images produced by solarisation or over-exposure. Phenyl-thio-carbamide with bromide and ammonia also works well with eikonogen, and gives fair clearness and density in copying.

As regards the theory of the action of these thio-carbamides in producing this remarkable reversal of the images, I have been so fully occupied with endeavouring to obtain some facts from which a theory might be deduced, and also to work out a practical process, that I have not yet been able to give much attention to the question of how the results are obtained. In any case, it will be difficult to offer a valid opinion in the present state of our knowledge of the curious phenomena connected with reversal and solarisation, and without knowing more of the delicate and complicated chemical reactions involved. The difficulty is increased by the fact that, at least so far as I can ascertain from the text-books, there is no record of a substance which added to the developer will produce reversal with certainty. Eder notes that an excess of hyposulphite of soda in the ferrous oxalate developer will sometimes cause it.

The only parallel case of reversal I have been able to find is that recorded by Carey Lea as caused by the action of hypophosphite of soda on silver bromide films. I have, however, tried the hypophosphite in various ways on ordinary dry plates by treating them with solutions of different strengths, and then developing either wet or dry, or by adding the salt in various proportions to the developer; but neither with the eikonogen nor ferrous oxalate developers have I been able to obtain any sign of a tendency to reversal, and the same applies to solutions of glucose alone, or with ammonia, and of manna with soda. All these substances, applied to the film in various proportions, showed, especially the last, a marked increase of reduction and density on development, but no sign of reversal. The effect was quite different to that of the thio-carbamides, and the action of the latter in darkening and reducing the haloid salts of silver without the aid of light is immensely stronger.

I have not yet been able to enter into the question, but it seems not impossible that this darkening and reducing action of the thio-carbamides may have some bearing on the production of Carey Lea's photo-salts, though if any such salts are produced, they would probably contain sulphur.

Reversal of the image is, as a rule, quite abnormal, and usually occurs from over-exposure or some irregular action of light during development. With dry collodion bromide plates it may be favoured by the presence of certain forms of organic matter, such as some of the aniline dyes, and in the case of gelatine dry plates it may occur by long keeping of the plates before development. Some years ago Captain Abney fully investigated the phenomena, and they have more recently been discussed at length by Professor Meldola in his excellent treatise on the *Chemistry of Photography*. Captain Abney attributes reversal to oxidation of the subsalt of silver formed by the action of the first impact of light on the exposed salt of silver, the rays of lower refrangibility being powerful accelerators of this oxidation; also to the presence of alkaline haloids or of mineral acids. The presence of a soluble nitrite or sulphite or other reducing agents is also said by Captain Abney to be inimical, while the presence of oxidising agents is favourable.

In the present instance, seeing that an ordinary gelatine dry plate, which with a normal exposure and developer will develop a negative, will, with the same exposure, and merely by the addition of a little thio-carbamide to the developer, develop a positive, it is obvious that the reversal is not caused by any abnormal action of light nor by the action of any special rays of the spectrum, and must be purely due to chemical causes. Over-exposure, as we have already seen, is unfavourable to the reversal, and although the ultra violet rays appear most active in producing it, it may be obtained in any part of the spectrum.

Against the theory of oxidation there is also the fact that the thio-carbamides, which undoubtedly are the active agents in producing these reversals, contain no oxygen, and, on the contrary, appear to be powerful sensitisers and reducers. Then, again, the presence of sulphite in the developer does not stop reversal and even seems to favour it. Pyrogallol with sulphite has produced reversal with thio-sinamine, when with nitric acid and bromide it did not.

Although the action of the thio-carbamides in producing this reversal thus appears to be in direct opposition to the generally accepted theory as stated above, I think it will be possible to reconcile the facts with the theory, and that these reversals follow the ordinary rules.

With normal exposure and development a gelatino-bromide dry plate gives a negative image; but if the exposure be prolonged, or if the film has become oxidised from any cause, there is more or less tendency to reversal, and the original action of light which would produce a normal negative image is undone, and a positive image is produced. In the present instance we have in the developer a substance which is capable of liberating halegen without the action of light, and, apparently, of oxidising and hardening the gelatine film. Thus the film, although it may only have received a normal exposure to light, is really in the same state under the developer as if the exposure to light were being continued and halogen being liberated all over it, as in the case of over-exposure. The halogen thus set free would appear to attack the parts reduced by the normal action of the developer, while the developer and the alkaline thio-carbamide complete the reduction of the unexposed parts and thus bring about the reversal. During the process the thio-carbamide probably becomes oxidised, and loses sulphur which would combine with the silver, and from the appearance of the images very probably does so. From the experiments described above it would appear that, with thio-sinamine at any rate, a soluble sulphide is formed by the addition of the alkali. In the case of thio-carbamide, or sulph-urea, ammonia is also evolved by the alkali, and this may be the cause of the irregularity of the results obtained with it. The fact of the reversals being most readily obtained with eikonogen would seem to show that it also exerts some chemical influence on the result. Some of the plates produced show a peculiar blue tint, very suggestive of *Prussian blue*, but how any such compound of *iron* could form it is difficult to see.

The theory I have given above can, however, only be considered a provisional conjecture which requires further investigation before it can be confirmed.

The results obtained seem to warrant the hope that it may be possible to perfect the process for practical use, but a great deal of work has yet to be done before the conditions of successful working can be fully ascertained. As in all these processes of reversal, the balance between reversal and non-reversal is a very delicate one. In any case, an entirely new method of producing reversed images with so many novel features must be of interest, and, it is to be hoped, may throw some light upon the still unsolved problems connected with the formation and reversal of the developed photographic image.

Since the above was written, it has been found that for copying line subjects it is an improvement to use the eikonogen and phenyl-thiocarbamide developer, and before developing to give the plates a preliminary bath of dilute nitric acid at five per cent., or of bichromate of potash solution at about three or four per cent., the solutions being flowed over the plate in a tray and washed off quickly. By this means greater density is obtained in the lines, together with clearer whites. The reversal takes place slowly, but is more complete, and the change is quite visible the lines turning black on a light ground. Greater clearness of the ground may also be obtained by treating the plate before fixing with a solution of bromide of copper at two or three per cent., but care must be taken not to weaken the lines too much.

In working with thio-sinamine good reversals have been obtained of half-tone subjects by adding about ten drops of bichromate of potash solution at ten per cent. to the ounce of eikonogen developer.

For copying work the process seems quite practical, as proved by heliogravure plates produced directly from the reversed positives taken in the camera, by which one operation (either the taking of a negative or of an intermediate positive) is saved.

COLONEL J. WATERHOUSE, B.S.C.

STEREOSCOPIC WORK FOR AMATEURS.

I.

When the question put to me, What, in my opinion, was the most fascinating branch of photography? I would have no hesitation in replying, stereoscopic work, most certainly; and were I asked to give a reason for such, I would reply, not only is such formed by myself from the amount of pleasure I receive in viewing a miniature picture in as nearly as possible the exact way the same appeared in nature to the eye, colour excepted, but when I see the unbounded delight and surprise expressed by my friends when they come to view a new subject for the first time through a stereoscope I am satisfied there is no other branch of photography in any way approaching it for fascination, and I can safely assert that the stereoscope and select stock of transparencies on my drawing-room table afford more real interest and pleasure to my friends than all my albums and portfolios put together.

Why so few amateurs practise this class of photography has always been a conundrum to me. I do not know what other districts can boast of in this respect, but I am satisfied that here, in the west of Scotland, the fingers on one's hand would suffice to enumerate those who go in for this delightful branch of photography. Doubtless, lantern-slide making has become most popular with amateurs, but there are always those to be found who are longing for pastures new in photography. To such I say, why not try stereoscopic work? There is no difficulty about the undertaking, and any one possessed of a good old sensible half-plate or whole-plate camera of a square bellows form, and which will admit of a dividing partition being inserted inside (and nearly every decent half or whole-plate camera should have such), need go to very little expense in the matter of rigging up a stereoscopic outfit. Of course, the new-fashioned tapering bellows cameras are quite useless for this work when a pair of lenses are to be used, and this is just a case in point wherein the present-day utility is sacrificed for portability; and those buying a photographic outfit should bear in mind that the latest new-fangled notions in the way of portability in apparatus mean very probably the sacrificing of some other important essential in the apparatus. I always use a good square bellows camera, and can give good reasons for my doing so.

I have said that any one having a good square half or whole-plate camera [illegible] taking stereoscopic negatives. This, at the outset, brings us to the question, what is the most suitable size for stereoscopic work? I am well aware that this is a debatable point, but I am writing a practical article more than a theoretical one, and in the remarks which I am about to offer on this subject, I hope to show that any amateur who is possessed of an ordinary camera of half or whole-plate size need have no trouble in accomplishing the work. At the outset, therefore, I have no hesitation in recommending a beginner to adopt half-plates, at least to commence with. In olden times, of course, this was not the stereoscopic size, and I am aware that very many of the old form of stereoscopes are too small to admit of half-plate stereoscopic transparencies being viewed in them, but this objection does not apply to the present form of stereoscope, and which has justly become so popular. I refer to the hood and bar stereoscope, and which, by the way, is not an expensive instrument, for it can be acquired from any respectable optician for a matter of six shillings or so. This form of stereoscope permits of any size picture up to half-plate being viewed with its aid, and I shall be surprised if before long it does not go a long way towards making stereoscopic work more generally popular with the large army of amateurs than it has hitherto been. In this respect it is immensely superior to the old form of box stereoscope, which limited the pictures to smaller dimensions. Sometimes I imagine that this question of size of stereoscopic picture has something to do with deterring many from practising this class of work. They get the idea into their heads that a special size of camera and plate is necessary, such as $7\frac{1}{2} \times 5$ or 8×5, or some other similar odd size, and that were they to go in for stereoscopic work it would mean something considerable in the way of expense, and a complete revolution in printing frame, dishes, &c. This need not be, however, for, as I have stated, and hope to show, in the remarks which I am about to offer on this subject, all that is necessary is a good half or whole-plate camera. Of course, if the latter be used, then the slide must be furnished with half-plate carriers, but this is a small and unimportant matter, and need not be thought an obstacle. Later on I may have to offer a few remarks regarding the adoption of a size somewhat smaller than half-plate, but at this stage I shall endeavour to lead a novice on step by step, and show him how easily it is to turn out perfect stereoscopic negatives with an ordinary half-plate camera.

Having therefore taken the first step and decided to adopt half-plates as the most suitable size to begin with, the next consideration will be, what are the most suitable lenses to employ? And there need be no difficulty in settling this matter either. If cost is a consideration, a couple of good single lenses of, say, five-inch focal length would not be a very costly investment, or a couple of good quarter-plate rectilinear of five and a half or six-inch focus are not expensive. The latter are handy for distant views, such as glens and landscapes. The cost of a pair of good French quarter-plate lenses ought not to be over a couple of pounds or so; and as a rule they are easily obtained in pairs of the same focal length. A very slight difference in this respect need not lead to their being discarded, for any little dissimilarity can generally be rectified by placing a small piece of cardboard under one of the flanges. A little examination of the images on the ground glass, and a corresponding adjustment of the lenses in their flanges, will generally suffice to make them coincide. This is just what I have done in the case of a pair of six-inch lenses which I use for landscape work. Once adjusted they work nicely together. Having settled upon the lenses to adopt, let a beginner see that the sliding front of the camera is so cut as to permit of the lenses being exactly in the same horizontal plane; this is an important point and ought not to be overlooked. The next question is, what is the proper distance at which the lenses should be mounted apart? For general landscape work a separation of three and one-eighth inches from centre to centre of lenses will be found to yield excellent results, and work quite sweetly into the after manipulation which I am about to describe. Of course, for nearer objects than landscape work, such as indoor working or other similar subjects, three and one-eighth inches apart would be too great a distance to separate the lenses, such would be apt to yield exaggeration in the results; and when near objects have to be photographed a lesser distance should be adopted, say two and five-eighth inches; but this can easily be arranged for by having an extra front to the camera—one for indoor working, and one for outdoor.

In my practice I have my lenses for outdoor work mounted on three and one-eighth-inch centres; and here just let me remark that a beginner would do well to give some little consideration to the theory of binocular vision. This will enable him to understand the reason for mounting the lenses at different distances apart for different subjects. A little grinding up of this subject will help also to enable him to understand much that is interesting regarding the stereoscope. Should it be desired to go in for instantaneous or detective camera work, then a good shutter is a necessity; but to commence with, let a beginner by all means confine his attention to fixed views, and when once he has mastered such and become proficient in this class of work, it will be time enough to fly at higher game. I am

satisfied once a beginner has tasted the pleasures of turning out a perfect stereoscopic transparency of an outdoor subject, such as a lovely winding path with overhanging boughs, I guarantee he will be no longer a silent worker, but will soon be heard loud in his praises of stereoscopic work, and once this stage is reached it is just about ten to one a desire will be felt to fly for higher game, such as instantaneous work; then a good shutter is necessary. But to start with there need be no bother about this or that complicated shutter or other contrivance for giving equal exposures to each lens; nay, not so much as even a pair of caps for the lenses are absolutely necessary in my practice. In landscape work I never use caps; I always expose with a pad, and more often than anything this is formed out of my focussing cloth. When instantaneous work is to be done a good shutter is a necessity, and I know of no better form than the Kershaw. Later on I will describe my stereoscopic detective outfit, made by Mr. Robb, a gentleman amateur of the West of Scotland, and who was, perhaps, one of the earliest to practise stereoscopic work. Mr. Robb, after many years' hard practice, has adopted half-plates as the most suitable size, and possesses perhaps the finest collection of stereoscopic negatives in the kingdom.

From what I have written it will be gathered that all that is absolutely necessary to equip any one possessed of a half-plate camera for stereoscopic work is a pair of good quarter-plate lenses and a dividing partition for the camera. Armed with such for outdoor subjects, he has all that is required to enable him to proceed to the making of a selection of negatives that will be a joy to himself and a never-failing source of delight to his friends.

In my next I hope to refer to some points necessary to be observed when working outside, and also treat of the development of negatives and transparencies on ordinary bromide and lantern dry plates.

T. N. Armstrong.

WHO OWNS THE NEGATIVE?

However poor a man may be, it is generally conceded that he owns his face. The State may have possession of it, as it does when he is a prisoner. His signature to a document, in some States, may give the holder the possession of his entire person for a period. But when a man does not own his own face he is poor indeed.

We must all admire the spirit of the apprentice who was constantly stopping his work to blow his nose. The master watched and reproved him every hour. The boy quietly submitted to the reprimand until the "Fourth of July" came. The hard-hearted boss made him continue at the bench on that glorious anniversary, and soon caught him blowing his nose. The spirit of independence arose in his bosom as he said, "*It's my own nose*, and it's Independence Day. *I* will *blow it*, by THUNDER!!" He felt that he owned his nose for that day at least, even if his body and soul belonged to the boss for the time of his apprenticeship.

The above is only a *preface* on what I purpose saying. You go to a printer and bargain that he shall furnish you with one thousand circulars for an amount agreed upon, he does not give you the type from which they are printed; they can be used for other work. Again, you wish some visiting cards; the engraver is to engrave your name on a plate and furnish the desired number of cards. The plate is yours, it was understood as part of the bargain. It is of no use to him.

You go to a photographer and bargain with him for one dozen pictures of yourself; he is to furnish the apparatus, material, and do the manipulating required to produce them; there is no agreement as to who shall own the plant with which he produces them. The photographer has no right to use that negative except in the way agreed upon. *He is to make* for you *the pictures ordered*, nothing more, nothing less. It is a breach of the contract, and he goes beyond the agreement if he furnishes *one print* for any purpose without the authority of the other party to the bargain. It is not in accord with the contract; he was to make *you* a certain number of pictures, and it does not allow him to make your pictures for the use of another. He may hold, and in a certain sense own, the negative, yet he has no right to use it for any other purpose than the one agreed upon, viz., to make a certain number of pictures for *yourself*. This, I believe, is the strictly honest and honourable position to take.

With public men, actors, actresses, and others, the agreement is entirely different. They sit with the understanding that you are to sell their pictures to all purchasers.

Instances occur in which judgment must be used. A trusted *employé* runs away with a large amount of money; the parties robbed rush to you for several hundred pictures from his negative for detective use in catching him. You are furthering the cause of justice in furnishing them, but it is the safe way to make the parties ordering them furnish the letterpress on [illegible] and become responsible for *such* use of his picture.

On several occasions the police commissioners sent to me for the picture of some individual (who had turned out a scamp) to place in the Rogues' Gallery. I would always say, "I have no right to furnish his picture for such purpose, but believing the ends of justice require it, I will do so, if you will take the responsibility attached to such use of it." They saw the justice of my request, and always gave me a paper with their signatures, assuming all responsibility for such use of it.

A young lady whose mind was a little *weak*, without the knowledge or consent of the family, went to a clergyman with the waiter or hall boy and was married to him. As soon as it was known, the sensation papers came to me for her picture with which to embellish and sell their papers. I positively refused to furnish them for any such purpose, and carefully locked the negative in my safe to prevent any tampering or bribery with the printers. She belonged to a highly respectable family, and I think I saved them from great mortification in not allowing her picture to get into the hands of these ghouls of the press, to whom neither home nor womanhood is sacred, and who are always ready to expose family troubles to the public gaze.

The graduates of one of our colleges were having class pictures made. A handsome young lady had registered her name just as several of them came for sittings. They saw her name on the register-book. In a week or ten days I received a letter ordering "one dozen of Miss —— pictures to be sent to —— College, with bill." Mistrusting the order was a trick to get the lady's pictures, I replied that the order could not be filled without her consent. Another letter came saying "they were honourable" (?) "gentlemen," and expressing surprise that I should mistrust them of anything dishonourable. The lady was perfectly "willing," &c. &c. I replied that as the lady lived in New York she could easily call, or at least send an order bearing her signature. I should not fill the order unless she did. It is hardly necessary to add, *it never came*.

As I have said elsewhere, there are few professions requiring more judgment and care than is needed in the management of a large photographic establishment. The diversity of opinions and tastes, the *will* and *won't* of ignorance, and the persistent attempt to procure the pictures of people for improper use, all tend to keep the proprietor constantly on the watch if he would protect innocent parties and save himself from trouble.

The negative is *not yours to use as you have a mind*. I am glad the law so decides.

It will be interesting to see and hear the opinions of others on this subject. We may have a lively discussion if the different views are given. Send them along, gentlemen, as it is not to be supposed that everybody will agree in opinion with

A. Bogardus.

—*St. Louis and Canadian Photographer*.

TESTING THE NEW ZEISS OBJECTIVES.

C.—Anastigmate, No. 133:—

Focus	260 mm.
Aperture of largest diaphragm	23 ,,
Effective aperture	22·2 ,,

The effective aperture is smaller than the largest diaphragm in the case of this objective also. It is an unsymmetrical doublet consisting of two cemented lenses. The tests gave the following results:—

Number of diaphragm in decimal system.	Circle of accurate focus.	Effective angle.	Field covered.	Alteration of focussing screen for each diaphragm as compared with full aperture.	Depth to which accurate definition reaches in metres from the objective.
No.	cm.		cm.		m.
13·7	30	60°	18 ×24	—	8
16	32	63°	20 ×25	—	5
32	34	66½°	21 ×26·5	—	4
64	36	69½°	22·5×28	—	3½
256	48	85½°	30 ×37·5	—	2
512	55	93°	34·5×43	—	1½

As may be seen, the focussing was done with this objective with full aperture, after which the diaphragm was inserted. The field is an extraordinarily large one, amounting to 60°, even with the largest diaphragm. The objective is consequently a "large aperture wide-angle," in the fullest sense of the word, and there can scarcely be any other objective which can give such an angle with the same rapidity. Consequently, this new construction may be said to be at the "top of the tree" whenever it is

unnecessary to attain the highest degree of rapidity, since, with diaphragm number sixteen in the above scale, very good instantaneous impressions may be obtained with angles of 60° and 63°, and with smaller diaphragms up to 90° and over. The depth of definition is also remarkable. With a 18 × 24 cm. plate used for an exposure at a quarter-past six in the evening, at a distance of 4½ metres, and with a drop shutter, both the grass at a distance of 3 m., and a building at 100, appear equally sharply defined. Not the slightest evidence of distortion could be detected by any means I had at command.

On testing for enlargement, plates 13 × 18 and 23 × 28 were enlarged to 52 × 72 and 82 × 100 respectively, perfect definition being obtained. The result was :—

Relative time of exposure—i.e., Diaphragm number.	Circle of accurate definition.	Effective angle.	Image.
No.	cm.		c.m.
13·7	90	41½°	56 × 70
16	110	49½°	69 × 86

he objective is consequently to be regarded for enlargement purposes as wide-angle. No tests were made with smaller diaphragms. There is, however, no doubt that the objective might be made use of for larger angles wherever rapidity can be dispensed with.

D. —Anastigmate Wide-Angle.—No. 84 :—

Focus	150	mm.
Aperture of largest diaphragm	8·2	,,
Effective aperture	8·6	,,

This objective, which may be regarded as a type of the doubtlets, is unsymmetrical, and consists of four lenses cemented together two and two. It is designed for landscapes and buildings, and as it embraces an extremely wide-angle, even greater than that of the last mentioned objective, it only gives good definition with diaphragms from one-twenty-fifth upwards. The following are the results :—

Number of Diaphragm in decimal system.	Circle of accurate focus.	Effective angle.	Field covered.	Alteration of focussing screen for such distances as compared with full aperture.	Depth to which accurate definition reaches in metres from the objective.
No.	cm.		cm.		m.
32					
64	16	56°	10 × 12·5	—	4
128	22	72½°	14 × 17	—	3
256	35	99°	22 × 27	—	2
512	43	110°	27 × 35·5	—	1½

This objective, in spite of its want of rapidity, gives a scarcely larger angle than objective C when well stopped down, while with diaphragm 32 the resulting image is quite useless. Its definition scarcely seems to be equal to that of C. Diaphragm 32 is only of use in focussing, after which smaller diaphragms must be employed. The maximum angle 110° is only obtained with the smallest diaphragm. Like all the wide-angles, except the pantoscope, it gives an equable definition throughout the field, though only with small diaphragms. If it were not that the pantoscope suffers from the "light spot," it would be superior to all the newer constructions for all the purposes here considered.

Owing to its want of rapidity (intensity) the new objective was not tested for enlargements. Of all Zeiss's more recent constructions, it appears to be the one which possesses the fewest characteristic advantages.

In concluding these remarks relative to the Zeiss objectives, I must draw special attention to the fact that they are all wide angle instruments in the widest sense of the word. Among the newer aplanates of many opticians more rapid constructions may be found, but few in which anything like the same angle is obtained with the same relative rapidity. As with the exception of D, they may all be used with full aperture or large diaphragm, and suffice for all instantaneous exposures except those in which excessive rapidity is required, and as they are also very suitable for enlargements, they may be described as universal objectives. It is of great value to have these different characteristics combined in the same objective, which is an end at which many modern manufacturers have aimed. The Zeiss objectives attain this end to a marked degree, and the celebrated firm may well be congratulated in having made so successful an entry into this new sphere of activity. DR. STOLZE.

Photographische Nachrichten.

ON THE NATURE OF THE INVISIBLE IMAGE.*

THE skilful carpenter's crown should be made of shavings: the work itself, alone, should reward the toiler. This is all very well, and as it should be; but generally an appreciative and grateful crowd of fellow-labourers insist on throwing in a shower of stones, rotten eggs, or vituperative epithets; and martyrdom is undoubtedly a form of greatness which a man, not unnaturally, objects—as a rule—to be born to, or achieve.

For any one who detests to chop logic as he hates the father of lies, to commit himself in cold blood, to express in words—printed, everlasting words—his opinion on a subject which no one knows anything about, yet on which many feel convinced they know much, an opinion which he himself can only hope to be, at best, but a provisional approximation to the truth, is a thankless task. Nevertheless, this task must now be undertaken, for the time surely draws near when the chaotic conglomeration of contradictory evidence must be sifted by some one into something like order.

All things considered, it is highly probable that by far the greater number of photographic operations consist in the deposition of metal, either by substitution, catalysis, or electrolysis.

As an example of the first we may cite toning with gold, where at the beginning gold is deposited on silver, and finally gold upon gold. In the case of reduction by simple contact, the case of the immersion of a piece of carbon in a solution of nitrate of silver may be taken, in which it is found that the carbon has reduced the silver salt, and has become coated with an encrustation of metallic silver. An example of the third instance is to be found in the lateral spreading exhibited in "halation," where the difference of potential existing between the portions of the film subjected to, and protected from the light, causes, on the addition of a developer, a more or less extensive reduction.

These are merely types, to be accepted provisionally only, selected in accordance with the present state of our knowledge of the more simple and comprehensive principles which determine the general effects. In all likelihood, when further crucial experiments shall have given us a stronger brain-grasp, it will be found that one type alone will suffice to explain everything, but till then we must be satisfied with a comparatively complex simplicity.

The aim of the present paper is, then, to show cause for the belief that the printed-out image consists essentially of an element and not of a series of similar salts; to point out the resemblance between it and the image produced by development, which, we are certain, is formed of metal; and to suggest that in the phenomena of halation, solarisation, and reversals, we have a test by which we can gauge, with more accuracy than we have hitherto been able to bring to bear on the subject, the solidity, capacity, and profundity of a few of the prevailing hypotheses.

Since 1839 there have been few endeavours made to group our facts. Since 1856 the tendency has been towards a narrow-minded, plausible explanation of the phenomena of one branch without regard to the lessons taught by another. More pains have been given to the amplification of detail than to the recognition of the principle. Hence, while the art has grown like a veritable Gargantua, the science itself is dwarfed and sickly as a changeling.

The generally received belief (in Britain) at the present time may be summarised thus:—Halogen has been liberated from the darkened product, therefore the change is chemical. As neither our eyes nor microscopes can see single chemical molecules, and as a faintly visible image can easily be developed to the same ultimate picture as the invisible one, it is assumed that both consist of the same product, and differ not in kind. As the great bulk of the printed-out images behave to certain chemical reagents in a manner intermediate between that of the normal salt and normal metallic silver, since it differs in colour from that ordinarily presented by both, since apparently similar darkened products containing something like the half of the usual combining proportion of halogen are said to have been prepared, it is supposed to be rational to conclude that both the invisible developable effect, and the visible discolouration, are due to the production by light of a subsalt.

Others there are, however, who, also believing that the effect is a chemical change, and that the product is the same in both cases, deny the existence of a subsalt of silver: first, on grounds of valency; secondly, because of the undeniable discrepancies in the percentage analyses; thirdly, because the identity of the light-produced and chemically produced compounds has never been proved; fourthly, because they hold that they are not true salts, but only mixtures of unaltered salt with metal; and lastly, because they believe that the acknowledged abnormal colour and chemical reactions exhibited by

* Continued from page 552.

the darkened mixture do not, all things considered, warrant such a departure from the conclusions deduced by Scheele.

Before touching more particularly upon the inferences to which a consideration of the principles and practice of development would logically lead, some notice must be taken of the more salient of the objections which have caused the number of Scheele's disciples to wane, and those of Wöhler to wax. For in choosing between the explanations afforded by the "chemical" theories, the question arises at once, "Which of the two strains at a gnat and swallows a camel?"

The weak point of the metallist is, it has been urged, that in asking us to believe that allotropic silver has such a wide range of chemical and physical properties, he overtaxes our powers of credulity.

The weak point of the subsaltist is simply this: his saltatory powers are so astonishing that we fail to follow his fanciful flight; in short, we say that he has proved nothing.

That the reader may with the greater facility estimate the true value of the various objections, based on the physical and chemical differences observed between the "darkened product" and normal metallic silver, and put forward as reasons for rejecting a belief in the complete reduction of certain silver salts by light, acting either instantaneously or for a very long time on one molecule or on many, it may not be amiss here to recapitulate some of the more trustworthy data advanced regarding the three haloid salts with whose behaviour the photographer most concerns himself.

Cl is a gas; Br is a liquid; I is a solid.

Combining equivalents 35·46, 126·85, and 162·31 ÷ 2 = 81·15 (79·95).

Cl as a gas is green; Br as a vapour is red; I as a vapour is violet.

The sp. gr. of Cl is 2·47; of Br (liq.) is (2·976), vap. 5·54; of I (solid) is (4·948), vap. 8·716.

The specific heat of Cl is ·1210 (·1858); of Br is ·0843; of I is ·0541.

The boiling point of Cl is −50°; of Br is 63°; of I is 175°.

Their chemical activity diminishes with increase of atomic weight, with rise of density, and of boiling point.

Cl forms crystalline hydrate $Cl10H_2O$; Br does the same; I does not.

Cl is very soluble in water; is less soluble in solutions of the soluble haloids.

Br is soluble in water and solutions of the soluble haloids.

I is least soluble in water, more soluble in solutions of soluble haloids, extremely soluble in solutions of NH_4I and KI.

Cl forms oxides and oxyacids.

Br forms one oxyacid.

I combinations with oxygen doubtful.

Field (*Photographic Notes*, 1861, p. 87) summarises the results of a series of careful experiments to the following effect:—

AgCl is white; AgBr very pale yellow; AgI bright pale yellow.

AgCl highly soluble in solution of NH_4HO; AgBr difficultly soluble; AgI nearly insoluble.

AgCl exceedingly soluble in solution of $Na_2S_2O_3$; AgBr far less so; AgI twice as insoluble as AgBr.

AgCl not precipitated by the addition of NaCl to its solution in $Na_2S_2O_3$; AgBr to a certain extent; AgI in very large quantity.

AgCl slightly soluble in cold concentrated KCl; AgBr scarcely soluble; AgI perfectly insoluble.

AgCl less soluble in concentrated solutions of alkaline chlorides than AgBr in alkaline bromides; and AgBr less soluble in alkaline bromides than AgI in alkaline iodides.

It is also to be remarked that AgCl discolours most readily, AgBr next, AgI least.

To take up each of these three silver salts and examine into the truth or falsity of the attributes with which they have been separately and collectively endowed by theorists more or less independent of fact, is out of the question; yet, since as a family they are not without some influence in one or two photographic processes, they can scarcely be dismissed without any notice being taken of the conditions under which they play their respective parts. Let us, therefore, take a passing glance at the way in which at least one of them behaves, or is said to behave.

In the Daguerreotype and Talbotype, for instance, it may be allowed that iodide of silver had a share in the production of the developable image.

Pure iodide of silver, it would seem, is quite insensitive to light, and not only cannot form a developable image, but is even incapable of darkening under the fiercest mid-day sun. As, however, this salt has never been prepared, and possibly never will be, we will confine our attention to three impure modifications which have. It is much to be regretted that the silver surface of the Daguerreotype plate was cleaned, till it became black, with nitric acid; this, however, appears to have been necessary for pictorial purposes, as it would seem that the formation of the image was due more to the oxide than to the iodide, since silver iodide, formed by exposing silver leaf to the fumes of iodine, appears to be absolutely insensitive. "The iodide of silver, then, which is found in the sensitive film is but the motive power of photographic action, *the whole of it being found after development.* In one word, it serves only to evoke the action of light" (Van Monckhoven, THE BRITISH JOURNAL OF PHOTOGRAPHY, 1862, page 247); on the same page it is also stated that when prepared by double decomposition ($2AgNO_3 + CdI_2 = Cd2NO_3 + 2AgI$), if the silver nitrate be in excess at the outset the iodide of silver will be sensitive, and will continue so even when the most determined attempts are made to wash away all the free silver nitrate. "It seems then that the iodide of silver tenaciously retains a portion of the nitrate of silver with which it has been formed, that it probably forms iodonitrate of silver, the existence of which we have demonstrated some years since, directing especial attention to its extreme sensibility to light." If, however, the iodide of silver be formed with the soluble haloid in excess in the first instance, "strange to say, this iodide is non-impressible by light, even when the excess of iodide has been removed by repeated washing." These remarks apply to the salts in collodion; remarks to the same effect are made, however, by various authorities speaking of the "pure" moist and dry precipitates alone or suspended in paper.

The same observations have also been repeatedly made with regard both to the bromide and chloride. The following, however, is an exception:—"Pure iodide of silver, exposed in the dry state to the action of the atmosphere and light, remains unchanged, and is not reduced to the condition of sub-iodide as might be expected. Calotype papers, which have been prepared by what is called the double or single process, may be thus exposed without change for any period to sunshine, but similar chlorided papers are immediately discoloured. Well-washed, iodised, collodion plates are equally incapable of receiving any visible impression, and so far as any actual decomposition is concerned, pure moist iodide of silver may be pronounced insensitive to light" (Worden. Extract from Sutton's *Dictionary of Photography. Photographic Notes*, 1862, page 196). The natural refuge for the bewildered student is therefore "nitrate of silver," for evidently the iodide can neither be reduced to sub-salt or metal by light or development, and taken as a type of the other two is a very unpromising subject. Yet, when it suits their purpose, writers talk just as glibly of the sub-iodide of silver as of the sub-bromide and sub-chloride.

To quote Worden again:—"When, therefore, papers prepared with iodide of silver and nitrate of silver darken in the sunshine, an idea might be entertained that the darkening proceeded from the nitrate only, but this would not be correct, because papers imbued with both salts darken more quickly than if the nitrate alone is present, and also because iodide of silver, precipitated from an excess of the nitrate in a test tube, will be found to change colour under the sun's action, while nitrate in such circumstances is not darkened except the light is assisted by organic matter. It is found on trial that whatever change takes place there is no liberation of iodine when iodide of silver and solution of nitrate are acted on by light, nor of any of the elements, except nitric acid, which remains in the solution; whatever change takes place is in their arrangement only, for in the dark the yellow colour is restored, except organic matter interfere to prevent. The yellow salt may be thus darkened and restored many times in succession."

HUGH BREBNER.

(To be continued.)

MY EXPERIENCE WITH HYDROQUINONE.

My attention was first called to hydroquinone about the time of its introduction by reading several articles setting forth its merits as a developer in the various photographic journals. During the summer of 1888 I saw some plates developed with this new reducer by a photographer in Philadelphia. I was pleased with its action, and secured a supply for the purpose of experiment. After my return home I gave the hydroquinone developer a trial, and have been using it in my photographic work ever since. I have found it superior to pyro in every way except in rapidity, and this objection of slowness in working can be removed by using caustic potash as an accelerator.

But hydroquinone does not owe its claim to superiority to rapidity of working, but to other points—the fine negatives it produces, the beautiful detail, even in the deep shadows, and entire absence of stain.

Another advantage which should be noted is the great latitude of exposure, and the fact that every effect of exposure appears to be grasped by it. I have exposed plates on scenes with heavy foliage, dimly lighted, and views in shady dells, giving a very liberal exposure, and developed with hydroquinone, getting full detail in the shadows and fine half tones,

without the high lights being opaque or too thin. Had the same plate been developed with pyro it would have resulted in a flat negative, with the high lights very much over-toned. The absence of fog or stain is one of its chief merits. The development of a plate can be prolonged to almost any extent without danger of fog, and the shadows always remain clear and transparent. Its pleasant and agreeable method of working, and the sureness of results with hydroquinone developer, makes developing a pleasure, and relieves the amateur of many disappointments.

Some operators are not successful in working hydroquinone, but doubtless most of the complaints are from persons who do not properly use it, or work with a solution not properly prepared. They may have under-exposed their plates, or lacked the patience necessary to develop a short exposure.

I tried several formulæ, most of which were good; and being an advocate of simple formulæ I chose the following, which has proven very satisfactory. The ease of working and certainty of results with it has led me to recommend it to others:—

A.

Sulphite of soda crystals	2 ounces.
Ice or distilled water	16 ,,

Dissolve and filter, then add—

Hydroquinone	120 grains.

B.

Carbonate of potash	1½ ounces.
Ice or distilled water	16 ,,

Normal developer: One ounce of A, one ounce of B, and one ounce of water. If pure water is used, the amount of sulphite used in A solution is sufficient to ensure its keeping; if more should be added, or any acid used, it retards its action. I find no difficulty in keeping it in good order for weeks. Nothing is added to the carbonate of potash solution.

Now as to the method of developing. First notice the temperature of your dark room, which should be seventy or seventy-five degrees Fahr. I find that a difference in the temperature makes a marked difference in the time it takes to develop.

If I have a batch of 6½ × 8½ plates to develop which I think have had about the correct exposure, I mix five ounces of solution with a little less than the normal quantity of alkali, and if my note-book leads me to believe that any are over-exposed, I reserve them for the last, using the weakened developer on them.

Put a plate in the tray and flow with the solution; if it has been correctly exposed and the solution is freshly mixed, traces of the image will begin to appear in one and one half or two minutes, and grow steadily, with good contrasts and infinite detail. Do not hurry the development by adding alkali, for the finest tone gradations are built up slowly. The development is completed when the shadows show no white on the surface. The high lights usually show on the back of the plate. Wash and fix as usual, leaving the negative in the hypo a few minutes after it is clear to ensure thorough fixing. You will then have a crisp, brilliant negative, full of detail in the shadows, and of fine printing quality, the film being pure in colour through all the range from black to transparency.

If a plate is known to have been over-exposed, or if you are doubtful as to the exposure, the solution should be prepared with not quite the normal amount of A solution and about one-fourth of potash solution. The image will then appear very slowly, giving the person time to modify the developer to suit the exposure, cautiously adding alkali or hydroquinone as the plate requires. It should then build up in fine form. Some may become impatient at the time required; but the amateur who works for results will not object to the time: and who would not rather have one good negative than a dozen poor or indifferent ones?

In regard to exposure: I am apt to over-expose a trifle and develop slowly, and by that means secure brilliant negatives, with plenty of detail in the shadows.

I will not say that hydroquinone will take the place of all other developers, for during the great advancements in photography other reducers may be discovered, and the possibilities of eikonogen are not yet fully known; but I do think that a developer superior to hydroquinone would be a perfect universal developer, and I venture to say that if hydroquinone development is once mastered, but few will return to pyro.

—*American Amateur Photographer.* J. C. Hedarty.

MITES.

As each year brings its summer holiday, so does it new photographic experiences, it is half one's thoughts to carry his camera, and as a consequence, more to learn, more to find out—what to do, and what to avoid. This year I wanted to know, and know "bad," as the Yankees say, little littles—little things in themselves, yet becoming, *pro tem.*, big factors to my resulting pictures. The trifles I wished to "know you know" no photographic journal appeared to stoop to.

I had always looked upon instantaneous shutters, in their ever variety of styles, with prejudice. But being again bound for Bloater Land, and having more or less photographed all inanimate objects there, the only remaining work was to fire away among the animated—get on the broads and rivers and snatch passing yachts. Then came the difficulty to one inexperienced in this speciality of work how short a duration of exposure was necessary to fix such subjects? Of this I had no idea, and no ready reference. I wrote to a friend well up; he had, he said, the previous day been working at one-two-hundredth of a second. I visited the maker of a celebrated shutter, but in a size I wanted would, and could, at its greatest speed, only travel the one-thirty-two of a second. I felt perplexed and troubled. A short query, "Would one-fiftieth be rapid enough?" to Doctor Emerson brought a courteous "Yes, quite," and so cleared and closed a difficulty and bother.

Not wishing to carry too much, decided no developing trial plates should be done (a mistake!); therefore purchased a new Ruby portable lamp, taking into four pieces, by a noted firm. It burned a night-light, but through a bad principle the lamp gave off white light round the edges, necessitating the using of a sheet of yellow paper, causing all and everything to become so glum as to be practically working in the dark. The night-light worked very well until about the third time of using, when its flame became so diminished as to make it useless. A second did the same (Childs' night-lights), and behaved precisely as its predecessor. The wick appeared not to properly ignite. Then I had a happy recollection of reading in the ever useful Yearbook the wax match decapitated made a good one. All now went well—fine, comfortable, burning light; but soon a smell of burning arose, and a glance gave something was wrong. Hastily pushing away the opened plates, mixing the exposed with the unexposed in the hurry to smother that now wretched lamp, and save another house from fire, leaving myself quite in the dark, with plates and slides open in a bedroom, I knew not its whereabouts. I felt sorry. To call the landlady would bring a light, and fog possibly my pick of exposures. Gathering together as best I could in a rough pile, I got them under the bed clothes and struck a match. It was evident the paper round the tallow had taken fire, and so finished my experience with one of the latest styles of portable changing lamps. Surely something could be made to be both safe and of sufficient illuminating power.

I carried a half-plate, square camera, by Hare—a splendid, solid piece of workmanship. This, with three slides loaded, three lenses, and other requisites, becomes heavy when marching under a hot sun with a few miles in front. I had, therefore, a waterproof tweed bag made to carry them, slung with a strap across the shoulder; leather, although the saying goes "nothing like it," under such conditions would be much too much of a good thing, causing pleasure to become a toil, always to be avoided, hence the tweed bag. When carrying, it was just the thing, but the moment you set it down, removed the camera, everything went over and became generally turned. It had there no support and collapsed. When working under such conditions, it is always necessary to have all tools handy and able to set up easily and quickly. The turn of a road may open up a fine composed bit with figures, just the thing, and to secure, must lose no time. Walking from the Town Hall to Vauxhall Station, I exposed the whole six plates, all on fine specimens of the native fishermen standing about gossiping, and all well suiting my requirements, and all done in the greatest of haste.

To resume. While the bag answered its purpose for lightness, it was a failure in other ways explained. Now, without adding greatly to the weight, I have instructed a tinworker to fit in a box with partitions to separate camera from slides, and slides from lenses and shutters. A comfortable bag is a greater pleasure than many would give credit for.

I carried three lenses, as the greater part of the pictures were instantaneous; was strange to find, on reference to my pocket, with only few exceptions, all were done with a Dallmeyer rapid thirteen-inch focus, size of plates used being 6½ × 4¾. The seven and eight-inch gave images too small to be of any use. With *f*-9 and *f*-11 got good definition through. Shutter used was a Thornton-Pickard "Time," and a very good shutter too. Where "time" exposures are to be given, care must be paid to alter the small indicator-point to the letter "T," or you will find it run through. I made this mistake twice, but afterwards worked it with ease. In doing work of this kind, one must keep himself cool and be in no flurry. I had no finder, and sadly felt its absence; without one you are quite in a fog, and may just miss many good results. The harbour mouth at Gorleston is a grand hunting ground for practice in this classification. In this little village, too, can be found a ever welcome dark room to change your plates, should you run through your rounds of ammunition.

I found the shutter wound up about two turns fully quick enough to secure all the moving objects I tried, while a greater rapidity may be had by turning the spring its full tension, viz., thirty. Plates used were the "Mawson" and "Red label Ilford," both very quick. I gave a group late in the afternoon a short run on a "Mawson," feeling sure it would be a waste of plate and time, but the soda application developed a result very different to my expectations, proving to what perfection of quality the plates are now made.

Packing away exposed plates brings some difficulty. My method is, on the back of each stick a small gum label bearing a number to that in some pocket-book, and have spare plate boxes with grooves. Pack a dozen in each, well wrapped in brown paper, and writing the numbers from —— to ——. This little job wants doing carefully, or otherwise you may not be sure of which exposure you are using, and as each picture mostly wants contrary treatment, must know with certainty what you are developing, otherwise a mistake must come about. Many gross of holiday plates are spoilt by carelessness in this direction. If you go to photograph, do so to the best of your ability, or not at all. Of course, no one would make a labour of the thing, it is not necessary to do so; still, many a camera was being carried, and the owner looking glum and hot. He had been strolling all the morning so, with the camera fixed under one arm, bag with slides in left hand, all fixed ready, but without any fixed purpose. "He saw nothing to photograph." To-morrow morning, if the sun was right (he had not troubled to learn if it would be), "he should try one on the London boat and then pack up his things. Yarmouth was no good for pictures, and felt tired of taking his lot out." And so many others do the same, and go home with about six plates, all on the Town Hall, Jail House, Church, Market Place, one Row, and ditto Pier, and show their friends all (?) that can be done in Great Yarmouth.

TOM COAN.

NOTES FROM NEWCASTLE.

OUR townsman, Mr. Lyd Sawyer, is destined for further triumphs with his new pictures; I consider them a distinct advance on his previous work, though not one perhaps attains the perfection of his *Boat-builders*. The best to my mind in the present collection are the instantaneous street scenes; the craft in London and elsewhere will see the exhibition for themselves and can form their own conclusions, but I venture to say that these street studies are among the best, if not far ahead of any work of similar character, the patience and skill necessary would be little short of wonderful.

Our studio and showcases all show signs of improvement. Mr. Bacon and Mr. Sawyer naturally take the lead for artistic display and finish. Mr. Dickinson's cases never looked better, and even Mr. Laws (in the finest position in the city) makes a far better show than formerly. An extraordinary collection of specimens, all sorts and conditions of photographs, gathered one would think from all parts of the globe, and all of fairly equal *badness*, is to be seen in another fine position near the Central Station.

The demand this season has been all in the direction of hand cameras and Kodaks, and local dealers have for the most part done good business; the results, however, in the way of good prints may be put down as disappointing. Ingenuity has been taxed to the uttermost in the construction of hand and detective apparatus, and there are some in the market nearly perfect, but we shall not see a much better proportion of successes until an increase in the brain power of the *users* is shown. To put a detective camera into the hands of a beginner seems to me little short of madness.

Being in Tynemouth lately I called on Messrs. Auty & Ruddock, and found them as usual full of business, the senior member of the firm was at the time busily engaged in developing some dozens of portrait negatives, and I was interested in watching the operations. Mr. Auty I believe on one occasion gave a description of his *modus operandi* at a meeting of the local society. In one large dish is a sufficient and ample quantity of developer, normal strength, made up of pyro, soda sulphite, and ammonia, and a second dish close by contains a similar developer, but about double the strength of the first. An assistant manipulates these dishes, keeping them gently rocking. A half dozen or so plates would be put into the first dish, and in the ordinary way would develop to full density without further trouble; the second dish is handy in case of under-exposure, but it is noticeable what effect a stream of pure water has upon some of these negatives with strong contrasts and a tendency to hardness. Mr. Auty has worked development almost to perfection, and, given the requisite "stamina" in a plate, will make as good a negative as can possibly be got out of it. During my stay of perhaps half an hour three dozen or so of plates were developed without change of solution, and the developer seemed equal to other three dozen. The alum bath is used previous to fixing, and finally, if requisite, the negatives are reduced with hypo and iron to a uniform density, which, together with their brilliant tone, must mean a great saving of time to the printer and spotter.

I have had to handle at different times large numbers of professionals' negatives, and have seen them often, from one firm perhaps, of all degrees of density; the trouble this means, to the enlarger for instance, is serious. To slightly over-develop, then clear and reduce, seems a rational method of procedure. While in Tynemouth I noticed a whole windowful of local views for sale, the work of an amateur (?) who has by good luck, some skill, and professional assistance, succeeded in pulling off prizes in some recent amateur competitions.

A brief run through Durham, Bishop Auckland, Barnard Castle, and Darlington is noticeable. It is strange that professionals, skilled, too, by the way, *some of them*, and planted amid such lovely scenery, allow themselves to be distanced by outsiders. By far the best series of Durham is published by Auty & Ruddock. At Barnard Castle, Yeoman makes the best show. I suppose the views taken are valuable enough, but surely are not the best that can be taken. Darlington has its full complement of photographers, Mr. McLeish in particular showing fine (and very large) work; some of his portrait studies are really good, and remind one occasionally of Winter. I think, on the whole, I prefer Mr. McLeish's portrait work to his landscape, though both are good.

The last excursion (to Gilsland) planned by the local society was advertised for last Thursday, the weather, *as usual* on these occasions, was very unpromising. At Gilsland, students of Scott could revel in memories of Guy Mannering and Charlieshope, Mumps Ha' and Dandie Dinmont. A portion of the disreputable ale-house still stands, and on the hills close by is a straggling and ill-kempt farmstead, which would require only a little imagination to people with Dandie and his troop of "curly headed varlets." Croom Crags, with its Roman inscription still distinctly traceable, and Naworth, with reminiscences of "Belted Will," are enough to make up a full day's pleasure.

D. D.

Foreign Notes and News.

WE have, some time ago, alluded to the remarkable success attained by Professor Ahn, of Breslau, in applying photography to fix the appearances accompanying different diseases of the eye. The Professor's results, obtained some with sunlight and others with flash light, formed a valuable addition to the exhibition. Anschütz's photographic zootrope was also in evidence.

OF even more interest than the foregoing as a contribution to one of the newest departments of science were Professor Fischer's photographs of cultivations of luminous bacteria (*Bacterium phosphorescens*), which were photographed by their own light—the views giving evidence of the constant movement in which the tiny organisms are unceasingly engaged.

ENLARGEMENTS of brain and spinal sections by Drs. Kronthal and Hesekiel, of cysts in the muscle of the ear by Dr. Hartmann, and an excellent embryological series by Dr. His, of Leipsic, as also a number of chromo-collotypes by Obernetter, must not be omitted from our notice. Nor, finally, may we fail to mention the photographs of the image in the eye of the beetle exhibited by Professor Exner, the method of taking which was described at length in last week's JOURNAL, and which was not the least of the many valuable items of the exhibition.

A RECENT number of the *Kölnische Zeitung* has been entertaining its readers with an account of the photographic adventures of the celebrated French spectroscopist, Mons. Janssen, in Algeria, whither he betook himself at the commencement of the present year for the purpose of studying certain dark lines in the solar spectrum in the excessively dry atmosphere of that country. He arranged his principal observatory in a rock-built fort on the edge of the desert, and from this elevated position he had frequent and excellent opportunities of observing innumerable varieties of mirage. These he did not neglect to photograph, and the results he obtained are stated to be of very considerable scientific value, as they enable, by means of accurate measurement, the conditions to be determined under which the phenomena take place, and which it would seem are of a much more complicated nature than was at one time supposed.

THE *Kölnische Zeitung* observes, that "as far as we know" this is the first occasion on which photographs of mirage have been obtained. It would, however, appear that as long ago as June, 1886, a mirage was successfully photographed in the presidency of Madras, and subsequently reproduced in the *Graphic*.

PROFESSOR PICKERING, California, has been particularly successful in obtaining photographs of the planet Mars. On two consecutive nights, April 9 and 10, fourteen different views were secured, and of practically the same surface of the planet too, as it on both days turned approximately the same side towards the earth. All the photographs show very plainly the various dark spots corresponding to the seas, as also the snowy mantle of the southern pole. Curiously this latter appears of much larger dimensions on the 10th than on the 9th, on which date, too, it presented the appearance of being more or less completely enveloped

in clouds. On the 10th, however, it appeared clear, bright, and shining, and extended to the thirtieth degree southern latitude.

It seems difficult to avoid the conclusion that while Professor Pickering was photographing our planet neighbour from the sunny clime of California, a terrific snowstorm was raging over its southern hemisphere—a snowstorm such as we can form no idea of in the more favoured climate enjoyed by this earth, which we nevertheless abuse so much. It has long been thought that the planet Mars is passing through a "glacial period," and Professor Pickering's photographs certainly seem to be confirmatory of this view. But if this be true, what becomes of the highly scientific gentlemen with which the exuberant imagination of Mons. Camille Flammarion has peopled the planet?

Eikonogen again! It seems it will not keep whatever you can do with it. Mons. Mercier has been examining into the subject, and has come to the conclusion that the cause of its decomposition is to be sought in the large amount of water of crystallisation—reaching ten per cent.—which it contains. If this water be removed by means of careful drying, the eikonogen no longer decomposes if it be preserved from contact with moisture by being pre-served in bottles or canisters. The statement occasionally made that eikonogen is acted on by metals does not appear to be true of dry eikonogen.

Mons. Mercier gives an interesting explanation of the way in which this water of crystallisation acts. Whenever the temperature rises sufficiently to liberate any of the water it decomposes the amido-naphthol mono-sulphonic acid—which is the chemical name of eikonogen—forming ammonia, which effects the ultimate oxidation of the whole mass. If the ammonia formed can escape, the eikonogen will keep much better. The practical conclusions at which Mons. Mercier arrives are, that eikonogen should always be supplied in the anhydrous state, that in warm places it should not be kept in air-tight vessels, and that undried eikonogen should be kept cool.

Herr Ch. Scolik, the editor of the *Photographische Rundschau*, must certainly be complimented on the ingenuity of the device he has employed for filling up some thirteen pages of the September number of his periodical. He has simply reproduced fifteen pages of his recently published work, *Die Photographie mit Bromsilber-Gelatine*, which we have already twice reviewed. We mention this, as it may prove useful to other editors who may happen to be writers, more especially as we believe Herr Scolik has not protected his invention.

We have received several numbers of the recently started Belgian photographic periodical, *Le Gui*, conducted by Mons. L. Van Neck. The new weekly appears to have a very extensive experience at its disposal, and supplies in a variety of short paragraphs, just the style of information most useful to amateurs.

THE LATE MR. J. SOLOMON.

We are able to supplement what we have already said concerning Mr. Solomon by some particulars gleaned from the New York *Jewish Messenger*. He died in New York on the 2nd of September, in his eighty-eighth year. He was a native of Falmouth, Cornwall, and after being in business in Red Lion-square as an optician during a long course of years, retired and went to New York in 1881.

Mr. Solomon was a gentleman of rare intelligence, a master of several languages, a student of nature and books throughout his long and well-spent career. Of distinguished appearance and courtly manners, he was noticeable wherever he went as a typical English gentleman. His memory was remarkable, and he possessed a fund of anecdotes relative to important events in England and France for eight decades past, to the progress of art and science, politics and religion, that made his conversation and his writings so thoroughly enjoyable.

As a merchant, he was far in advance of the average for general attainments, just as he was the peer of the best for integrity.

Our Editorial Table.

A Comprehensive Handbook of Photography.

The new issue of so important a handbook as that of Dr. Eder is an event worthy of special notice, as the work in question stands alone in comprehension and completeness, while the reputation of the author is a sufficient guarantee that the fresh edition will be brought well up to date.

Unfortunately for some of our readers, Dr. Eder's work is issued in German, and the edition now being issued will consist of forty parts to appear fortnightly, and to be sold at one mark (one shilling) each. These will make an aggregate of 2560 super-royal octavo pages, with no less than 1173 woodcuts in the text, and forming four large volumes; the publisher being Mr. Wilhelm Knapp, of Halle.

In the first part of the new edition now before us we find the early history of photo-chemistry very thoroughly dealt with, commencing with the observations of Aristotle and his school as to the colouring action of light on plants and animals, while afterwards are detailed the observations of Vitruvius, Pliny, Albertus Magnus (who noticed the darkening of silver compounds), and the alchemists. A distinct epoch is marked by Schulze's experiments on mixtures of silver nitrate solutions and chalk (1727), as this investigator made artificial negatives by attaching paper marks to glass, but although he printed from these negatives he had no means of fixing the images. After Schulze we have details of the work of numerous experimenters—including the classical investigations of Scheele on silver chloride—until we come to the time when, by the labours of Niepce, Talbot, and Daguerre, photographs were made which were permanent in the sense of no longer darkening on exposure to light; the fixing of the photograph by the climax which founded the art of photography.

The first volume is, after treating of the history and chemistry of photography, to deal mainly with apparatus, the second with the earlier methods and the collodion process, the third with the gelatine emulsion methods, and the fourth volume with the various printing methods.

Specimens of Optical Flint Glass.

Messrs. Swift & Son, Tottenham-court-road, London, have sent us, fitted in a neat cabinet, specimens of optical flint glass by the three great makers of the period respectively, Messrs. Chance, Feil, and Abbe-Schott. They consist of quadrangular slabs with the ends optically worked, showing each one and three-quarter inches of clear glass. On the sides of each is cut the refractive index (given in the D line) and the specific gravity. The following represent the specific gravity and the refractive index:—

	Sp. Gr.	Refraction = D.
Abbe-Schott	3·63	16296
Feil	3·42	16169
Chance	3·40	16147

As regards colour, the Abbe-Schott, notwithstanding its greater specific gravity, shows decidedly less colour than the others, and hence must necessarily, from this cause alone, be quicker in action from a photographic point of view. We shall be pleased to submit these fine samples of glass to such scientists or societies as desire to see them.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 14,688.—"Improvements in and relating to Photographic Cameras." Communicated by M. A. Seed. W. R. Lake.—*Dated September 16, 1890.*

No. 14,681.—"Improvements connected with Photographing." T. A. Kennedy.—*Dated September 17, 1890.*

No. 14,682.—"Improvements in Portable Apparatus for Use when Developing Photographic Plates." W. H. Evans.—*Dated September 20, 1890.*

R. Pickles & Co., Refiners, &c., Wilderness Works, Clerkenwell-road, E.C., have registered a trade mark, No. 98,229-40-41, the subject being a representation of some of the tools used in their trade.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
September 30 ..	Bolton Club	The Studio, Chancery-lane, Bolton.
October 1 ..	Coventry and Midland	The Dispensary, Coventry.
,, 1 ..	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 1 ..	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 2 ..	Bolton Photographic Society ...	The Baths, Bridgman-street.
,, 2 ..	Leeds	Leeds Mechanics' Institute.
,, 2 ..	Dundee and East of Scotland ...	Lamb's Hotel, Dundee.
,, 2 ..	Glasgow Photo. Association	Religious Institn., 177, Buchanan-st'
,, 2 ..	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 3 ..	Sheffield Camera Club	Whiteley's Institute, New Surrey-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

September 18,—Mr. F. P. Cembrano in the chair.

Mr. A. Cowan showed some negatives taken by a rapid doublet lens of the usual form; first without addition, and afterwards with supplementary lenses

added for the purpose of lengthening or shortening the focus, as the occasion might require. The lenses were concave and convex spectacle glasses, the latter of periscopic form. He considered it of value to be able to improvise an instrument of focus different from that of the lens which might be in the photographer's possession at the time; and although these additional lenses were not achromatised, he had not found any necessity, so far as his observation went, for allowing for want of achromaticity in focussing.

The CHAIRMAN had always found the lens in its proper form, as furnished by the optician, to answer best.

Mr. COWAN, in opening the discussion on the powder process, showed a very fine result on opal glass. He also showed two that were printed by artificial light and not yet developed, in order that he might demonstrate to the members the necessity for using a fixing solution and drying off the film before allowing it to be touched by water. On heating an unfixed image before completion and drying it was seen to wash entirely off the plate. The first necessity was to get a transparency that was very thin. The sensitising solution that he had commonly used was composed of five per cent. each of dextrine, glucose, and bichromate of ammonia. It was also generally necessary to add glycerine, and here the principal difficulty came in. On a damp day none might be wanted, whilst at other times varying quantities were required, according to the dryness of the weather. The opal glass upon which the picture is to be printed should be absolutely clean. Whilst still wet, the sensitising liquid should be poured over two or three times, and the plate then stood in a warm place free from dust to dry. When the picture is printed it should be flowed over with a mixture of methylated spirit saturated with boracic acid and twenty per cent. of nitric acid. After a change or two the plate is stood up to dry, and when quite dry may be washed with water, which finished the process.

Mr. A. HADDON had made some trials of the powder process for the purpose of producing burned-in pictures on enamel. He had had no guide but a book, which proved a very defective guide, as in one formula it gave proportions of several ingredients, but did not mention the water in which they had to be dissolved. Other formulæ were given with equal carelessness. He had, however, made some progress, and showed an enamel which he had produced. He had used five per cent. each of gum arabic, sugar, and bichromate of ammonia, and added five or six drops of glycerine to the ounce. The addition of glycerine assisted in getting deep shadows and clear high lights. He had developed the pictures with black enamel powder. It was necessary not to heat the enamel too strongly, or the colour became bluish and weaker. For drying the sensitive film he placed a piece of zinc over a Bunsen burner and laid the plate upon it. Too high a temperature would discolour and spoil it. When transferring the image to the enamel it was necessary to lay it down with the collodion side next the tablet, or it would not adhere during the fixing.

Mr. COWAN added that plates must be exposed as soon as dry; if kept for an hour they were spoiled.

The subject for discussion on October 2 is to be *Preserving Sulphite of Soda*, and on the 9th there will be a lantern night.

Mr. J. Weir Brown was elected a member.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

AT a meeting held at 4, Great James-street, Bedford-row, London, on September 17, Mr. T. E. Freshwater in the chair, two applications for assistance were made, and one application granted, the other being adjourned.

A letter from Mr. W. S. Bird, Chairman of the Executive Committee of the Photographic Section of the London Chamber of Commerce, was read, enclosing 30*s*., being an outstanding item of the Drapers' Hall Exhibition.

A Sub-Committee of this Association was appointed to confer with the Photographic Club for carrying out the proposed concert and lantern show to be given by the Club in the coming autumn.

HOLBORN CAMERA CLUB.

SEPTEMBER 19.—Mr. N. BAKER gave a lecture, illustrated by lantern slides, on *How I Spent My Holidays in Yorkshire and Derbyshire*, views of several places being shown. Thereafter several slides by Messrs. Chang and Bayston were shown.

Next Friday will be a lantern night—*White Mountain* set.

The annual supper in November.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 19,—Mr. F. W. Edwards in the chair.

Five members were elected and five proposals received.

Mr. F. W. HART gave a demonstration in *Flash-light Photography*, and also exhibited his portable screens and stands for lanternists, which are easily transformed, by the aid of a few curtains, into an open-air studio.

Mr. RANSOM brought to the attention of the members a new folding copying apparatus for use in enlarging, reducing, or making lantern slides, which is very compact, and goes into a small space when not in use.

The next meeting will be held at Hanover Hall, Rye-lane, S.E., on Friday, October 3, being a lantern night.

On Saturday, the 20th, a party visited Epping Forest. Although the wind was a trifle high, the light was excellent, and a very enjoyable afternoon was spent.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

ON Thursday, the 18th, the first and last outdoor meeting of the above Association for the season was held at Gilsland, Lanercost, and Naworth, under very favourable meteorological conditions. This season the Association has been so unfortunate as to have each of its previous outings prevented from being held by wet weather, but on this occasion, contrary to general custom, we were favoured with a splendid day, although at one time the wind was rather troublesome. Starting from Newcastle at twenty-five minutes past six, it was found when we reached Gilsland that we mustered ten members, as well as two from the Haltwhistle Society, and one from Southport, present by special invitation. Fourteen cameras, ranging from 12×10 to stereoscopic and quarter-plate, were in active operation all day, the nett result being one hundred and thirteen exposures. After breakfast the party embarked in two traps, and, whether it was the breakfast or the excitement consequent upon the unusually large muster, it was discovered, before we had gone very far, that two of our number were missing. After picking up these truants, we got fairly under way at the reasonably early hour of nine. Driving to Bird Oswald, the Roman camp was the first object to receive our attention. Another drive of a few miles and a pleasant walk through the woods brought us to our next point of interest—Coombe Crag—a beautifully wooded stretch of the River Irthing. Here a couple of hours were spent, numerous exposures made, and considerable amusement created by the misadventures which befel some of our number, the most noteworthy being the immersion of a camera in the river, and the lens, parting company from the camera, necessitated the exercise of some considerable fishing on the part of its owner. Another member, in crossing the stream, lost his footing, with no worse result, however, than the acquisition of two wet feet and the filling up of a lens with water. Rejoining our conveyances, we proceeded to Lanercost Priory, a splendid old pile, possessing great attractions to those who care for architecture, and cameras were soon again in operation all around, and exterior and interior views obtained in profusion. Crossing the river, we entered the beautifully wooded grounds of Naworth, and pretty bits were quickly secured. Upon our arrival at Naworth Castle, the stately, ancestral home of the Earl of Carlisle, many and loud were the complaints that the available stock of plates was running low. General views of the castle, courtyard, and a fine old tower were obtained. Here our carriages were waiting for us, but, before starting upon our homeward journey, a group of the members was taken by Mr. Auty. A pleasant drive in the cool of the evening, and we once more reached Gilsland, where, at Spring House, a particularly good dinner was waiting for us; and surely no party of famished plate exposers ever did more ample justice to good fare.

The whole of the arrangements had been made beforehand by Mr. Auty, who acted as "leader," and the best and most enjoyable outing the Association has experienced for many years testifies to the thoughtfulness and skill of Mr. Auty in that capacity, who, needless to say, received the heartiest thanks of all present.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

TONING ARISTOTYPES.

To the EDITOR.

SIR,—*Apropos* of your leader of the 5th inst. and sub-leader of the 19th, I would like to bring under your notice a toning bath I have been using for the past twelve months, and the results from same in my hands you will see in photograph enclosed.

To tone thirty cabinet aristotypes, take three leaves of gilders' gold leaf in china saucer and dissolve in an *excess* of nitro-muriatic acid, neutralise carefully with a saturated solution of bi-carbonate of soda, and your bath is ready for use. Now the points in this bath I consider worthy of notice are, first, its economy, costing only three halfpence for two sheets of sensitized paper; second, its ease in manipulation, and the beauty and variety of tones without the slightest sign of mealiness.

I have never yet exhausted a toning bath made in this way, as I like to get through my toning as quickly as possible, and I never cared for using any toning bath twice, as I always believed the adding more gold to a used bath was only throwing it away. Hoping you will try this and give your own experience.—I am, yours, &c., G. PATTERSON.

P.S.—With your permission, in my next I will give you my experiments for the past twenty years on fading.

Belturbet, Ireland, September 20, 1890.

[The tone of the print enclosed is a fine purple-brown.—ED.]

GLOUCESTERSHIRE PHOTOGRAPHIC SOCIETY.

To the EDITOR.

SIR,—The date being now fixed for our Triennial Exhibition, we shall feel obliged if you will kindly announce the same.

The conditions and Schedule of Awards have been revised, and are now more in accordance with prevailing opinions than the one issued in 1888, although that exhibition proved a success in every way with its 140 exhibitions and upwards of 600 frames, besides a large show of apparatus. We hope, as before, to secure the support of leading amateurs and professionals. The exhibition will open Wednesday, April 17, and close on Saturday, April 27, 1891.—We are, yours, &c.,

Bank Buildings, Southgate-street, Gloucester, September 22, 1890. A. H. CLINCH, F. H. BURR, *Hon. Secs.*

P.S.—Prospectuses will shortly be issued and duly advertised.

VENTNOR AND BONCHURCH LITERARY AND SCIENTIFIC INSTITUTION.

PHOTOGRAPHIC EXHIBITION, 1891.

To the EDITOR.

SIR,—A photographic exhibition, open to amateurs and professionals of the United Kingdom, has been arranged by the Committee, January 19, 1891, having been fixed as the opening day.

During the past few years the art of photography has advanced in an extraordinary manner, and a considerable proportion of our visitors now bring their cameras to this "Photographers' Paradise." An exhibition of

the work of amateur and professional photographers, held in the capital of the Undercliff, is therefore an event which should command the hearty support of all residents in the Isle of Wight. No exhibition of this character has hitherto been held in the island.

Any surplus resulting from the exhibition will be devoted to the fund recently started for reducing the debt on the institution building at Ventnor.—We are, yours, &c.,

R. V. MALDEN (Colonel), *Chairman of Committee.*
W. HOSKIN, *Hon. Sec.*

Ventnor, September 18, 1890.

AMERICAN LANTERN SLIDES.

To the EDITOR.

SIR,—It may be of interest to Hon. Secretaries of the Photographic Societies of the United Kingdom, who are making their arrangements for lantern exhibitions during the coming winter, to know that the Boston Camera Club (U.S.A.) are sending over to us another lecture, entitled *In and about Columbus* (the capital of Ohio), and the slides will be here about the end of this month. This is a gift to the Amateur Photographic Societies of England by the Columbus Camera Club on the same terms as *Illustrated Boston* and *The White Mountains of New Hampshire*.

There will then be three sets of lantern slides of about eighty each, with accompanying lecture neatly mounted in type of American scenery, in free circulation among Photographic Societies in this country, and which can be loaned on application to me.—I am, yours, &c.,

E. M. TURNBALL, *Hon. Sec.*

Liverpool Amateur Photographic Association, September 20, 1890.

THE STANDARD OF BEAUTY.

To the EDITOR.

SIR,—Last week's number of this JOURNAL brings a paper read at the Convention at Washington, in which Mr. Thomas Wilson says about women, "Throughout all time artists have chosen woman as their standard type of beauty. Most truly she is for, judging by our standard and looked at with our eyes, we cannot but declare that whatever else the Creator of the world and the Maker of all things might do, He certainly has not made anything more beautiful, more lovely, more charming, more attractive, more to be worshipped on earth, than a beautiful woman."

Perhaps it would be not amiss to remind Mr. Wilson, relating to form, that all artistic schools do agree that the man represents the standard type of beauty, not the woman.—I am, yours, &c., F. B.

RETOUCHING.

To the EDITOR.

SIR,—Mr. D. L. Hurd, in his interesting article upon *Retouching* in last week's issue, states that it was born in Boston more than "twenty odd years ago." Possibly Mr. Hurd is not aware that Mr. Thomas Edge, then of Preston, introduced retouching upwards of thirty years ago, and adopted it in all his work. His exquisite examples of photography were then, and are now, of the highest artistic excellence. Like Mr. Hurd, I could mention some curious episodes regarding the introduction of retouching, but to recount them in the pages of the JOURNAL would be out of place. The proper time for their rehearsal would be after a Convention dinner.—I am, yours, &c.,

SILVESTER PARRY.

Chester, September 23, 1890.

HIGH-CLASS PHOTOGRAPHY.

To the EDITOR.

SIR,—Will you permit me to point out what appear to me the chief obstacles to artistic success as a photographer? First of all, the ease with which the mechanical part of the art is acquired leads many to engage in the profession who have neither the education which would fit them to undertake, nor, what is more important, to appreciate the highest excellence in the production of a picture. This lack of a capacity to perceive their shortcomings keeps them down to the level of those artists who spend their lives, either from necessity or choice, in the production of pictures of the "pot boiling" order of ability. These professionals are to be found in every class, and the best of them endeavour by mere mechanical results to compensate for a lack of artistic skill which a careful system of education and the power of rational appreciation alone imparts. What chance has an illiterate painter to rank among the artists of the day, colour be never so deftly? or what Academician or A.R.A. can be found illiterate or uneducated?

The successes which the great artist photographers of the day have established are not been due to mere mechanical facility, but to the art which can never be found in men content to misplace their "h's" and murder grammar for the remainder of their days. These are the men who grow to despise the "happy clever" while in reality they owe their success to personal attributes, for true success is not so much upon ability to take a respectable photograph as to select *the* one from a score of indifferent.

A word on the taking of large direct photographs leads many astray. The exclusive use of such a lens as a portrait combination, and the use of many a thousand excessive. If large portraits are desired, suitable enlargements will give far better results than can be devised by the most skilfully executed direct negatives. The nearer the lens approaches the focus and size of the human eye the truer to nature will be the resultant picture. These are facts indisputable by any artist. Yet how long will there be a mass of photographers who perennially send to our exhibitions the grossest caricatures of art in blissful ignorance of its elementary principles?—I am, yours, &c.,

Ostend. AN ASPIRING PROFESSIONAL.

A WARNING.

To the EDITOR.

SIR,—"Wood's Washer" has answered a conundrum of his own to his entire satisfaction. If, instead of playing with a "fresh sample of sulphurous acid," he will make up a solution in the following proportions, viz.:—

Sodium sulphite	4	ounces,
Water	4	,,
Sulphurous acid	3½	,,

I shall be surprised if he obtains any effervescence with a carbonate. This, with the addition of pyro, one ounce, is Beach's A solution. I have used it for some years, have prepared it myself, and have obtained it at reliable dealers, and have never seen any effervescence with a carbonate. I do not pretend to be a chemist, but I should be surprised to find free sulphuric acid in such a solution, and was under the impression that the sodium sulphate acted as a restrainer, doing away with the necessity for a bromide. To substantiate my accusation of carelessness I would further mention that the salts in the B solution were so imperfectly dissolved that it had to be heated and filtered before it was fit for use. I know that the B solution is difficult to make, but I never saw such a bad result as in this bottle supplied to me.—I am, yours, &c., R. J. S. S.

To the EDITOR.

SIR,—It is a curious fact, but evidently an oversight on the part of "Wood's Washer" in last week, when he mentions that in examining a sample of sulphurous acid he noticed strong effervescence on the addition of a carbonate, showing the presence of sulphuric acid.

How does he reconcile the following equation?—

$$H_2SO_3 + NA_2CO_3 = NA_2SO_3 + CO_2 + H_2^{\circ}.$$

The inference is evident.—I am, yours, &c., E. THORP.

London.

CRYSTAL PALACE DISTRICT CLUB.

To the EDITOR.

SIR,—I am instructed to inform you of our having formed a photographic society at 86, Beckenham-road, Penge. It is called the Crystal Palace District Camera Club. We purpose having lectures and demonstrations during the winter months, with a view to stimulating and improving the latent tastes and varied abilities of the amateurs of our district. We hope to find the same sympathy and assistance from you that you have always extended to kindred institutions. I refer, of course, to the fact that it is in your power to make your readers aware of our existence through your widely circulated JOURNAL.—I am, yours, &c.,

H. HUNT, *President.*

3, *London-terrace, Green-lane, Penge, Surrey, September*, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, superior light whole-plate camera and slides; exchange, Dallmeyer's 2B portrait lens.—Address, CURZON, 11, Waterloo-crescent, Dover.

Exchange, whole-plate square bellows camera, swing back, and slide, for half-plate rectilinear lens with stops.—Address, J. REVELL, 11, Bath-street, Corporation-street, Salford.

Will exchange Burr's extra rapid quarter-plate portrait lens, two and three-quarter inches diameter, six inches focus, for a 12×10 wide-angle doublet.—Address, GRIMSHAW, Photographer, Haslingden.

A quite new Ross portable symmetrical, No. 5, seven-inch focus, to be exchanged for a Dallmeyer wide-angle rectilinear, five and a quarter inch focus.—Address, T. COAN, 109, Caledonian-road, London, N.

Will exchange a new half-plate set by Underwood, three double backs, lens, instantaneous and time shutter, tripod, &c., for a good lens for large direct portraits, Euryscope or any good make.—Address, W. GREAVES, 193, Belgrave-gate, Leicester.

HOW TO MAKE TRANSPARENCIES.—This is the title of a brochure issued by Messrs. Marion & Sons, which embraces in its scope lantern and stereoscopic slides. It contains many useful hints and formulæ, and also a well-arranged catalogue of every requisite in the department of photographic practice.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Suggest, October 2, *Kinetoscope and Fleeting Scenes of Life*; October 9, First lantern night, and demonstration on *Lantern Objectives* by Mr. T. E. Freshwater; October 16, *Practical Digression*, adjourned discussion, resumed by Mr. W. E. Debenham.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

C. W. Clarke, Devizes.—*One photograph of a painting entitled "Devizes Castle in the Olden Time." One photograph of the ground plan of the British Temple at Avebury, Wilts.*

Percy Graham, Bedford.—*Photograph entitled "Something awful this week, mam!"*

J. Davis & Son, Lancaster.—*Two photographs of Clemintina Prampff von Bratiano, alias "Patty Byrne."*

T. Edge, Llandudno.—*Two photographs of the Queen of Roumania. Three photographs of the Queen of Roumania, suite, Mostyn family, and John Thomas, harpist to the Queen. One photograph of the Welsh bards summoned to meet the Queen of Roumania.*

G. MASSY.—Thin Japanese paper for protecting enamelled pictures can be had from Marion & Co., and from similar houses.

D. ANDREWS.—The formula is reprinted from the original, but the word "in" seems to be inserted in error. Read without that, and if the solution be then too thick dilute it to your own taste.

W. B. J.—Series of lenses, fitting with the same mount, and forming combinations of various foci, are supplied by several houses here. Messrs. Swift, Wray, Beck, Suter, and others supply them.

C.—You ought to experience no difficulty in getting unprepared photographic paper. It is kept at most photographic warehouses. From your letter we suspect you have been applying for it at the stationers. If this be the case the difficulty is accounted for.

MONMOUTH.—A thin solution of gelatine, or jelly, is very prone to decomposition at this time of year. Therefore an antiseptic should always be added, unless the solution is made fresh daily. A little oil of cloves, or of salicylic acid, will be a good antiseptic.

PNEUMATIC.—The system of exposure described has been published before, although some of the details in yours differ from what was published. It would be useful to the brotherhood to publish it in the ALMANAC, but would scarcely form subject for a patent.

F. BELL.—Some years ago rolling presses with glass beds were put into the market. But their manufacture has since, we believe, been discontinued. So fas as glazing the prints was concerned, they answered very well. Although the glass was very thick it was liable to fracture.

MATT PRINT.—The tone and surface of platinum pictures can be better imitated with bromide paper than by the carbon process. With skilful manipulation bromide prints can be made to resemble platinum so closely that it is extremely difficult to distinguish between the two.

A. C. THORNTON.—The following is a very good encaustic paste for photographs:—Beeswax, or *good* white wax, 500 parts; elemi, 15 parts; benzole, 250 parts; oil of lavender, 250 parts. For the oil of lavender, spirit of turpentine may be substituted, but its odour is somewhat unpleasant to many.

NOVICE (Edinburgh).—The cause of the flocculent appearance on the wet collodion plates when taken out of the bath, and the floating iodide in the solution, is that the collodion is over-iodised. Add some plain collodion to it—say one part to two. If that does not get over the trouble, make a further addition of plain collodion.

COL. NICHOL inquires: "Is there any after ill-effects from using the perchloride of iron cleaning solution without the after bath of hypo. I find I can get what I want without the hypo."—The only ill-effect likely to arise is that as a portion of the image has been converted into chloride of silver it may afterwards darken slightly by continuously being printed from.

SCOTTY.—1. Try the effect of doubling the proportion of the pyro, and do not hurry the development.—2. If the lens will give "no definition at all" with a larger aperture than *f*-48 it must be a very inferior instrument.—3. Such a studio as you describe can probably be built for about thirty pounds. Get an estimate from some horticultural builder—practically it is a greenhouse.

S. W. asks why it is that ceramic photography is so little worked, seeing that the results have the great advantage of being permanent. The question is somewhat difficult to answer. But we imagine it is that the public do not care for them. One thing is certain, namely, that several who have worked the process did not find it a commercial success, and therefore relinquished it.

M. STANWELL says: "The other night I dried a number of whole-plate prints by laying them across a line. In the morning I was annoyed to find that all the pictures were marked where the line had been. Can you account for it? The cord used was the usual thick white cotton."—Evidently some of the material used in bleaching operations remained in the cord; hence the markings.

E. PUSEY says: "I want a perfectly opaque black varnish, when spread upon glass, but cannot get one dense enough. I have tried Bates' and other photographic varnishes, but they are all too thin. Can you assist me at all?"—Possibly a double coating would answer our correspondent's purpose. The opacity of Bates' black may be materially increased by the addition of lamp black.

A SUBSCRIBER (Dublin).—Evidently you are using an unsuitable collodion, or you do not use it properly. It is clear that there is no collodion on the print enclosed, though there are indications that it has been used, for the surface of the picture partakes of its crapiness. But that does not account for the collodion leaving the print. Better send us fuller particulars of your method of procedure.

J. E. O. asks: "Will you be kind enough to tell me in your 'Answers to Correspondents' how much hydrochloric acid it would take to precipitate the silver in about thirty gallons of water from print washings? Also, will the silver recovered pay for the acid, as I have to pay eightpence per pound for it here?"—Before answering the query we must be informed how much silver there is to be precipitated. The quantity of water in which it is contained is no guide whatever. Add the acid in small quantities at a time, with vigorous stirring, and when a fresh addition causes no further turbidity all the silver is thrown down. Commercial hydrochloric acid at about twopence a pound will answer quite as well as the more expensive quality.

F. E. puts the following queries:—"1. Can you tell me of something better than paraffin for covering a solution of ferrous oxalate to keep it from oxidising? I have tried the latter with a layer five-eighths of an inch deep, but find the oxalate solution soon deteriorates, and gets very slow in developing. 2. Can you give me a receipt for a varnish for paper prints similar to that used to give collotype prints the appearance of silver prints? 3. How is the varnish applied?"—1. There is nothing that answers better than the paraffin. Of course the same solution sets slower each time it is used, quite apart from the oxidation. 2. Dissolve one part of borax and five parts of white lac in twenty parts of boiling water. Then dilute with water according to the gloss required. 3. Usually by floating the prints on the solution.

LUMINILEX says: "1. Could you suggest the materials and method for producing a sudden flash of magnesium light for photographing thieves at night, such as might be fired from a pistol barrel or any other way, but without previously ignited flame of spirit or other lamp? Detonation no objection.—2. Wishing to make cabinet size portrait of adult and little child, who won't keep quiet half a second, what is largest aperture in ordinary extra rapid whole-plate portrait lens which may be given and secure good definition, both figures standing?"—1. Make a loose cartridge with gun cotton, distributiug the magnesium well amongst it. Place in a pistol and fire with a percussion cap.—2. If the whole-plate lens be a good one it will take a cabinet portrait with its full aperture. This, in the case of an extra rapid combination, is equal to about *f*-3.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, October 1, *Printing Clouds in Lantern Slides;* October 8, *Flash Lamps.*

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, September 30, at eight p.m., in the Exhibition Gallery, 5A, Pall Mall East.

MESSRS. PERCY LUND & CO. have considerably extended their factory at Bradford by adding to it the adjoining building, No. 18, St. John-street. The new building will provide extra warehouse room, and also a sample room and sale room for general goods, a showroom for backgrounds and accessories, private and editorial offices, and laboratory.

CHEMISTS' PREMISES BURNED.—FIREMEN POISONED.—On Tuesday evening a disastrous fire broke out on the premises of Messrs. Mawson & Swan, chemists, Mosley-street, Newcastle. After the flames were extinguished the firemen on duty were all more or less affected by the fumes, and some of them were conveyed to the Fire Brigade Station in Westgate-road in the tender; several of them gradually got worse, and medical gentlemen were sent for. William Murphy was the first to fall a victim to the poison. He bravely combated against its effects, and walked about the floor of his room, thinking to the last that he would recover. Gradually, however, he became weaker, and had to lie down, when he rapidly became unconscious, and died between eight and nine o'clock. The next victim to succumb was James Grey, thirty-five years of age, who died about ten o'clock. He had been a member of the Newcastle Fire Brigade for about three years, having eleven years' service altogether. Other persons who attended the fire are in a serious condition. The fumes above referred to, which acted so disastrously, are believed to have been those of bromine.

BARON ROTHSCHILD AS A PHOTOGRAPHER.—A pretty story of Baron Rothschild and his amateur photography is given by the *Daily News* correspondent at Vienna as current in that capital. The Baron had found a good point of view, half way up one of the hills rising above the valley of Cortina di Ampezzo in the Tyrol, and arranged his apparatus, esconced in the black velvet covering, which is such a conspicuous item in the photographer's outfit. When he emerged, a fat couple stood before him whose dialect immediately showed them to be well-to-do Berliners. The husband promised he would pay the photographer handsomely if he consented to take their portraits with the background of Monte Cristallo or the Antelao for the uncles and aunts at home. Baron Rothschild, highly amused at the self-sufficient tone of his would-be patron, said his apparatus was for landscapes only, but this was pooh-poohed by the Berliner, who knew better, and gave his name, adding that he was a banker who could pay for his caprices. Baron Rothschild no longer resisted, and repressing his laughter when the fat lady arranged her dress and put on her sweetest smile, took the portraits. They proved a success, and the Berlin banker gave strict injunctions that he must have at least four copies by noon the next day, as he had fixed his departure for that hour. On the following day one of Baron Rothschild's servants took the photographs to the Aquila Nera, where the Baron's autograph on the beautiful portraits standing out in bold relief against Monte Cristallo created a sensation.

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THE BRITISH

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THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.

The *soirée* of the Photographic Society of Great Britain took place last Saturday evening with all the *éclat* which has always attended these annual displays of the latest triumphs of photographic art and science, the guests being received by the President of the Society, James Glaisher, F.R.S. The elements were most unusually generous in their assistance, resulting in a profuse warm atmosphere, developing a slight quietude of deportment, which was somewhat roused by the strains of a grand piano, upon which W. K. Selle, Mus. Doc., discoursed some light music, and subsequently by the appearance of the chief dignitary of the City of London, the Right Hon. the Lord Mayor, who carefully examined the pictorial works now filling the whole of the space at the disposal of the Society. Thus was the function of the opening of the most important exhibition in the photographic world carried out, and it remains for us now to note the value of the exhibits, which show a marked ascendancy in pictorial value, especially in what may be alluded to as constituting hitherto the lower strata of exhibition work, but which this year has risen very high, both in the selection of subject matter, and in its good reproduction by photographic means.

The comparative absence of those very large products of photographic skill which formerly occupied much of the available space in the gallery, the large number of pictorial works by some exhibitors, and the interesting specimens of good work by new candidates for distinction, help to cover the walls with a most interesting and exceedingly successful attempt at picture making by the agency of photography.

The studies of figure compositions (involving a very high perception of art possibilities) by photographic action are very profuse in this year's exhibition, but some suggest the idea that the figures in these very charming productions have been fitted to the chosen spot, rather than the figures having been the primary consideration, and the surroundings fitted to them. Nevertheless, however that may be the case, the results are very good, and the combination forms some very effective results, evidencing design and thought; and it is this design in the selection of subject matter which constitutes the difference between the two divisions in any exhibitions, viz., the mere photographing of objects which could be reproduced more or less successfully by various operators, one after another, and the patient study of the best place wherein to arrange the figures, both for artistic effect and also for the best combination of lines and expression of position, and this involves an ideality of thought which, in the carrying out, shows the artistic capacity, the result being the production of a work which possesses individuality, and therefore cannot be repeated by one person after another.

This form of photographic art is spreading very much, the whole result being very pleasing, and this year's exhibition is very rich in studies of this kind, and therefore will well repay most careful and thoughtful investigation.

We then notice the landscapes without figures, where the effect has to be obtained without any foreign matter introduced. This really involves a higher study of subject matter to be the centre of interest, which in many of the exhibits has been well considered, while in others it has not.

The pure figure pictures, where the subject or action is the primary and leading consideration, are not many in number, but some interesting pictures are shown which will require careful consideration in due course.

In the portrait exhibits there are some few studies where thought and skill have been exercised, but in this department, more than in any other, the subjugation of portions of the surroundings, so that the face of the sitter becomes the leading object, has not always been so carefully considered and arranged for as the subject or individual demanded. The modern craze for powerful shading on the face (which always becomes darker when seen at a distance) has resulted in a strong tendency to destroy the proper relations between flesh tints and other parts of the picture, suggesting the notion that the face has been taken under one condition of lighting, and the rest of the picture under another. Can it be that this unsatisfactory condition of portrait photography has reduced, year after year, not only the size, but the number of portrait exhibits?

There are (as must be expected) some examples of work produced by degrading the normal outcome of the principal instrument which has enabled photography to become a recorder of facts, so that the pictorial effect, to a great extent, of this new craze depends upon the "idiosyncrasy" of the beholder, who has to create the "pleasures of the imagination" when looking at it, and not on the picture itself, which should be the "pleasure" to every one. An exhibition of pictures entirely composed of similar results might result in furnishing patients for "ophthalmic" treatment.

It is somewhat singular how very few results are shown of studies taken under the rapid exposures which can now be obtained. We allude especially to many artistic possibilities of groups and other combinations. The exhibition again this year contains many machines for this work, but where are the results which could be made with these clever instruments?

An announcement appears in the catalogue of this year's exhibition which shows that the evolution of photographic progress has almost annihilated the original method of producing a photographic print, inasmuch as it is recorded that nearly all the exhibits are by the platinotype process. Thus gradually but surely has science come forward to the assistance of the

art side of the exhibition, where softness of tones, and an almost entire absence of those dark, unexplored regions which formerly prevailed, and which even in these advanced times have not entirely been eradicated. At the same time there has arisen a small defect from this point of view which practice alone will eradicate. We allude to a certain loss of power in the scale of tones, which results in flatness and a want of effect; but a study of the good platinotype work shown will soon restore this matter to its proper condition.

In considering the exhibition as a whole, the Photographic Society may be congratulated upon this year's display, which has produced some fresh exhibitors, whose studies in the future must increase in power from the capacity for good work thus shown.

The roll of exhibitors has been somewhat contracted by the absence of many who in past years have shown most excellent work; and in concluding these opening remarks we will just record a word upon the curious fact of the large majority of the pictures being small. Various reasons possibly may have tended to this result, but the outcome undoubtedly suggests that size alone will not atone for inherent difficulties of composition and treatment, and that a picture taken direct will always command, not only the closest attention, but will also show the best conditions under which the chemical and optical possibilities can be utilised for the production of a photograph.

Next week we shall commence our usual detailed notice of the exhibits, beginning (which is only right and proper) with those to which medals have been awarded.

KEEPING EXPOSED AND UNEXPOSED PLATES.

The question how long gelatine plates will resist deterioration, either before exposure or after, is one to which it is next to impossible to give a conclusive or at least a satisfactory answer. We have to bear in mind that each maker adopts an independent system of preparation; that it is difficult, if not impracticable, to arrive at an intelligible comparative estimation of the finished products; and that no two photographers agree in the mode of keeping and otherwise treating the sensitive films. Notwithstanding this uncertainty and ignorance in regard to so vital a point, experience should teach us certain broad truths which, if thoroughly understood and properly applied, will not fail to assist us in meeting the matter with tolerable wisdom.

Entirely unlike rare wines, valuable pictures, and so forth, sensitive films are not designed to last for long periods. They are eminently what might be called of a perishable nature, and therefore the sooner they are used the better. Yet, notwithstanding such an obvious fact, many persons, somewhat unreasonably we think, are in the habit of discussing the keeping qualities of prepared plates from practically the same point of view as the probable permanence of paper prints—an absurdity which some makers of plates, no doubt unconsciously, help to accentuate by declaring their plates capable of keeping "indefinitely." On the other hand, there is with numerous people quite a mania for fresh plates, to which they add the belief that no plate retains its original good qualities, under any circumstances, for more than a few months. This theory may hold good in particular instances, but we incline to believe that in the majority of cases it is carrying caution to an unnecessary length, and is often as wide of the mark as the expectation that an intimate mixture of gelatine and bromide of silver will remain unchanged for many years.

Undoubtedly, the sooner gelatine plates are used the better it is likely to be both for producer and consumer. Where, however, it becomes necessary to retain them for any length of time before use, we may mention that several authorities join in counselling the removal of the plates from the packing boxes and their storage, pressed tightly film to film and wrapped in well-dried paper, in air and light-tight receptacles. This course has also been strongly recommended for exposed plates which may have to await development for a considerable period. There is also practical unanimity in the opinion that neither exposed nor unexposed plates should be left in the dark slides any longer than can be helped, which, seeing that air and moisture, besides emanations from the slides, are certain causes of fog and other forms of deterioration, is a piece of advice that we do not hesitate to repeat with emphasis. By many, grooved boxes are not preferred to the cardboard boxes in which the plates are sent out, inasmuch as the latter, in every good manufactory, are always thoroughly dried before use, and are "made"—that is, cut, covered, and pasted from the outside, while the grooved boxes are frequently made by those who fail to understand the necessity of rendering them as harmless as possible.

It would be profitless to consider in detail how long gelatine plates—whether in their original packages or stored as we recommend them—may be kept without undergoing deterioration, and for the reasons already stated; but probably we shall be well within the mark in expecting that under the best conditions an average of eighteen months may be safely allowed to them. Some, of course, last longer and others shorter periods—we simply strike what we consider a fair average. Plates have been proved to defy innumerable vicissitudes of situation and atmosphere for five, and even six years, but this is exceptional. On a recent photographic excursion to the Thames Valley we exposed some plates that we had had for about three years. We were doubtful of their identity, not having kept them with a view to their ever being used, yet on development the character of the negatives conclusively showed that the sensitive films had not suffered the least deterioration. This, we are glad to know, is no common experience; but, *en revanche*, we often hear that plates not made as many months behave in an opposite manner.

The term deterioration may, of course, be applied in different ways and with different meanings. Thus, some plates have a strong proneness to frilling, others to iridescent markings, which defects can be proved to be due to faults of manufacture. The deterioration we are now treating of arises from imperfect methods of keeping the undeveloped films—their retention too long in the original packages, or in the dark slides, or in unsuitable boxes or wrapping papers. By observing the recommendations given above such risks are greatly lessened, if not actually destroyed.

Many good judges profess to descry advantages in purposely keeping plates for a few months, it being believed that if plates with a known tendency to frill are thus held back the defect partly, if not wholly, disappears. There is, on the face of it, some possibility of this being the case. We should, however, scarcely believe, without proof, that plates increase in rapidity by keeping, as some suppose. On the other hand, if we consider the difference in the methods of preparation, it is easy to believe that slow plates keep better than quick ones; this we have experienced from observation. As to whether the undeveloped image fades in course of time no proof has as yet been forthcoming, and we should be disposed to dis-

believe in the accuracy of such a conclusion, except in very extreme cases. It has been stated that the undeveloped image gains in vigour between exposure and development, but this we have little hesitation in rejecting as improbable.

On the whole, except where frilling is apprehended, the balance of advantage is decidedly against keeping plates for a length of time, although we believe such may be safely done in case of necessity. But, we repeat, the sooner a plate is used the better. The observance of such a rule will do much towards establishing harmony and satisfaction among makers and users of plates respectively.

UNSUSPECTED CAUSES OF FADING.

It goes without saying that of the multitude of examples of faded silver prints that are, or may be had, in evidence, in almost every studio, and, indeed, in almost every house in the kingdom, common consent has saddled the fixing agent, the so-called hyposulphite of soda, the familiar hypo (properly known as sodium-thiosulphate), with the sin in the vast majority of cases; wrongly so in many instances, whether in the majority of them we will not now stay to inquire. "Hypo" in mounts is now an old story; every one who reads his JOURNAL is familiar with the fact that a large number of the mounts made for photographers' use are unsuitable for such use on account of the presence of hypo, which, as we have so often been told, is used as an antichlor, *i.e.*, to so react with the chlorine used for bleaching the pulp as to render it innocuous. As this deleterious ingredient has been found in dark-coloured quite as much as in pure white cards, the question very naturally presents itself—"Are such objectionable cards made direct from good pulp, or from batches of material rejected as unsound for other purposes? If paper pulp is to be shortly converted into coloured—be it cream or other darker colour—paper, where is the use or the economy of bleaching at all?" It cannot but be admitted that there is suggestion of imperfect or defective material coloured to pass it off as good, where the bleaching process itself has no *raison d'être*.

There has lately been brought to our notice the existence of a state of affairs in a large and well-known studio which may ultimately lead to great disaster, and which itself is of such probable occurrence in other studios that we hasten to bring it under our readers' notice.

It is the rule rather than the reverse, in large towns, for the studio to be like lock-up shops—that is to say, all the staff leave at the close of business, locking up everything behind, or, perhaps, leaving a caretaker on the premises. In the case we speak of the caretaker lived on the adjacent premises, and had access to the studio for cleaning purposes, or for gathering up and washing all soiled towels, and so forth, used during the day. Being of an inquiring mind, and not gifted with an acute perception of the laws of *meum* and *tuum*, she, knowing the virtues of soda, at once seized on some crystals and took a supply home. This little transaction remained undiscovered till circumstances fortunately arose requiring the caretaker's permanent absence. Then the secret was one for but a short time longer. The proprietor was informed. "I keep no soda," he said. "I'll show you the very barrel it came out of," said the boy who had "split." He led the way to the hypo barrel. For some unknown time the towels and the cloths used for drying prints had been submitted to the tender mercies of this pernicious female, who had used hypo for soda, and very likely not rinsed the cloths in clean water. It was impossible to learn any details, or to discover for how long a time the hypo had been so misused; it may be hoped that its uselessness for the purpose would tend to its being thrown away. The mere narration of this near approach to a real disaster will serve to put other similarly circumstanced photographers on their guard against charwomen and others having access to the store of hypo.

The present will be a suitable occasion for recounting another case of misused hypo which happened a number of years ago in the practice of one of our contributors. Daily, on the occasion we describe, he was perturbed by clients bringing back to him prints that had become spotted in patches with peculiar light marks—some to a great extent, others scarcely at all. He had had experience of the evils of bronze printing, and for a while, and incorrectly as it happened, put these returned prints in the same category. It is not necessary to describe the various further steps he took to discover the real cause, until the day of its discovery.

He had eliminated most of those possible by discovering that the marks were all in the neighbourhood of the stippling on the print. He jumped to the conclusion that the gum employed must be acid, perhaps some "ready-made rubbish." But no, it was pure and sweet; he was still baffled. Next he asked his spotter, "What water do you use?" "Oh, some I keep in a bottle on purpose." "Where did you get it from?" "I went to the toning room, and as the water was off at the main, I got it out of a dish like this, but it was quite clear."

The "this" was the trough wherein was left the fixing solution used for the day's prints. And we have the photographer's word that this literally happened, and this "water" had been in use for a month or two. It needs no argument to prove that the story is probable; it is very likely that the same *contretemps* under, possibly, different surroundings may have happened in many other places. We do know of an instance where the toning and fixing of prints being carried on in the kitchen of the dwelling house attached to a certain studio, greatly to the disgust of the help, she on one occasion took upon herself to remove the flat dish containing the hypo that had been put aside to dissolve. She merely lifted it from one end of the bench and put it at the other, to make room for her own work, but to do this necessitated carrying the dish over the toning solution, the inevitable spill of a few drops into this toning solution following. Those of our readers who are ignorant of the effect of even only half a dozen drops of hypo solution in a gallon of toning bath may with advantage try for themselves (on a small scale would be better).

It is clear that when disasters such as we describe can so readily happen, a watch and guard, nay, a lock, put upon all hypo receptacles might, very possibly, considerably reduce the number of unsuspected causes of fading.

MANY will be glad to see that there has been a considerable fall in the price of silver. The metal is now being quoted at over fourpence halfpenny per ounce less than it was three or four weeks ago. The fall has been rapid, a penny to three halfpence per ounce in a single day. This is very unusual, but the silver market may be said to be in an abnormal condition just now.

WE wish we could say the same with the price of platinum as with silver. Its price, instead of receding, is advancing, and, unfortunately, there is every prospect of its continuing to do so. This is certainly a misfortune, as it must to a great extent retard the progress of

platinum printing, and more particularly the new modifications wherein the image is first produced in silver, and afterwards converted, more or less perfectly, into one in platinum. This method of printing is one of great promise as regards permanence if the whole, or the best part, of the silver is replaced by the more stable metal.

The Chemical Union, of which there has been a great deal of talk lately, but very little definitely known, has, it is stated on the authority of a news agency, issued a prospectus to the manufacturers concerned therein. From this it appears that the capital is to be eight and a half millions, seven millions being set against works, plant, land, and buildings, and one and a half for stocks and working capital. Paper manufacturers, as well as other large consumers of chemicals, naturally look with no very favourable eyes on this combination. At the present time foreign competition in the paper market is very keen, and if English makers have to pay an enhanced price for their material they will be placed at a great disadvantage. There is a rumour, as we said a short time ago, that the paper makers are likely to form a Union amongst themselves to manufacture such chemicals as they employ, and thus be independent of the ring.

Speaking of paper reminds one that the foreigners have the entire trade of photographic papers in their own hands, and meet with no opposition whatever from English makers. English papers stand pre-eminent everywhere, yet the makers do not seem to care about taking up the manufacture of one suitable for photographic purposes. This is surprising, seeing that the prices paid for these papers are far in excess of those of the very finest and most expensive writing papers. All the photographic paper used throughout the world is at present made by three, or perhaps four Continental firms, and they have for many years held the monopoly without opposition.

The impurity of photographic mounts is still a subject of anxiety amongst photographers who are careful of their reputation. Many there are who would willingly pay a higher price if they could receive a guarantee that the mounts were what they ought to be—that is, contain nothing that might act deteriously on the photographs mounted upon them. This none of the leading London makers will give. We find, on inquiring amongst them, that photographers will not pay the price for cards in which only the best materials are used. One of the largest cardboard manufacturers in London, and whose cards have a world-wide reputation, told us recently that the photographic mount trade was now so cut up by foreign goods that they had practically relinquished that branch of the business. Upon suggesting that we believed there were some photographers who would not mind paying a good price for reliable mounts, the reply was that past experience had taught them that the business would not prove remunerative, owing to the rush after low-priced goods regardless of quality beyond appearance.

That there are, however, many scrupulous photographers amongst the profession who would give more for mounts upon which they could rely is beyond question. The other day we were shown some cabinet and panel portraits mounted on the ordinary commercial mounts, but the photographer had first taken the precaution to first mount a piece of plain paper a trifle smaller than the photograph on the card, and on this mounted the pictures. By this means the photograph was insulated from the mount, and would be in a great measure protected from any deleterious material it might contain. Of course, this method of procedure is costly, both for time and material, but with it greater permanence is secured, though by a roundabout way. The paper used for the insulation was, we believe, the Saxe paper. A pure paper must necessarily be employed for the purpose.

Apropos of the article last week on the expansion of paper in photomechanical processes, it may be mentioned that if paper be rolled several times under very heavy pressure its expanding property is in a great measure destroyed, even when the paper is afterwards wetted. At the Ordnance Survey Office we are told that the paper is always heavily rolled before being taken into use.

While photographers are speculating on when the automatic photographic machines are to make their appearance, and with what form of lens they will be furnished to take portraits with during the dark days, another "penny in the slot" affair to do with optics has made its *début*. In appearance it is very like the usual automatic machines, except that it is furnished with a pair of lenses with shades, which give it somewhat the look of a large revolving stereoscope. It is, however, for testing the sight. The *modus operandi* is this: A penny is put into the slot; then, while looking through the lenses, a handle is turned until one of the numbers within is seen distinctly. The number is noted, and a card taken from the drawer. This, together with a certain sum, is to be sent to a given address, and a pair of spectacles to suit the sight are to be forwarded in return. What do opticians think of this?

Ancient ideas are sometimes useful. Here is one. A few days back we saw an antiquated camera of large size for twenty-four-inch or larger pictures. It was of the old folding type for travelling, with double dark slides for paper negatives, and was probably made in the early "fifties," if not before. The peculiarity about it, and to which we direct attention, is that the focussing screen, instead of being composed of a single piece of glass, was glazed with several squares, like a window sash. The advantage of this is that in the event of an accident the chances are that only one or two of the squares would be broken, hence the screen would still be usable; whereas, with a single piece of glass the screen would be placed *hors de combat*. It would be by no means a bad plan to make the focussing screens of all cameras for outdoor work on the sash principle. It would often save serious inconvenience. Many old and far less useful contrivances than this have formed the subject of modern photographic patents.

SAMUEL FRY.

Mr. Samuel Fry, whose death we are very sorry to announce, has been, in a sense, a public man in photography for more than a quarter of a century.

It was in 1857 that he commenced his career as a professional photographer in connexion with the then London School of Photography. Two or three years afterwards Mr. Fry commenced business on his own account in King's-road, Brighton. He subsequently removed to London, and opened a business in Gracechurch-street. This was during the *carte* mania. He eventually settled at Surbiton, where he established a high-class business.

In the early days of gelatine plates he went in for their manufacture commercially, and to afford him the opportunity of devoting his undivided attention to this branch he disposed of the portrait business, which is still being carried on. As most of our readers are aware, Mr. Fry ultimately disposed of his dry plate business to a limited Company, the state of his health rendering necessary his retirement from active business.

The immediate cause of his death, which took place on Sunday last, the 28th ult., at the age of fifty-six, was heart disease, accelerated by other ailments. He was buried yesterday in the Friends' Burial Ground, Kingston.

Mr. Fry was formerly a frequent contributor to photographic literature, was a trenchant writer, and a man of active business habits.

DEATHS BY INHALING THE FUMES OF NITRIC ACID.

Since we recorded, last week, the death of the two firemen who succumbed in consequence of the inhalation of some deleterious gas on the occasion of the fire on the premises of Messrs. Mawson & Swan, Newcastle-on-Tyne, it has been ascertained that the fatality was not caused by bromine, as was at first surmised, but by nitric acid.

The premises of Messrs. Mawson & Swan, where the fire occurred, are situated in Mosley-street. It is one of the best-known establish-

ments in Newcastle, and its extent is very considerable. Besides manufacturing photographic and electrical apparatus, which comprise the more recent additions to their business, Messrs. Mawson & Swan have very extensive stores of chemicals, of which they sell great quantities. A fire occurred in one of the rooms on the basement, the result of the explosion of a carboy containing nitric acid. This acid acts energetically on organic matters, and the result of the freeing of the liquid from its receptacle, and its contact with other substances, was the rising of dense poisonous fumes, which quickly filled the room.

From the *Newcastle Weekly Chronicle* we learn that Messrs. Mawson & Swan have a fire-extinguishing apparatus of their own, and it was immediately brought into use. They also sent a telephone message for assistance to the headquarters of the fire brigade in Thornton-street, Westgate-road, Newcastle.

The firemen, on their arrival, relieved Messrs. Mawson and Swan's people, and set to work vigorously to inject water into the room. No flames seem actually to have been visible, the place being full of the dense, suffocating smoke from the nitric acid. The attempt to enter was followed by considerable pain on the part of those who inhaled the fumes. William Murphy, one of the oldest and most esteemed permanent members of the fire brigade, although strongly warned of the danger, bravely advanced into the place, carrying with him the nozzle of the hose that had been fixed to a hydrant. After a few moments he began to show evident signs of distress, and those others who had followed him found the atmosphere so suffocating that they were obliged to retire. Some of them urged Murphy to come out of the place, but it appears that he did not do so, either because he was unwilling to leave his post of duty, or because the poison had affected him so much that he was unable to move from his position. Some of his comrades, believing that he required assistance, went to his aid and brought him out. Murphy was then greatly distressed, and was breathing with difficulty. He was placed in the tender and was removed to the fire station. Those who remained continued their work, but none ventured so far as the place from which Murphy had been rescued. Several of them, however, were even then suffering, and soon afterwards Fireman Grey, a powerful and energetic brigadesman, was obliged to give in, and he, too, was conveyed back to the station. By five o'clock the fire was at an end, little damage having resulted beyond that which was caused by the water.

Dr. William Teesdale Wilson, who first examined and prescribed for the injured men, states that on his arrival at the station Murphy and Grey were very ill, and the others showed evidence of the effects of the poison. On learning the nature of the ailment he at once proceeded to get the men to inhale ammonia to neutralise the acid. The firemen were seated round the table for some time at this operation, but as the men became prostrated he ordered them to bed. As to the nature of the injuries the men received, the doctor states that the fumes were really those of nitric acid in a gaseous state, which on inhalation were carried into the minute ramifications of the air cells of the lungs. This set up intense irritation, and nature asserted itself by causing a secretion of mucous. The cases very much resembled acute capillary bronchitis. The secretion on the part of Murphy and Grey was so copious as to cause asphyxia, or death by suffocation. Murphy from the very first was so severely affected by the poison that his case was hopeless. The secretion was thrown off by the deceased men to an extraordinary extent, and with the object of performing tracheotomy, messengers and telephonic messages were sent to physicians, a few of whom arrived after Murphy and Grey died. In the case of Bowey, remedies of a stimulating nature were resorted to. Drs. Dodd, Baumgartner, Page, and Wilson held several consultations during the course of the evening and the early hours of the morning. During the small hours of the night Bowey gradually became worse. All treatment seemed of no avail, and it appeared as though every moment would be his last. Being endowed by nature with a wonderful constitution, however, Bowey had been able to withstand the first onslaught of the insidious effects of the gas. Poultices and hot bottles were applied, and as a last resort he was bled in the arm, but without any successful result, as the blood coagulated. So hopeless did the case appear that any further interference seemed to be only adding more torture to the injured man. About eight or nine o'clock on Wednesday morning symptoms of an improved condition showed themselves. It was then decided to try the effects of the inhalation of pure oxygen at intervals. Whether they could ascribe the improvement to the inhalation of oxygen or not, the fact remained that he was considerably better. The change undoubtedly showed that Bowey had a marvellous constitution, with which he might ultimately shake off the terrible effects of the poison.

It is gratifying to be able to record that the Mayor and civic functionaries of Newcastle have interested themselves in starting a fund for the benefit of the families of the unfortunate firemen, and that Messrs. Mawson & Swan have headed this with the handsome subscription of two hundred and fifty guineas.

The deaths here recorded are not the first that have occurred in a photographic stock house through the inhalation of the fumes of nitric acid. The esteemed head and senior partner of a well-known Boston (U.S.A.) photographers' supply house, Mr. Charles H. Codman, a few years ago lost his life under the following circumstances: A carboy of nitric acid was accidentally broken, and the liquid spread over the floor with great rapidity, causing a fire. When the breakage occurred Mr. Codman was seated at his desk, which he immediately left to give the necessary orders in the emergency. While doing this and seeing that they were executed he inhaled the fumes, and falling on the floor had his clothes burned. This occurred at ten o'clock in the morning. After the fire (a small one) was extinguished, Mr. Codman kept about his work till two o'clock, when he began to feel sick and went home. During the night the results produced by the poisonous vapour became more apparent, but next afternoon he rallied and desired to be taken out for a drive. Death ensued, however, before this could be carried into effect.

From this experience, those storing large quantities in enclosed situations should take warning.

ANOTHER FLASH-LIGHT EXPLOSION: A WARNING.

I have recently had a sufficiently disagreeable experience of a flash-light explosion which resulted in injury to a Japanese sailor and to myself, not serious, fortunately, but that were very nearly being so, and as a few particulars may serve as a warning to others, I send a short account of the whole occurrence.

The explosion took place in connexion with some experiments in deep-sea photography which were undertaken at the suggestion of Professor J. Milne, F.R.S. I do not intend here to give any elaborate description of the deep-sea photographic apparatus, as, if it is in any way successful, I shall have to make a special communication about it. It will serve for the present time to say that it consists of a heavy cast-iron box with a thick plate-glass window, containing a small camera, all mounted on four iron legs somewhat more than three feet long. The box had to be made very strong, as it was proposed to lower it to such depths as 200 fathoms, at which the external pressure is nearly 600 pounds per square inch. It consequently weighs, in air, over one hundredweight, and has somewhat the appearance of a huge spider.

The apparatus is designed to be lowered by piano wire, after the fashion of Sir W. Thomson's sounder, and the action is as follows: Immediately on the machine touching bottom the window automatically opens, and a second or two afterwards a flash powder is ignited in a bottle that is overhung by a lever so as to illuminate a dish at the bottom several feet in diameter. The bottle is so arranged that it upsets a moment after the window is opened, the act of upsetting letting a drop of sulphuric acid into the powder, which ignites it. The bottle, of course, is sacrificed.

I spent some time in experimenting in flash powders, my object being to find a powder that would ignite with sulphuric acid, and that would flash rapidly, but not with explosive violence. This I seemed to find in the following:—

Chlorate of potash	2 parts.
Sugar	1 part.
Ferrocyanide of potassium	1 „
Powdered magnesium	1 „

The machine was tried with success (at night time), first on land, then in the water of a deep reservoir in the University grounds, and everything went well. It was found, as might have been expected

that the quantity of powder needed for under water was very considerably greater than on land.

We were so far encouraged by our results that we took the whole apparatus to Misaki, a town about thirty or forty miles from Tokio, where there is a building in connexion with the University devoted to biological purposes. Our preliminary experiments were made in comparatively shallow water, a rope being used for lowering, as the piano-wire gear was not ready.

The proceedure was as follows:—Professor West's yacht, *Daimio*, was anchored in the bay, with a spinnaker boom rigged up as a derrick for lowering the photographic gear. The gear was carried out to the yacht on a sampan (a large flat-bottomed boat, rowed with a peculiarly formed oar at the stern), the bottle of flash powder not being placed in position till the gear was just ready for lowering. The bottle had 200 grains of the flash powder in it.

Our first experiment was in every way successful up to the development of the plate. The result of the first exposure—the only one made by the gear at the bottom of the sea by flash light—was unfortunately lost, partly by my own carelessness, and partly on account of the imperfect nature of the dark room that we had temporarily rigged up.

On attempting our second experiment we had the explosion. The flash bottle was stood in the bow of the boat, the gear stood in the middle. In the boat were Professors Mitsukuri and West, a couple of assistants, and myself.

We got as far as the yacht in safety, but here one of the sailors, stepping off the yacht on to the sampan, canted the latter so that the gear seemed likely to topple overboard. Both Mr. Mitsukuri and Mr. West made to take hold of it, thus canting the sampan still more. At this moment there was a blinding flash and a terrific explosion, followed by a great splash in the water. We were all, for the time being, blinded, and the general impression of each was that some one else had fallen overboard. As a matter of fact, it was the deep-sea photographic gear, but there was a scene that must have been grand could any one have seen it.

It was not till we had all got over our surprise, and were beginning to laugh at the incident and congratulate ourselves that it was no worse, that it was noticed that blood was running down the side of one of the sailors, and that my left leg was covered with blood from the knee downwards.

The laboratory was turned into a temporary hospital, and the wounded were attended to. The wounds were not serious; but that to the sailor might very well have been. He had been very violently struck in the side by a piece of glass, which, fortunately, struck his lower rib and rebounded. Had it struck an inch lower it would have penetrated deeply, and might have been fatal. For myself, my leg was considerably lacerated; but the only result was a few day's confinement to the house. Professor West was struck in the side; but, fortunately, the contents of his side pocket saved him from anything further than a torn coat and a broken pair of spectacles.

All this was highly interesting, albeit the interest was of a somewhat painful kind to those immediately concerned; but it is probably not so to the general public. What ought to be both interesting and useful to know is the cause of the explosion. Of course, the immediate cause was the upsetting of the bottle and the contact of sulphuric acid and the flash powder; but the further question remains, Why should a powder that, on the occasion of many previous experiments, both above and below water, in bottles and loose, had flashed without explosive force, on this occasion not only violently explode, but actually detonate—for it was certainly a detonation? The noise was heard all over the country side, I believe, for a distance of miles. My ears were singing for a couple of days after it.

The reason was one that might appear trifling, but it is one certainly worth knowing about. It was simply difference in the dryness of the powder. In the case of the first experiments the powder was not desiccated. In the case of the last it was roughly desiccated by leaving it for a couple of hours in a closed vessel along with some chloride of calcium wrapped in a piece of porous paper. I thus desiccated the powder because the air was unusually damp—even for this country—when I mixed it, and I thought the dampness might interfere with the quickness of the burning. I had no idea that the drying I gave would so enormously increase the rapidity of it.

The fact that so slight a thing as the drying of flash powder should connect it from a harmless inflammable into a violent explosive indicates the very great care with which such mixtures should be handled, if, indeed, they are to be handled at all.

W. K. Burton.

P.S.—The deep-sea photographic gear was recovered by a diver, and more experiments will probably be made with it. I think it could be worked quite satisfactorily from a fairly large steam vessel, but not with the means we have at our disposal.

STEREOSCOPIC WORK FOR AMATEURS.

II.

In my previous article I referred to the necessary adjuncts of an ordinary half-plate camera to enable a beginner to undertake stereoscopic work, and now proceed to offer a few remarks on outside working.

First comes the selection of a subject suitable for the stereoscope, and here a beginner must exercise patience and study to select such views only as are best adapted for this work, and perhaps there are no more lovely or suitable studies for the stereoscope than are to be found in many a country lane or hedgerow. One of the first essentials to a good stereoscopic picture is a strong or prominent foreground, but not too near the camera. When the lenses are set at three and one-eighth inches apart, I have seen one of the best stereoscopic effects produced by working in a bank of nettles into the picture, behind which was a receding lane with overhanging boughs. A beginner should strive to study well the nature of the views he selects. A bare, uninteresting, flat foreground, as a rule, never lends itself well to a stereoscopic effect, while a strong foreground, such as a projecting bush, or bank of ferns, or bracken, will work in nicely at, say, a distance of about fifteen or twenty yards from the camera, and show up in nice relief and contrast to the middle and extreme distances. An intelligent beginner will only want to take one or two examples of a really suitable view for the stereoscope to enable him to select only such as are best suited.

It must not, however, be supposed that an operator is tied down to hard-and-fast lines of landscapes for the stereoscope; some of the most lovely effects are procured in marine work also. As I write, I have in my mind's eye an exemplification of this class of work; the view represents a yacht tearing through the water, while in the foreground there is a lovely wave just curling its crest in the act of breaking. This just makes the necessary foreground to the picture, and is altogether one of the most notable effects I have ever witnessed in stereoscopic work; in fact, so realistic is it, that when recently showing this picture to a lady who had never previously seen through a stereoscope, she declared that this breaking wave was so natural that it made her feel quite sea-sick; this negative, I might say, was taken by that clever stereoscopic worker, Mr. Robb, and is perhaps the finest thing he ever secured. It is not often that such a chance offers itself to any one, but his hand camera was handy at the moment. As a rule, however, when working at marine pictures, some suitable objects, such as a small boat, or even the foam from the wake of a passing steamer, will be found to lend itself for excellent effects.

So much with regard to the choice of a subject. Now just a word or two anent the best light to employ when working on confined views, such as lanes or avenues with overhanging foliage. When possible, such should be taken without strong sunlight. A good, soft diffused light is far the best for this work, and will go a long way to prevent a chalky or snowy appearance of the foliage, provided plenty of exposure be given, with a liberal stop, and not too concentrated a developer used; but of this I may have something to say later on, when writing on the development of stereoscopic negatives. I always strive to avoid taking foliage after a smart shower of rain; the glitter of the wet leaves tends also to yield this snowy appearance in the resulting prints, whether they be on paper or glass. Perhaps there is no class of work requiring such untiring patience in the way of selection of calm moments as when working on near foliage, nothing looks worse than a blured indistinct mass of leaves. I have frequently waited for hours to secure one view without any movement in the foliage, but have generally been rewarded for my patience. I get the best results early morning, and late afternoon; there is at such times a much better chance of stillness, and this is of primary importance in all landscape work, no matter whether it be stereoscopic or otherwise.

So much for a few of the many outdoor subjects that offer themselves. When working on near views, such as groups or interiors, the lenses should be set at a somewhat closer distance than three and one-

eighth inches apart. This will tend to avoid exaggeration of objects in the near foreground. A slight study of binocular vision will enable a beginner to understand the reason for such an alteration in the separation of the lenses. When taking near views, such as groups and interiors, there are several contrivances whereby such can easily be arranged for; perhaps one of the simplest is having a space front for the camera. Another very excellent arrangement is that which Mr. J. Traill Taylor was the first, I believe, to mention, viz., having a wedge-shaped front to the camera. By merely altering the push of the wedge the two ends of the front are, of course, brought more together, or separate farther from each other as desired. It is simplicity itself, and can be easily applied to any front. It is always advisable, however, even when taking groups or similar subjects, to arrange them at not too near a point from the camera.

An intelligent operator will readily understand the importance of giving sufficient time to his exposures; perhaps in this more than any other branch it is of the greatest importance, for not only will the results be hard and spotty, but there will be a sad deficiency in detail, which is so necessary when viewing these pictures with aid of magnifying lenses or prisms. As to the best method of exposing, so as to yield exactly the same exposure to both lenses, I have before mentioned that in my landscape and general outdoor working I make use of my focussing cloth rolled up into a soft pad; but an intelligent worker will soon devise a means of giving equal exposures, even should it be the good old way of using a flap, such as the lid of a cigar box. Whatever method be adopted, let the operator strive to see that equal exposures are given. It is surprising when the development stage is reached how many little dissimilarities will crop up to annoy one in respect of unequal density to both negatives. But these inequalities, however, are not generally brought about by lack of equality in exposure. I rather suspect they are more frequently traceable to uneven plates, and a faulty application of the developer. Undoubtedly such faults in a negative are very annoying to any one when they come to be printed from, but a negative need not be discarded for such, for in the after manipulations of printing, be it on paper or glass transparencies, much can be done to counteract the mischief, especially in the case of where transparencies are printed and developed. But on this dodging up of a print from an unequal negative I shall speak more fully when I come to treat of the development of transparencies. Once let an operator feel the need of exercising the utmost care in producing fully exposed and equally developed negatives, and he will have done much towards smoothing away many troubles on his after working.

As to the development of negatives, I seldom like to advise good workers to change their formula, and I imagine it will only be good workers who will care to go into stereoscopic work. My best advice is, stick to the formula you are in the habit of working, and strive to turn out the best negatives you can with it. Personally, I prefer pyro and ammonia to all others, and am seldom bothered with what some dread in the shape of a yellow stain; I rather like a plate with a little in it. A wash in chrome alum prevents too much of the yellow discolouration when using pyro and ammonia, and should always be used. But by all means let a beginner work away with a known formula; he will find plenty new in stereoscopic work to exercise his brain without bothering about a new developer for his negatives.

In my next I hope to treat *re* the printing of paper prints and transparencies from stereoscopic negatives. T. N. Armstrong.

ON THE NATURE OF THE INVISIBLE IMAGE.*

This now is to the point: To what is the darkening due? Claudet, as has been already said, found that red or yellow light apparently undid the effect of white light upon an exposed Daguerreotype; but in a subsequent memoir he says:—

"But I had not yet been able to ascertain that when light has decomposed the iodide of silver, the red, orange, or yellow rays cannot restore the surface to its former state. The action of light which can be destroyed by the red, orange, or yellow rays does not determine the decomposition, which would require an intensity 3000 times greater. White light or the chemical rays which accompany it communicate to the surface the affinity for mercury, and the red, orange, or yellow rays withdraw it. I must notice here a singular anomaly, viz., that when the sensitive surface is prepared only with iodine without bromine, the red orange or yellow rays instead of destroying the action of white light continue the effect of decomposition as well as that of affinity for mercury. That is a double compound of iodine which is far more sensitive than the simple compound, and on which the red, orange, or yellow rays exercise their destructive action, as in the case of the bromo-iodide. The phenomenon of the continuing action of the red, orange, or yellow rays on the simple compound of iodide of silver was discovered by M. Ed. Becquerel, and soon after M. Gaudin found that not only do those rays continue the action by which mercury is deposited, but that they develop without mercury an image having the same appearance as that produced by mercurial vapour." (Hunt's *Photography*. Second edition. 1851. Pp. 199-200.)

Once, again, let us remark that this is equivalent to saying that the action of these rays is capable of darkening the Daguerreotype film so that the darkened product would correspond to the fixed portion where the mercury has not been deposited, which, therefore, being laid bare of the haloid salt, shows dark, on account of the black polished silver or oxide of silver formed by the treatment with nitric acid.

Shaw and Percy also made some experiments which cannot be ignored in any examination of the probability or improbability of the developable image consisting of the same substance as the printed-out or developed image (this latter with the exception of the Daguerreotype). Having determined the exposure which gave a strong image when exposed to mercurial vapour, they exposed a number of plates correctly. Some of these they set aside, others they treated with the vapour of iodine, of bromine, and of mixed iodine and bromine, respectively, and they found that the plates which had received no after treatment with halogen were capable of being developed by mercury, while those which had received an after treatment were not, and could be successfully re-exposed on another subject without re-cleaning the plate.

Now, though doubtless the ordinary developable image was destroyed by the access of fresh halogen when referred to the ordinary developer, whose business it was to take cognisance of and render visible in a particular way the unseen action of light, it would be perfectly absurd to maintain that the second application of halogen had exactly re-established the *status quo ante*. Certainly at a given instant an approximation to this was attained, but the construction at all other times was either less or more than the destruction, and we shall later receive very conclusive although indirect evidence that at the period at which the action stopped for the second time the construction was more than a mere re-construction.

We shall also be able to see that the doubly continuing action of the less refrangible rays discovered by Gaudin bear a singularly marked resemblance to a very simple compensating action of which photographers have constantly been in the habit of availing themselves.

With regard to Claudet's destruction of the first invisible impression, the same explanation holds good; at one point of time the interference of the complementary rays to those producing the first disturbance would exactly annihilate the primary impulse, and would then go on to produce an influence of their own to which the mercurial vapour might, or might not, bear witness in a manner recognisable by the eye. Nevertheless, we shall later quote Claudet once more to show that this law has more bearing on the resolution of the problem than the most detailed and plausible account of the chemical changes occurring in printing, developing, toning, &c. Ere we can do this, however, we must examine and generalise, first, as to the cause of sensitiveness to discolouration by light; second, as to the cause of sensitiveness to discolouration by development; third, as to how these causes interfere.

As far as we have gone yet, then, we see that an excess of soluble bromide is not conducive to what has, too loosely perhaps, been termed sensitiveness. As an admirable illustration of the fact that what is excess of sensitiveness to the one observer is a woeful deficiency of the quality to another, we may, before going on to the "darkened product," give a little attention to a silver salt which, in the past, must have been responsible for more than one grey hair.

Explaining the principle of "dry collodion," the irrepressible Editor of *Photographic Notes* says, in Vol. II., p. 395, "If a collodion plate which has been excited in the ordinary way is removed from the nitrate bath and set up to dry, a curious effect takes place. As it dries, the creamy yellow film of iodide of silver gradually becomes thinner, and disappears altogether when the plate is perfectly dry. The reason of this is that, as the moisture evaporates, the solution of free nitrate which remains on the plate becomes more concentrated, and finally so strong as to dissolve the iodide of silver; for iodide of silver is soluble in a *strong* solution of nitrate of silver. The clear, transparent film of pyroxyline containing the double salt (iodide of silver in combination with nitrate of silver) is nearly, if not absolutely, insensitive to light, and consequently unfit to receive an image in the camera." Hugh Breusser.

(*To be continued.*)

* Continued from page 618

OPINIONS OF THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

[*The Times.*]

The Exhibition of the Photographic Society, which opens to-day at the Gallery of the Society of Painters in Water Colours in Pall Mall, is certainly remarkable for two things. It illustrates very forcibly the distinct improvement which has recently been effected in photographic printing methods, and it shows a marked advance—consequent to some extent on that improvement—if not in the artistic capacities of photographers, at all events in their powers of producing the most artistic results with the appliances at their command.

It was, until the last year or two, a commonplace among photographers that, while continual progress had been made in the method of producing the negative, no important alteration had been effected in the methods by which the ultimate picture was obtained from the negative. The well-known "silver" process was really only a modification of the earliest device by which a photographic image was produced, and it bid fair, though often threatened, to hold its own as the one generally applicable means of printing photographic pictures. Considering how many substances there are which are readily affected by light, and the numerous efforts made to utilise them, it is not a little remarkable that for so long no substitute for silver should have been found. The "carbon" process was, indeed, a dangerous rival, and allied to it are the whole range of processes depending on the same curious property possessed by gelatine and other like bodies in combination with one of those chemical sorts, of which the bichromate of potash is the best-known representative, that of hardening and becoming insoluble in the light. None of these gave the best possible results, suitable as they were and are for very many purposes, and for years the best pictures at Pall Mall were always printed in silver.

Then, some years ago, a new process of printing in platinum—to be strictly accurate we should speak of this as a process of printing in iron salts, platinum being deposited on the faint image thus produced—was brought out. At first it was recommended for its permanency chiefly, and because for it the glossy albumenised surface of the silver print was no longer needful. Its tones, however, were somewhat cold, and, if it was appreciated by the more artistic, the general public would have none of it. In the energetic hands, however, of the firm which held the patent rights for the process great improvements were made, and now a wide range of tone is available, from the coolest pearly grey to the richest sepia brown. Gradually it came more and more into use. The best workers adopted it. The public gradually got to appreciate it, and it now, except for the most ordinary class of pictures, is rapidly displacing silver.

The powers such a process gives were at once appreciated by the newest school of photographers, those who, not content with the most perfect transcript of nature—the ideal of a few years back—aspire to produce such a rendering of nature as would be given by a skilled artist in monochrome. There is, indeed, a school, comprising many of the cleverest amateur photographers, who advocate impressionism in photography, and inveigh against the clear, sharp pictures full of minute detail which were once considered its *ne plus ultra*. They would represent, not merely what the ordinary human eye (improved to the perfection of a photographic lens) sees, but the impression made on the artist's mind. Here there are difficulties. The camera cannot select and discriminate. It cannot omit an ugly object, or introduce a beautiful or suitable one. It cannot make those slight adjustments of the landscape which all painters do. The artist with a camera can but select his landscape, and choose his point of view, regarding, of course, those conditions of sky, sun, and cloud, light and shade, which make the difference between success and failure. A great deal, indeed, can be done in the development of the picture, but this power is as nothing compared with that of the man with a brush.

But at all events, they say, we can consider how a painter would treat this scene. He will indicate with skilful touches what he wishes us to realise, leaving something for the imagination. He will not give us the mean details, the buttons on that distant figure's coat, the texture of brickwork in that far-away cottage, the straw stems of the thatch upon its roof. Let us also avoid minute detail, let us attempt broad treatment and encourage the imagination. We can at all events put our lenses out of focus and see the result. And strange to say—in clever hands—the results were in many cases admirable. They charmed the artists, those artists, at least, who condescended to admit the existence of photography. The artist saw something much more like what he sought in his own work, and admired in the work of his fellows.

But they scandalised the old school, and they aroused in photographic circles a controversy fierce and loud. As is the wont in all disputes of an artistic nature, this one has been waged with no small degree of acrimony, and with many hard words on both sides. The worst epithet applied to the work of the old school seems to be "topographical," which, while admitting correctness of outline, conveys the covert sneer that the result is not even pictorial, let alone artistic. On the other hand, the impressionist work is "muddy" and "fuzzy," and, indeed, the fact that the chief tenet of the new school is that no object must be in sharp focus would seem to offer a certain justification for such epithets.

The question is not easy of decision, perhaps will never be decided. Those, however, who care to judge for themselves have an excellent opportunity of doing so now, for on the walls of the gallery are many admirable—and some not particularly admirable—examples of both schools. Prominent among those of the newer style are the works of Mr. Davison, to whom the judges have rightly awarded a medal and a place of honour in the gallery. Perhaps no more beautiful landscapes have ever been produced by photographic methods than Mr. Davison's *Old Farmstead* and *Breezy Corner*, to the former of which a medal has been given. In this one especially atmospheric effect is admirably rendered, and, looked at from a suitable distance, the picture gives a wonderfully true rendering of the subject, combining in large proportions the broad effect resulting from skilful artistic treatment with the actual truth in detail of a photograph. A series of smaller pictures, by the same artist, on the opposite wall, are equally worth study. All are printed in a sepia tone on the roughest of rough paper, and some, including it appears the large pictures, are done without a lens at all, merely with a pinhole. It is certainly a satire on the labours of the optician that, after the resources of science have been exhausted to produce a perfect lens, the best work can be produced with no more elaborate optical instrument than a bit of sheet metal with a hole pierced in it.

Work of something of the same character has gained Mr. Lyonel Clark a medal for a small view, *Dedham Bridge*, which has the further merit of illustrating a process invented by the exhibitor. Mr. Gay Wilkinson's exquisite little picture, *Sand Dunes*, is another instance of the way in which genuine artistic skill can treat a subject simple and commonplace enough.

Mr. H. Tolley takes a medal for a fine view of Bantry Bay, one of an excellent series, of which several others are almost equally deserving. Mr. Ralph Robinson shows a number of clever character groups, one of which has received an award, and Mr. Shapoor N. Bhedwar has been equally fortunate with one of his careful and well-executed series of views from posed models.

Mr. Lyddell Sawyer shows some fine views of the Tyne, and has received an award for a cleverly-arranged rustic group, *Two's Company*, a slighted swain regarding with gloomy brow the dalliance of his fair one with a more favoured youth. Mr. J. B. Wellington has an award for a study of figures, *The Latest News*, and Mr. J. E. Austin for his *Love Letter*.

Two medals are given for portraits. Mr. R. H. Lord takes one for an excellent, if somewhat conventional, *Study of Two Children;* Mr. Byrne the second, for a large-size, full-length portrait. Mr. Van der Weyde's group, *An Invitation to Supper*, might perhaps be classed with the portraits. It represents a number of persons in fancy dress, who may be supposed to be passing along a corridor leading from the ball-room to the supper, and its skilful arrangement and admirable workmanship well justify the judges in their award.

Amongst pictures which have not received any award must first be mentioned those shown by two of the judges, Mr. Gale and Mr. H. P. Robinson; these are, of course, *hors concours*. Mr. Gale shows several figure studies and groups, perhaps the best of them *The Ferry*. His work, which is all small, and full of the clearest, most delicate detail, may well be compared with that of Mr. Davison, for the two together show the extremes of their respective schools, both as good as they can be. It is as different as possible, occupying, indeed, the other end of the scale, and showing merits of an absolutely opposite character. Mr. Robinson's work also may be taken as a standard of excellence with which to measure the pretensions of the innovators, and he shows some fine large landscapes with figures which may serve as excellent tests.

Two heads, *Studies from Nature*, by the late Robert Faulkner, seem to have been overlooked by the judges, who might also have been almost justified in considering the claims of Mr. Arthur Burchette's *Belle Bretonne*. Mr. Wainwright shows some good landscapes—of the sort which took prizes a few years ago—and so does Mr. Bedford. Mr. Dresser's *Corbière Rocks at Half Tide* is worth notice, so is the photograph by the same gentleman of boys playing leap-frog, as an illustration of the detail which can now be obtained in very rapid pictures. Messrs. West and Mr. Symonds show some of their well-known yacht pictures, good as ever, but, of course, not presenting any really novel features. Mr. H. Robinson, besides his pictures above referred to, sends an interesting series of portraits of Royal Academicians. Of other portraits there are not very many. Mr. Mendelssohn sends some, of the usual fashionable style, and Mr. Byrne has a good collection. Among other pictures worth notice may be mentioned a frame of small views by Mr. K. Greger, Mr. Gambier Bolton's kittens, Mr. Kimberley's winter scenes, and Mr. Brownrigg's views of the Alhambra. Some carbon enlargements by Mr. Flather, with what he terms "dry-point needle-finishing," are extremely good. There are not many lady exhibitors. Among them Miss Florence Harvey is the most successful. Her *Dutch Fisher-folk* shows considerable skill in selection and grouping. Mrs. W. P. Arnot also shows some heads and figure studies.

There are, as usual, some fine examples of photo-gravure, Messrs. Boussod, Valadon, & Co. being the principal contributors. Looking at such a picture as the reproduction of Mr. Luke Fildes's *Al Fresco Toilet*, one cannot help the remark that it is well the length or breadth of the room separates these graceful figures from the self-conscious models appearing in too many of the photographic groups. Too close a comparison would be hardly fair.

Of illustrations of scientific applications of photography there are very few in the exhibition, a fact all the more remarkable since photography has of late found so many and such important applications. A photograph of the moon, taken without an equatorial movement, is evidence of manipulative skill on the part of the producer and of the speed of his plate, but it can hardly be considered representative of the work now being done in astronomical photography. Scientifically, the most interesting and the most novel exhibit consists of the illustrations of the photographic application of pinacyanole, a new coal-tar dye. This substance, first brought to public notice at the recent meeting of the British Association at Leeds by Messrs. Green, Cross, and Bevan, possesses the property of being decomposed by light. In its undecomposed condition it reacts with other coal-tar derivatives to form colouring matters of various shades; when decomposed it loses this power. If, therefore, a fabric dyed with pinacyanole be exposed under a pattern or picture, the pattern or picture is reproduced. Where the material has been protected from light it is in a condition to combine with the other colouring matters; where the light has acted it is not. The picture, therefore, can be brought out in the colour desired by treatment with the proper colouring matter, which attacks the undecomposed portions, leaving the rest, where the light has done its work, unaffected.

The process would appear to be capable of very various uses, and suggests the application of photography in a new direction, thus adding yet one more to the many and diverse purposes for which it can now be applied.

The attention of the amateur—and who is not nowadays a photographic amateur?—will be attracted by the collection of apparatus on the table—cameras, tripods, shutters, and all the myriad appliances considered necessary nowadays for the successful prosecution of the art. When we heard of such feats as that recorded by Mr. Frank Stevens, who in his book, *Shooting for Sunday*, tells how with his detective camera he stalked and "took" the wild rhinoceros at twenty yards' distance, we must admit that there is a use for the latest cameras which appear in such numbers on the table, even though we doubt if many of the pictures on the surrounding walls were obtained by their aid.

[*Daily Telegraph.*]

The Annual Exhibition of the Photographic Society was inaugurated on Saturday evening by a *soirée*, at which the president, Mr. Glaisher, F.R.S., gave welcome to some 450 members and friends. The exhibition, which is held at No. 5a, Pall Mall East, will remain open until November 12. There is a considerable variety of pictures, and most of the leading representatives of the art have examples upon the walls. Mr. R. W. Robinson shows a striking series of portraits of Royal Academicians, Mr. Gray Wilkinson some fine seashore studies, Mr. Lydell Sawyer a group of pictures, including a pretty River Thames steamer "off to the seaside," Mr. Frank Green some natural and realistic cloud effects, Mr. Harry Tolley several Indian sun and snow scenes, Mr. Byrne a collection of "At-Home" pictures, while Mr. Sharpour N. Bhedwar sends from India a set of charming and graceful groups. As a whole, the show is one marking decided advance in execution, and well repays a visit.

[*The Standard.*]

The Annual Exhibition of the Photographic Society holds to-day its "private" view, and offers, by all accounts, a display in every way worthy of those through whose care it is organized. Novelties in apparatus and in manipulation are there in ample variety, and though it may appear well nigh impossible to improve upon the efforts of previous years, the impossible has been achieved in some instances. Delicacy of printing, rapidity of execution, artistic grouping, and that combination of light and shade which is the Alpha and the Omega of a picture, at best but a shadow itself, show distinct advances over the efforts of former Exhibitions. Still, it must be confessed that, taken as a whole, one photographic show is amazingly like another. There may be more, or there may be fewer "studies." The landscapes may be nearer transcripts of nature, or they may be more remote reminiscences to the scene depicted. The human beings who look at us from the walls may happen, owing to the absence of self-consciousness on the part of the subject, to look out quite as wooden as they used to do. But the result is much the same. All are photographs—all are momentary reflections of the mood which may have been accidentally presented to the unsympathetic lens. They are not idealisations—not what a painting ought to be, pictures giving the average appearance of an individual or of a subject. That the camera never can attain; for though the almost instantaneous execution enables the sensitive plate to seize a passing glance, it is seldom that even professional models can entirely abandon that peculiar tell-tale countenance which is well known as "the photographic face." The rapid plates have, however, done much to relieve the sitter of that terrible weariness which is the chief characteristic of the first sun pictures. Nowadays, almost before the customary request to "look pleasant" has been pronounced by the gentleman behind the black cloth, a click informs the patient that all is over. The present generation, to whom the fussiness of the "poser" is irritating, cannot imagine what must have been the torture endured by their predecessors. Forty or fewer years ago or so, the person who essayed to have his Daguerreotype taken had to sit screwed to the back of a chair, his face dusted over with a fine white powder, and his eyes tightly closed, while the full glare of the sun was permitted to play upon him. When Draper, in order to lessen the painful fatigue of the brilliant light, placed between the sitter and the sun a glass tank filled with ammonia sulphate of copper, which filtered out most of the heat rays, he was thought to have effected a vast improvement. Finally, when the whitened face was dispensed with, and the sitting reduced to a few minutes, there were folk who fancied that the millennium had arrived for the sun-painter and his clients.

But though, as the present Exhibition offers ample proof, we have learned a good deal since then, the advances of late years have been mainly in apparatus, in the ease and rapidity of manipulation, and in the art of printing the negatives in a manner which ensures greater beauty and durability to the positives. Artistic talent has also been pressed into the service of the science, but it has been more frequently displayed in landscape than in figure work. And in the greater number of cases the improvements have been effected by amateurs. The latter are, indeed, in many instances amateurs in name only. They do not make a profession of what is the amusement of their idle hours. But in skill and knowledge a large number of them are more than the equals of their teachers. They have, moreover, time and money to devote to experiment which are not at the disposal of the professional, who must spend his hours of daylight in earning an income by the process which enables him to secure sitters at a price not higher than those charged by his rival round the corner. No doubt a vast number of the amateurs who infest the highways and byways, who jump from a bicycle, produce a 'kodak' or a 'detective,' or set three legs astraddle with a quarter-plate camera on the top of them, take a 'shot' at the fair face of Nature, and are off again, are but indifferent competitors with the professional. But the amusement keeps them out of mischief, and their handiwork is better than a pen-and-ink description, and more accurate than the best of pencil sketches. And it pleases the executant, though the average 'picture' of the average amateur, working with rapid dry plates, paper rolls, or celluloid films, which during the past twelve months have almost displaced glass in the baggage of the tourist, is not calculated to make the sun proud of his proceedings. The professional has, therefore, no temptation to be jealous of this kind of amateur. He is an excellent customer for apparatus, and in other ways brings much grist to the photographic mill. It is certain that, after good-natured friends have once submitted to have 'their portraits taken' by him, they are not at all likely to repeat the process, or to entertain in the future a less appreciative opinion of the professional than of old. Hence, there is, perhaps, no occupation in life in which one class of workers are on better terms with the other. Yet, it is none the less true that a large proportion of the best work on view to-day will probably be credited to the men and women who practise photography as an amusement.

There will be some disappointment. Amid all the excellent landscapes and seascapes, cloud studies and compositions, we shall look in vain for the oft-promised photographs in colours. A few months ago this discovery was affirmed to have been made by a Bohemian operator; but time has not confirmed all the pleasant things which were then prophesied. We fear that, as Captain Abney then declared would be the case, the nearest approach to success in producing coloured pictures by light alone is the suggestion to take three negatives of the same subject through different coloured glasses complementary to the three-colour sensations, which together give to the eye the sensation of white light. Yet even this method, still to be put into practice, is open to objection on account of the impure hue of the glasses used, and is not that "photography in colours" for which popular expectation has been so long waiting. To take a photograph on a plate, after the usual manner, and hope to see every shade displayed just as they are seen in the ground glass of the camera, is hopeless, for the simple reason that no possible chemical can ever be affected at the same time in a dozen different ways by the same kind of light. In short, though it is rash to play the prophet in any science, and especially in one like photography, the progress of which depends upon discoveries in optics and in chemistry still unmade, the feeling is beginning to gain ground in the minds of men not altogether pessimists that in taking pictures by the sun we have, as in microscopy and astronomy, gone about as far as we are ever likely to get. Better apparatus, easier handling of these delicate tools, and more extensive applications of the art to everyday life, are probably the chief advances which the future has in store for us. The automatic machine, by which, at the cost of dropping a "penny in the slot," a recognisable likeness of the investor is to be shot out by wheels inside, is, perhaps, in a rough way, the forecast of what in a more refined fashion will be accomplished in the future. No traveller in distant lands now thinks of laboriously painting the scenes through which he passes, or, like Bruce, spending months of patient skill in depicting, with all the errors introduced by the "personal factor," the architectural remains of antiquity. Five minutes' labour, and the most minute details of the most intricate design, the face of the most *bizarre* savage, or a landscape which no words could ever fully describe, are transferred for all generations to a dry glass plate, or better still, to a film of gelatine, or a piece of paper sensitised by "emulsion." This negative is even more acute than the eye. For now that the heavens are being systematically photographed by international co-operation, it is not unfrequently found that stars appear on the plate which the observer had never noticed with the telescope. The motions of an animal, the zigzag of a lightning flash, are now caught by the

camera. *Facsimiles* of rare manuscripts are so easily produced by the same obedient amanuensis that the possession of a priceless codex is no longer an anxiety to the librarian; and the American book pirate has learned by photography to reproduce them so cheaply that their patrons are content with the sham instead of the reality. But beyond these and a hundred similar applications, the sun-painter seems unable to go.

[*The Globe.*]

There has been a private view to-day at the rooms of the Royal Society of Painters in Water Colours of the annual exhibition of the photographic Society, which opens to the public on Monday, and remains open until November 12. In point of size the exhibition is much the same as in previous years; but is increasingly interesting from the popular point of view, from the fact that there is far less of the portrait element and much more of the pictorial. Consequently it is more an amateur's show than one by professionals, and as amateurs excel in landscape and *genre* subjects the exhibition largely gains in attractiveness by the change. Still, almost necessarily, perhaps, at present, there is much on view that is crude and amateurish. There are not a few exhibits that hardly deserve a passing glance, and some that claim scarcely more. It is difficult to conceive why some should have been hung at all. Of the bulk, however, it may be said that they show more or less artistic instinct, as well as technical skill; while the number that are real works of art is decidedly on the increase. One feature in the show is sure to excite wonder in the minds of many of the visitors, especially those unacquainted with the present photographic craze. It is that the majority of the Society's medals should have been presented to faded-looking "fuzzy" pictures, out of focus, and generally indistinct; printed on sensitised rough drawing paper. There are an abundance of pictures that will seem to the many far more worthy of these distinctions, and it is exceedingly doubtful whether the present craze will find many admirers among the general public. Another feature of the exhibition is that the greater part of the pictures are of small dimensions, showing that the tourist camera has been in active and successful operation. The number of enlargements is not great, but they are distinctly meritorious, while there are few direct pictures of the larger sizes, and those are almost entirely confined to portraits. Among the exhibitors are H. P. Robinson, J. Gale, Ernes Spencer, H. Tolley, T. M. Brownrigg, Lyddell Sawyer, J. E. Austin, and T. M. Brownrigg, who send a number of exhibits each—mostly landscape with figures, or cattle, or boats. No. 231 is an idealistic picture by R. H. Lord, which recalls Millet's masterpiece, and is a very successful art study. In a prominent corner is an enlargement by the Autotype Company of a negative by Browne and Shepherd, of Calcutta, of the Tozal Mahal, Agra, which is notable for its technique; and near by (No. 277) a very good study by Clarence James, entitled *His First Study*, and depicting a boy drawing a dog. No. 222, a study of two boys' heads, by Ralf W. Robinson, is one of the best things in the exhibition. In the apparatus department is a novelty entitled "Diazotype printing." It is a "positive process," based upon the fact that the diazo derivatives of a newly discovered group of coal tar colouring matter—known under the name of primuline—are extremely sensitive to light, and therefore rapidly decompose on exposure. The diazo compounds react with a variety of coal tar derivatives—phenols and amines—to form colouring matters of very rich shades; when decomposed by light this property is entirely lost in the product of decomposition, which is an inert substance. After exposing a surface sensitive with the diazo compound to the graduated action of light, such as results from the varying tones of a positive, the destruction of the diazo compound is found to have taken place in exact proportion, and the subsequent development produces a coloured picture with an accurate reproduction of the details of the original. Shown behind glass some would make excellent imitations of tiles, while the prints exhibited on cloth promise to become popular for decorative purposes. Several well-known manufacturers and dealers exhibit cameras, instantaneous shutters, and other accessories. Detective cameras evidence no sign of waning popularity, and the snapshots on view show an increasing amount of merit.

[*Sunday Times.*]

The annual exhibition of the Photographic Society of Great Britain will be open from to-morrow till the middle of November, at 5A, Pall Mall East. The number of exhibits is about the same as last year, and while the show does does not include any individual works of startling value, or very surprising new developments, it reveals a steady progress on the part of the members of the Society as well as outside amateurs. The average of merit is very even, and it must often have been a matter of close inspection for the judges to decide upon the pictures and collections most worthy of their coveted medals. The platinum processes of printing have so entirely superseded the old-fashioned silver and gold tonings, that special mention is made when any form save platinotype is used. It used to be an ideal of photography to produce its prints with the shiniest and most glazy surfaces imaginable. The present standard of excellence is the bold quality of an etching or an *impressioniste* drawing printed upon the rough face of hand-made drawing paper. Among the most striking of the photographs shown yesterday at the private view were the interesting series of portraits of the Royal Academicians by Mr. R. W. Robinson, in completion of the set he commenced and exhibited last year, many of them being admirable character studies. Mr. Lyddell Sawyer secured a medal for a pleasing group of pictures, one of a crowded Thames steamer, *Off to the Seaside*, giving an almost Turneresque effect of smoke and haze. Very clever were Mr. B. Gay Wilkinson's set of seashore studies which duly received medallic recognition, and Mr. Harry Tolley's softly toned pretty Irish sea and lake views deserved and received the same, as did Mr. R. N. Lord, Mr. Lyonel Clark, Mr. J. N. Austin, and Mr. J. B. B. Wellington, for more or less interesting examples. The sets, however, which will attract the most notice come from India, and are done by Mr. Shapoor N. Bhedwar—a really beautiful series of classical groups, graceful in pose, and charming in soft, yet clear, light and shade. Almost all the leading professional photographers are represented, Mr. Byrne sending a collection of his "At Home" pictures, Mr. Mendelssohn some pleasing portraits of society beauties, and Mr. Van der Weyde many pretty studies, including a deliciously dainty group of the three children of Mr. Mortimer Menpes, who are posing as miniature graduates of a Japanese "School for Scandal."

Foreign Notes and News.

All kinds of improvements are constantly being suggested for the glass roofs of photographic studios, and a great many of them turn out to be only improvements in the eyes of their suggesters. Such, however, would appear not to be the case with the very excellent studio design recommended by Herr Wilde, of Görlitz, as being employed by Herr Johannes Haupt, of Iglau. This gentleman builds his studio with a gabled glass roof in the ordinary manner, the glass employed being ordinary clear window glass. Some distance below this roof he arranges a second horizontal roof composed of sheets of ground glass laid on T irons which run across the studio. This flat roof is said to make a much pleasanter impression than the inclined roofs usually employed, and the lighting is said to be more equable. Further advantages of the arrangement are said to be that it prevents the entry of any direct sunlight, and that it renders the studio cooler in summer than is usual with other installations. In addition to the "matt," glass sheets are merely laid upon the T irons and not puttied in, so that they may easily be removed for cleaning, or in winter when the entry of warm air between the two roofs is desired in order to melt away accumulations of ice or snow that may have collected upon the outer roof.

Herr Liesegang has been making some remarks concerning the osmium toning bath recommended by M. Mercier, and of which we gave an account some weeks ago. This is what he says:—"The toning salt consists essentially of ammonium-osmium, chloride, and acetic acid, and is fit for use on simple solution in water. On immersing in the bath a washed-out silver print, it first assumes a brown tinge, after which the half lights tone a deep azure blue. Aristo paper tones deep blue-black when acted on sufficiently long, which gives a very beautiful effect, considerably superior to that of platinum prints. The prints ought not to be washed out between toning and fixing."

As a means of preventing the formation of bubbles in albumen paper, Herr Krönke recommends the following solution:—

Glycerine	15–20 c.c.
Water	100 ,,
Common salt	5 grammes.

The prints are immersed in this solution immediately on being taken off the frame. The object of the salt is to precipitate any silver dissolving in the bath as chloride. The efficacy of Herr Krönke's receipt does not seem to be very well established however.

Professor Eder and Herr Lehnart have been making experiments on platinum toning, and the results to which they have been lead go to show that toning a silver image with platinum presents many advantages over the employment of commercial platinum paper, especially as regards economy of platinum—a point of some importance, considering the constantly rising price of platinum. The best results were obtained with Dr. Just's algein paper and arrowroot paper. The toning bath recommended is:—

Potassium platino-chloride	1 gramme.
Water	500–1000 c.c.
Nitric acid	5–10 drops.

Time, 5 to 10 minutes.

We have to chronicle the death through a sailing accident of two well-known Berlin artists—the sculptor Riffsack, and the painter Paul Weimar. Herr Weimar was for many years a member of the Berlin Photographic Society, and was an artist of very considerable attainments. He frequently exhibited in the Berlin Academy, where his pictures of Dutch life excited well-deserved admiration. In particular his *Fischermädchen*

and *Het Nieuws van den Dag* bear witness to his talent as a painter, and his peculiar ability in reproducing the national characteristics of the country to which he was very specially attached.

Our Editorial Table.

Sun Artists.—No 4.

London: Kodak Pacl, Trench, & Co., Limited. Price 5s.

The pictures in this number are selections from the works of Mr. Lyddell Sawyer. They are representative of this clever, artistic photographer, and have all obtained medals at some one or other of the numerous exhibitions recently held. They are respectively, *Waiting for the Boats*, *The Castle Garth*, *In the Twilight*, and *The Boat Builders*. We have on former occasions given an account of these and other works of Mr. Sawyer, hence it is now unnecessary to do so. The engraving and printing are such as to do fitting justice to these clever pictures. The text is a discriminative essay on Mr. Sawyer's works and cognate topics by the Rev. F. C. Lambert, M.A., some of whose remarks on the scope and aim of the artist we shall take the liberty of reproducing in the interests of art.

Amateur Photographer Prize Pictures.—No. II.

Hazell, Watson, & Viney, Limited. Price 2s. 6d.

In this number we have a series of nine excellent Woodburytypes of Norwegian scenery by Mr. Paul Lange, eight of these being quarter-plate size and one whole-plate. They form a useful accompaniment to the useful series of articles on Norway which we have recently published, and which were written by a gentleman who formed one of the party with which Mr. Lange went to the "Land of the Midnight Sun." The tone is an engraving black, and the text (by Mr. Lange) is a well-written account of his visit.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,091.—"An Improved Preparation of Chemicals adapted to the Development of Photographic Plates and the like." A. McDonald.—*Dated September 24, 1890.*

No. 15,092.—"A New or Improved Photometer." F. C. Sugrate.—*Dated September 24, 1890.*

No. 15,101.—"Improved Apparatus for Taking Instantaneous Photographs." J. F. Fetter.—*Dated September 24, 1890.*

No. 15,112.—"An Improved Stand for Studio Cameras [and Optical Lanterns." T. P. Watson.—*Dated September 24, 1890.*

No. 15,127.—"Improved Photographic Camera." Communicated by E. Bullard. J. P. Batle.—*Dated September 24, 1890.*

No. 15,185.—"Improvements in Photo-lithography." G. Stephens.—*Dated September 25, 1890.*

PATENTS COMPLETED.

Improvements in or Relating to Photographic Cameras.

No. 5227. Charles Whitney, Chicago, Cook, Illinois, United States of America.—*September 6, 1890.*

My invention relates to the improvement of photographic cameras and their adjuncts, my improvements being especially designed for the variety which may be termed "pocket" cameras, or those of such diminutive size as to render them conveniently portable in the hand, or by being otherwise carried or stowed away on the person ready for immediate use whenever desired; and of the adjuncts referred to, my invention relates, particularly, to the lens-shutter detail for the cameras, to means for controlling a flexible sensitised ribbon for the negative plates, in the form both of a continuous sheet or ribbon, or in separate plates cut to desired size; to the numbering and construction of the negative ribbon, and to the cutting mechanism for severing it into plates, and means for permitting observation of the position of any negative plate for its exposure.

The objects of my improvements are to provide a construction of the instrument whereby it shall be produceable in the various forms, and in the comparatively diminutive dimensions with proportionately large capacity, to adapt it to serve the purposes for which it is intended, and the purpose of perfecting and simplifying the operations necessary in making negative-plate exposures.

[The specification is illustrated by no fewer than twenty eight drawings, and the nature of the invention may to some extent be deduced from the following claims]:—

1. A photograph camera in the form of an opera glass, field glass, book, box, or the like small and readily portable article, and provided with negative-plate material in the form of flexible sensitised ribbon, and with means herein described for controlling the said ribbon, substantially as described. 2. A photograph camera in the form of an opera glass, field glass, book, box, or the like small and readily portable article, and provided with negative-plate material in the form of a continuous flexible sensitised ribbon, perforated at intervals and numbered, and means for controlling the ribbon, substantially as described. 3. A photograph camera in the form of an opera glass, field glass, book, box, or the like small and readily portable article, containing a triangular compartment having the lens at its apex, and provided in its base with an aperture for plate exposure, substantially as described. 4. A photograph camera in the form of an opera glass, field glass, book, box, or the like small and readily portable article, containing a central triangular compartment, having the lens at its apex and open at its base, and dividing the interior of the article into three compartments, the central of which serves to make the exposure through it, and the lateral ones, respectively, for storing the plates before and after their exposure, substantially as described. 5. A photograph camera in the form of an opera glass, field glass, book, box, or the like small and readily portable article containing a central triangular compartment, having the lens at its apex and open at its base, and dividing the interior of the article into three compartments, the central of which serves to make the exposure through it, and the lateral ones containing, respectively, a roll of flexible sensitised negative ribbon and a delivery friction-roller, to which the end of the ribbon is passed around the base of the triangular compartment, substantially as described. 6. In a photograph camera, a shutter provided with means for actuating it by a single operation both to set and trip, substantially as described. 7. In a photograph camera employing negative plates in the form of flexible sensitised ribbon, a coloured-glass peep hole in the case through which to permit the position of the negative plates to be located, substantially as described. 8. In a photograph camera having all its parts confined in a compact case in size rendering it readily portable, a slotted tube in the case at one side of the lens for confining the roll of sensitised flexible negative ribbon, and a winding roller at the opposite side of the lens upon which to secure the free end of the ribbon passed across the lens, and unwind it from the roll, substantially as described. 9. A photograph camera having its containing case of a diminutive size rendering it readily portable, and formed with telescoping frames, substantially as described. 10. A photograph camera having its containing case of a diminutive size rendering it readily portable, and containing the severed or unsevered plates formed of flexible sensitised ribbon, and a friction feed-roller for manipulating the said plates, substantially as described. 11. In a photograph camera of a kind described, whereby it is formed compactly in diminutive size rendering it readily portable, the combination with the negative plate, flexible ribbon contained therein and means for manipulating it, of cutting mechanism for severing a plate from the ribbon after exposure, substantially as described. 12. In a photograph camera of a kind described, whereby it is formed compactly in diminutive size, rendering it readily portable, the combination with the negative plate, flexible ribbon contained therein, means for manipulating it, and the triangular frame, of a spool for the free end of the roll of ribbon, having a fastener connected with the spool by a link, substantially as described. 13. In a photograph camera in the form of an opera glass, field glass, book, box, or the like small and readily portable article, the combination with the containing case of a roll of negative ribbon, the triangular frame, a friction feed-roller and a receptacle for the plates of the ribbon after exposure, substantially as described. 14. A photograph camera formed with an opera or field glass, having the outside telescopic cylinders forming spools for supporting and operating the flexible negative ribbon, substantially as described. 15. A photograph camera formed with an opera or field glass with the outside telescopic cylinders affording spools for supporting and operating flexible negative ribbon, and containing the triangular frame open at its base, and having the lens at its apex and provided with shutter mechanism actuated to perform all its functions through a single pressure on its spring controlling rod, substantially as described.

An Improved Appliance for Use when Cutting Photographic Prints, Pictures, Mounts, and the like.

No. 18,609. Benjamin Jumeaux, 11, Brighton-place, Stretford, Lancashire.—*September 6, 1890.*

My improvements relate particularly to the thick pieces or sheets of glass which are used when cutting off the edges of photographic prints or pictures to the size of the glass plate.

At the present time the glass sheet is placed upon the surface of the print, picture, or mount to be cut to size, and owing to the smooth surface of the former it is apt to slip or move under the pressure of the knife when cutting.

In order to overcome this difficulty I propose to grind or otherwise form three or more, preferably four, small recesses in the under side of the glass, say near each corner. Into these recesses are secured, by any suitable cement, small pieces of indiarubber, cork, flannel, or other suitable material, the surfaces of which project slightly beyond the face of the glass; by this means the glass will be prevented from slipping sideways during the operation of cutting or trimming the edges of prints, pictures, or mounts.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

The improved appliance for use when cutting prints, and the like said appliance consisting of a sheet of glass provided with recesses in which are secured pieces of indiarubber, cork, or other suitable material substantially as and for the purposes herein set forth.

Improvements in Bi unial or Dissolving view Lanterns.

No 19,926. Henry Bond, 126, Wilderspool road, Warrington.—*September 6, 1890.*

My invention consists of a device for utilising the light derived from an oil lamp, or other suitable illuminant, in two directions, in such a manner as to

produce and converge upon the screen two independent and simultaneous discs or fields of view from one light.

The rays utilised are those shining in the directions right and left of the operator, standing behind the illuminant and facing the screen.

Condensers are placed on each side of the illuminant with their edges towards the screen, their axes corresponding with the two lines of light from the central source.

The slides or transparencies to be thrown upon the screen intervene in front of the condensers in the usual way.

Images of the slides are reflected to the objective lenses (placed with their axes at right angles and in a horizontal plane with the axes of the condensers) by plano-mirrors or specula placed vertically between the slides and the objective lenses, and fixed, in regard to the axes of those lenses and of the condensers, at an angle of forty-five degrees.

Means for bringing the two discs of light together, at varying distances of the lantern from the screen, are provided by the movement of one or both optical systems independently on a common pivot under the illuminant, the axis of which pivot lies in a vertical line drawn through the centre of the illuminant.

An alternative method is to preserve the condensers in a fixed position in regard to the source of light, and to adjust one or both mirrors and their associated objectives on separate centres or pivots with vertical axes, which axes lie in the planes of the reflecting surfaces and cut the horizontal axes of the condensers.

The claims are:—1. A bi-unial or dissolving-view lantern, having a pair of light condensers located one at each side of a common source of light with their axes passing through the same, two sets of objective lenses having their axes intersecting those of their respective condensers, two reflectors, each located at the point of intersection of the axes of its condenser and lenses, and adapted to reflect the light forward through said lenses, and means for adjusting some or all of the above parts in such manner that two coincident discs of light may be thrown upon the screen at varying distances of the lantern therefrom, substantially as described. 2. In a bi-unial or dissolving-view lantern, provided with two sets of objective lenses having axes that can be made to converge, a pair of plain mirrors so arranged one on each side of a common source of light that the lateral rays therefrom are reflected forward through said lenses, substantially as described. 3. A bi-unial or dissolving-view lantern in which two optical systems, such as described, are arranged one on each side of a common source of light, and are mounted upon suitable frames, one or both of which is or are adjustable about an axis passing through such source and perpendicular to the axial plane of said systems, substantially as and for the purpose described. 4. The alternative arrangement for adjusting the aforesaid optical systems constructed as a whole substantially as described. 5. The improvements in bi-unial or dissolving-view lanterns, taken as a whole substantially as described, whereby the user is enabled to perform all the necessary operations and adjustments from the rear of the lantern and in full view of the screen.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 7	Carlisle and County	CathedralHall,57,Castle-st.,Carlisle
,, 7	North London	Wellington Hall, Islington, N.
,, 7	Holmfirth	
,, 7	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 7	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 7	Paisley	Paisley Museum.
,, 7	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 8	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 9	Birkenhead	Hamilton Rooms, Birkenhead.
,, 9	Cheltenham	
,, 9	Manchester Photo. Society	36, George-street.
,, 9	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 10	Ireland	Royal College of Science, Dublin.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

SEPTEMBER 30.—Technical meeting.—Mr. Friese Greene in the chair.

Mr. Green, of the firm of Green, Cross, and Bevan, showed some specimens of the diazotype process: a method of dyeing or producing designs by means of a substance sensitive to light, namely, primuline in conjunction with sodium nitrite and an acid. Specimens of fabric which had leaf and geometrical patterns of four colours, namely, orange, red, crimson, and purple, were shown; and some fabric that had been treated with primuline and exposed to light were developed in the solutions that gave these tints. Another specimen of an exposed but undeveloped fabric was laid upon the table, and, by means of the solutions applied by brushes, was developed of different colours at different parts of the pattern.

Mr. A. COWAN asked what was the effect of longer or shorter exposure.

Mr. GREEN replied that if too short an exposure was given the effect was that of a daub without detail; if the exposure was too long there was not sufficient depth.

Mr. ARNOLD SPILLER inquired whether the effect of light in this case was reducing or oxidising.

Mr. GREEN replied neither, but more like the effect of heat.

Mr. COWAN inquired whether the process gave gradations.

Mr. GREEN replied that it did give very good gradations.

Mr. JOHN SPILLER thought that we could not yet see the full extent to which the process might be used. He had tried the prints for permanence, and found that they resisted the action of all the ordinary laboratory reagents. As to the permanency against the action of light, he had exposed them to the action of the sun for some time without being able to detect any change. One thing that was wanted was to be able to discharge the pale yellow colour from the groundwork; perhaps Mr. Green would eventually succeed in doing this, and then he thought there would be a great future for the process in photographic printing.

Mr. Varley showed a stereoscopic camera for producing photographs in rapid succession.

Mr. FRIESE GREENE had made exposures with it at the rate of four or five in a second, and produced a long roll of paper negative film that had been exposed and developed, with figures showing the slight extent of movement that had taken place between the exposures.

It was announced that at the next technical meeting, to be held on the fourth Tuesday in October, the apparatus on show at the exhibition would be explained and the action demonstrated.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

SEPTEMBER 25,—M. G. W. Atkins in the chair.

Mr. F. A. BRIDGE said that as the winter was coming on, and many people would be trying photography by magnesium flash light, it would be well to mention an accident that had recently happened in connexion with one of these lamps which was advertised as being "practical, safe, and reliable." Mr. Dando had on the preceding evening brought to the Photographic Club a nozzle and piece of ring, which were all that was left of the lamp in question. It was of a "repeating" pattern, and the whole charge appeared to have exploded or ignited. Not only was the lamp itself destroyed, but seven panes of glass were blown out, and the operator had his hand injured, though probably not permanently. Whether the powder sold with the lamp was an explosive compound he did not know, but the effect seemed to suggest that it was.

Photographs taken at the last outing of the Society by the Chairman and Messrs. Chang, Debenham, and Parfitt were passed round.

Mr. P. EVERETT inquired whether any one had had experience with the white light said to be safe for dark-room purposes that had traversed a solution of nickel and cobalt, as described in a recent communication to the photographic papers.

None of the members present appeared to have tried the light, but Mr. W. E. DEBENHAM said that as the light from every part of the visible spectrum had some effect on photographic compounds, it was not easy to see where the possibility of a non-actinic white light could come in. He had shown some years ago a light of pale yellowish colour, produced by reflection of red and green light from a yellow surface, that was very effective for photographic manipulation, as a plate might be exposed to it longer than to most dark-room illumination without showing any fog; but to say that any light was without effect on the sensitive plate was, he thought, a mistake.

Mr. A. COWAN had been astonished to see what an enormous amount of light might be admitted to the plate after the development was well advanced.

Mr. E. W. Parfitt was elected a member of the Association.

It was announced that on the 9th of October there would be a lantern night and a demonstration by Mr. T. E. Freshwater on *The Effect of Large and Small Objectives with the Lantern;* on the 16th the discussion on *Pictorial Definition* would be continued, to be opened by Mr. W. E. Debenham; and on the 23rd Mr. W. H. Prestwich would open the discussion on *Preparing Sensitive Plates.*

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

SEPTEMBER 26,—Mr. W. F. Benham, Chairman.

Two loans were granted.

Messrs. Sawyer and Jessup were elected members.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

SEPTEMBER 16,—Mr. W. Bishop in the chair.

This being a technical evening, the CHAIRMAN asked for any specimens of negatives or prints which the members had brought with them.

Mr. Parfitt showed a number of beautiful quarter-plate negatives taken upon Lumière's plates in his new Quadrant hand camera, and developed with the following;—

A.

Sulphite of soda	1 ounce.
Anhydrous carbonate of soda	1 ,,
Water	10 ounces.

B.

Pyro	1 ounce.
Sulphite of soda	4 ounces.
Citric acid	30 grains.
Water	10 ounces.

To develop, take twenty-four minims of A, twenty minims of B, and five minims of saturated solution of bromide of potassium to each ounce of water. These negatives were greatly admired.

Mr. Grover showed some beautiful views taken in Hampshire and printed on Aristotype paper dried on glass.

The SECRETARY showed some negatives on Ilford ordinary plates developed with the soda developer, and with hydroquinone, and with pyro. All developed without sulphite in the developer were stained somewhat, but he stated that in the case of those developed by the soda potash developer the yellow stain seemed to add to their printing properties.

Mr. Hudson showed a new spirit level brought out by Mr. Adams, of Aldersgate-street, which was imbedded in a right-angled triangle of mahogany, and was useful and handy in practice, the price, 2*s.* 6*d.*, bringing it within the reach of all.

Mr. SMITH showed two negatives taken from a coloured subject—one on the ordinary negative plate, the other on an isochromatic plate, and the superiority

of the latter was at once seen. Mr. Smith also asked the reason for some white spots appearing on the negatives.

Mr. A. Mackie replied that sometimes it was caused by the water with which the developer had been mixed. Caustic potash and caustic soda should always be mixed with distilled or boiled water.

Mr. Bolton asked whether there was anything in the hydroquinone developer which, though to all appearances allowing the developer to remain unchanged, yet without other cause fog by being kept for any length of time. He had been attempting to develop some negatives with some old hydroquinone developer which he had used a month ago, and although he had taken the plates from three different packets, they all had the appearance of being fogged all over. He had not had very successful work with hydroquinone, but after some of the negatives which the Secretary had shown, it was evident that it could be used successfully.

Mr. Mackie said that great care should be taken not to get the slightest trace of hypo into the developing bath.

Mr. Hudson stated that Lumière's plates will not stand ammonia. He also asked if any one had tried acid bisulphate of soda in the ordinary fixing bath.

Mr. Mackie stated that he used metabisulphite of potash—about one drachm to a pint of bath—and, according to Mr. J. Traill Taylor, sulphurous acid would do as well. Sulphurous acid has no decomposing effect upon hypo. Get the acid pure, not crystal. This acid bath makes the alum bath unnecessary, as the film is hardened by it.

The Secretary asked where pure pyroxyline could be obtained for the collodio-bromide process.

Mr. Mackie stated that the only way was to get a specimen and try a small quantity before making the emulsion, but Schering advertised a pure pyroxyline, guaranteed to give no sediment whatever, under the name of soluble fine.

Mr. Bolton stated that saponine was a most useful adjunct to the dark room, both for cleaning the backs of pressure-frames for taking films from the lenses.

Mr. Hudson stated that he had lately had the misfortune to break his ground glass, and that he had utilised a collodion film most successfully by cleaning off the emulsion and fixing it flat in a mahogany frame.

Mr. W. T. Cooper-Key asked whether ruby-tinted green glass in front of one thickness of the canary paper made by Reynolds & Branson, and sold by Hodgson, was a safe light for quick plates.

Mr. Mackie stated that this paper was an excellent medium, but that great care was necessary with it because it faded. He showed a specimen of it as used in the Society's lamp which had done so. He also stated that cathedral green was simply used to make the light more pleasant.

Mr. Hudson *for* stated that he always worked with his dish covered until the negative was well out.

Mr. Mackie drew attention to Mr. Cowan's experiment on fogging the plate for under-exposed negatives. When so much as could be got out of the plate as apparent possible, Mr. Cowan had exposed the negative to the full uncovered light of the developing lamp until the light spots just began to be developed, and it was astonishing how detail would be seen to appear in parts apparently hopeless. Prints had been taken from such negatives and from others fully exposed, and very little difference could be seen. From this it would appear that an enormous light was to advantage in developing under-exposed negatives if the developer was thrown off and the plate washed the moment clearness could be seen.

Mr. Hudson said that he found that in taking a lantern slide and washing well before fixing, and then leaving it in alum water for a short time, it became intensified.

Mr. Mackie stated that lantern slides left in the hypo bath for a longer time would become a better colour if black when put in.

The Chairman said that if a lantern slide was left in the acetic acid bath until the clearing for some time it would intensify.

The Secretary said that he had successfully toned and intensified some lantern slides on Eastl plates in the ordinary acetic bath.

Mr. Bolton suggested that the Society should have a lantern-slide competition, negatives to be given out, and each member to take the negatives in turn and make slides from them.

On the motion of Messrs. Clevenger and Hudson this suggestion was heartily taken up; and on the motion of Mr. Hudson it was agreed that four negatives should be supplied, two permitting of shrouds if the members choose to put them in.

Mr. Mackie offered to supply the negatives, and the Chairman offered to supply a second lantern for the competition.

Mr. Smith asked which was the right place to put the spots that were usually affixed to lantern slides.

The Chairman said that they should be placed on the side which faces you when the slide is held up so as to look right in nature.

The Secretary then stated that October 7 would be a lantern night; October 21 Demonstration on *Pyroxyline as Opal Canvas*, by Mr. Fraser Greene; November 4 would be the annual meeting, and all communications for officers must be sent in to the Secretary a fortnight before this meeting; November 18 would be a lantern night; December 2 Mr. J. Traill Taylor would give his second lecture on *Stereoscopic Photography*. December 16 would be a technical evening and exhibition of "lantern-slide studentship" pictures, kindly lent by the Editor of the *Amateur Photographer*.

WEST LONDON PHOTOGRAPHIC SOCIETY.

September 26.—A special meeting was held at the new premises of the Society, the Lecture-hall, Broadway, Hammersmith, the President, Mr. C. Bilton, occupying the chair.

The meeting was of an informal character, there being no special business to transact.

The Chairman reminded the members that the annual general meeting would take place on October 10, and expressed the hope that every one would make an effort to be present. He congratulated the Society on its change of quarters.

The Secretary then exhibited the fusee-repeating flash-light lamp—an ingenious and portable piece of apparatus recently introduced by Messrs. Adams & Co. A "Perpetual" shutter by the same firm was also shown. The special features of this shutter are that it requires no setting, and by an ingenious arrangement of a pneumatic cushion it can be fitted to lenses of various sizes without the employment of adapters. Negatives and prints therefrom, taken during the summer, were then handed round and criticised, after which the proceedings terminated.

The annual general meeting takes place on October 10, at the Broadway Lecture-hall, where all future meetings will be held. Friday, October 24, will be a lantern night. Members are requested to bring slides.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

September 22.—Mr. T. C. Lashbridge in the chair.

Mr. E. T. Hiscock exhibited several whole-plate prints in platinum, which were very fine, the negatives being made on Edwards's isochromatic plates.

Mr. E. S. Pack exhibited one of Chadwick's eclipse lantern-slide carriers by which, when introducing a new slide upon the screen, it first cut off the light, after which the fresh slide was pushed into position when the shutter was again withdrawn, and the fresh slide appeared upon the screen. The simplicity with which it worked was especially remarked upon.

The Chairman then called upon Mr. Beadle for his paper and demonstration of lantern-slide making. The following is an extract:—

Gentlemen,—To-night I feel myself somewhat in the position a medical student might when asked to discourse upon some subject before a society of learned doctors when he is well aware that they know considerably more of the matter than himself; nevertheless, at the risk of reiterating a well-worn phrase, I do not think there can be a more interesting branch of our fascinating art than the production of slides for the optical lantern, and in the few simple words I shall give you in connexion with this topic I trust to induce any of you who have not as yet tried this branch to do so. Now that the holiday season is over, we are all anxious to show our work in the best possible way, for I think it cannot be denied that in a glass transparency we obtain a more complete result from our negatives than by any other printing process. As to the production of these, I do not pretend for a moment to have given any original research in the matter, but rather to have followed as carefully as I could the instructions usually issued with the plates by the makers. In reading articles in the numerous photographic books and journals on the subject, great stress is usually laid upon the necessity of cleanliness for all dishes, measures, &c. This is perfectly correct. At the same time you will find that the ordinary care which has enabled you to produce a good negative will enable you to obtain a good lantern slide from it. There are, of course, many means now of arriving at good results. I may say that I do not think anything can surpass in beauty those produced by the old collodion process; but as the dry plates now in the market are so good, and the ease of production so great, I think we amateurs of little leisure need anything better. It is somewhat of a disputed point as to whether slides obtained by reduction by means of the camera or those printed by contact are the better, but given a good negative I do not think the effect is materially different whichever way is tried. My own experience is that those produced by reduction are the sharper of the two, this quality being a great *desideratum*, for, however much our great artists may differ as to sharpness in positive prints, we all find that when the subject has to be so many times enlarged upon the screen, the general fuzziness is as a rule quite sufficient to satisfy any of us. With respect to plates, I do not believe there are any in the market but what will produce good results, and the best way of treating them is to work with the formulæ given. I do not say that at times it may not be necessary to alter it to suit, perhaps, a thin or over-dense negative. ——'s plates are the ones which I have chiefly used, and acting upon the principle of a witty American who advised that having found a good thing to freeze to it, I propose using these by way of illustration to-night. Now we come to the subject developers. Although I am no lover of hydroquinone as a developing agent for ordinary negative work, owing to the uncertainty of results and tendency to choke up distances, with a slow transparency plate it is different, and I hardly think for this purpose, by reason of its simplicity and cleanliness, it has yet been surpassed. The developer which I use is as follows:—

Hydroquinone	160 grains.
Sodium sulphite	2 ounces.
Citric acid	60 grains.
Potassium bromide	30 ,,
Water up to	20 ounces.

And for the second solution:—

Sodium hydrate	160 grains.
Water up to	20 ounces.

Use equal portions of each for development.

Next we come to the important subject of length of exposure, upon which hinges to the greatest extent the success of the finished picture. In my own practice I have generally obtained the best results by giving as long a one as the plate will bear, and then developing smartly, when a clean, bright picture should be the result. Should the plate require prolonged development by reason of under-exposure, a yellow stain will frequently result. This may be removed by a solution of—

Cyanide of potassium	2 drachms.
Water	20 ounces.

But it is better to avoid having to do this, for it has the effect of somewhat reducing the density of the probably already too weak picture, and in spite of thorough washing I have found it leaves a granular effect on the film which is somewhat difficult to remove. The alum protosulphate of iron and citric acid clearing bath, recommended with most issues of plates, works better, but is seldom required if the exposure has been correct. The time of exposure varies according to the density and colour of the negative. Lately I have been working from those having a slight brown stain, due to the absence of sodium sulphite from the pyro developer, and find the average time, working with an

aperture of *f*-22 in an afternoon light before five o'clock, to be about fifteen minutes; I am, of course, alluding to those slides made by reduction from a half-plate negative. By contact, using a kerosene lamp as illuminant, the flame of which is about one and a half inches wide, holding the printing frame about twelve or fourteen inches from the light, the average time has been about forty-five seconds. I may here remark that, as the result of experimenting with various developers upon the same box of plates, those developed by the solution pyro-ammonia, ammonio-bromide, and carbonate of ammonia, required a longer exposure than those by the hydroquinone formulæ, and where much longer in the picture appearing. It should be borne in mind that the distance of the plate from the flame in contact printing influences the result considerably, a dense negative being the better for making the positive from it as near as four inches; on the other hand, a thin one should be held at least eighteen inches to two feet away, these alterations, in my opinion, modifying the result in a better way than in varying the time of exposure. You will also find this same principle work well when using bromide paper for prints. When talking of transparencies, of course we are not confined to the regulation size of three and a quarter inches square adopted now generally for the lantern; larger plates can be treated in the same manner, limited only by the size of your negative or the depth of your pocket. It is, of course, necessary, when making these large window transparencies, and you do not wish the subject to appear reversed, to use those plates sold with a ground-glass back, the plain glass of the front simply acting as a protecting cover as in a lantern slide. Woodland or river scenes it hardly matters reversing for decorative purposes, in which case the plates with emulsion on plain glass can be used, and a fine ground glass used to diffuse the light. The emulsion on the plates being a slow one, I would remind you, is generally beneficial, certainly so when desiring to screen or locally expose for a longer time any portion of a negative. In this way I found when making a transparency of an interior of Worcester Cathedral, the east window in the negative, of which is partly choked by local over-exposure, which is frequently miscalled halation, the difficulty was overcome by cutting a small hole in a piece of rough card, and using this locally after having given the requisite exposure to the bulk of the plate. I will in a few moments pass this round for you to see more clearly what I mean. It will no doubt suggest itself to you as well, that any portion of the negative being over this can be screened from the light in the same way. Recollect when using to keep the card moving, so as to prevent any hard line. In working large plates, should an error occur, producing too dark a transparency, it can be reduced by the ferricyanide of potassium and hypo freshly mixed, in the same way as you would for a negative. I mentioned just now that I thought a slide made by reduction in the camera the better of the two plans; in fact, in my case, I have few plates that any slide can be made out of except by that means. Sometimes the instructions given for this purpose read a little formidable, more so than there is occasion for. If not keeping you too long, I will describe a box which I made for this part of the work some time ago, and also when making enlargements. It is a little too large for me to have brought here to-night with the other things. Since making it I find a convenient box has been put on the market at a low price, but this can only be used for reductions. The plan I use saves all blocking out of the bath room or other windows used as our dark rooms. The sketch I pass round will explain it better than any words; but it consists of two parts—a platform with an end to hold the negative of any reasonable size, and a box to put the same in when the camera has been adjusted on it. The platform has a narrow groove down the entire length, to enable the camera to pass up and down, and can be fixed in any required position by means of a thumbscrew underneath. At the extreme is nested a set of frames to hold any negatives from a quarter to whole-plates, these being held in position by small brass buttons. It is probable that most of us desire to reduce from one size; that being so, it a great deal simplifies matters, as when once in sharp focus to the required size a mark can be put upon the baseboard or platform, and another on the camera when racked out, and in this way all trouble of focussing upon any future occasion is avoided, and the plates can be exposed one after another without fear of varying sharpness. You will notice the place for negatives has been adjusted so that the exact centre comes immediately opposite the centre of lens. The complete action is as follows:—The lantern plate being placed in the dark slide (I use an ordinary quarter-plate carrier with a small strip of wood half an inch wide to keep the plate from shifting out of the centre), the slide is placed in the camera, which we will suppose has been adjusted on the platform to the required place. Stop the lens down to *f*-16 or *f*-22, if light is good the latter, cap the lens, draw the slide, and place the whole in the box, which has been made with a light tight-fitting cover and a door at one end where the negative is. Place this box now in any position you may find suitable, either pointing to the sky through a window or door, or on its end in the garden, it matters not so long as it can have the light free of all obstruction. In the event of not being able to get clear of wall or trees, &c., a white cardboard reflector must be used, placing it at an angle of 45° degrees to the negative. In a box such as I have described the door may be made use of to hold this in position. I must not forget to mention that in using a box made in this way it will be necessary to use a lens working at not more than six-inch focus, as in a longer lens the dimensions of the box would become too great for carrying about. The exposure is made by opening the door of the box, cap taken previously off lens, and lid shut down when not in use. I have found it being practically dust-tight. I have found it useful to stow away the ever-increasing *impedimenta*. It is possible I have not made the details as clear as you desire, but shall be pleased to give further particulars. The results are generally better when the slide embraces the whole of the negative. The lecturer then exposed and developed a lantern slide, also a half-plate transparency, which were very fine, the high light being remarkably clear for a gelatine slide. The exposure was given by the dark-room lamp, which gave a flame of about one and a quarter inches, and the time eighty seconds at six inches distance from the burner. One slide, the interior of a cathedral (in which the negative from which it was made was badly fogged by halation), was shown round, in which no trace of this fault was visible, and was much admired. This result had been obtained by masking.

Mr. MARCHANT wished to know which was the better to use for copying, a rapid rectilinear lens or a wide-angle.

Mr. BEADLE: It does not matter which, as among those who I have recommended my plan to there are those who use both.

The SECRETARY: The results would be equally good, the only difference being in the time taken, the rapid rectilinear working at a larger aperture.

Mr. T. SMITH recommended the bromo-chloride plates of ——'s make as being easier to work.

A vote of thanks to the lecturer concluded the meeting. Next meeting, October 13, Mr. D. P. Rodgers, who has been photographing in Egypt this summer, will give a lecture entitled, *Pictures of Egyptian Life*, illustrated by lantern slides made by himself, and shown by the optical lantern. Visitors invited to attend.

HOLBORN CAMERA CLUB.

A GREAT treat was experienced by the members and friends of the above Club on Friday last, when the *White Mountain* set of slides, prepared by and lent to this country by the members of the Boston Camera Club, was shown to an appreciative audience.

Other Societies who may be having these slides should note they are 4×3¼, and get carriers accordingly.

HACKNEY PHOTOGRAPHIC SOCIETY.

SEPTEMBER 25,—Mr. Beckett presiding.

Messrs. Hensler, Gosling, and Dean passed round views they had taken whilst on their holidays, and were commented on by the members present.

The Secretary showed *Le tison èclair*, a flash lamp of French make, the flash being brought about by magnesium being blown through an ordinary match flame.

After reminding members that the entry forms for exhibition purposes were now ready, the CHAIRMAN called on Mr. W. L. Barker for his paper on *Shutters*.

There were between twenty and thirty different makes of shutters for the lecturer to comment on, which incidentally he did. After mentioning the various positions in which shutters were used, he proceeded to state his opinion that undoubtedly the most correct position for a shutter was between the lenses, as the illumination was more even and the shutter was practically faster. He was, moreover, of the opinion that the centre required less lighting than the margins of a picture. He said that the moving part should be extremely light, so that there should be no kick, or jump, thereby causing vibration, and advocated the use of a shutter which had no parts to get out of order. He showed his Newman shutter with a pin attached to the central screw, a contrivance he had constructed to see at a glance whether the shutter was set or no. If it was, the pin would rest at a given point (indicated). The best position for a shutter on a hand camera or studio lens was better at the back of a lens, as it was then unobtrusive. In the discussion, Messrs. Dean, Hensler, Reynolds, Barton, the Secretary, and Chairman took part. The Chairman preferred the ordinary plain-drop shutter, which he judged roughly fell at a one-tenth of a second. He generally tested a shutter with the aid of a bicycle wheel. Mr. Barker said he had done so, with the result that the experience showed as follows:—Newman's one-fiftieth equal to one-twentieth, and the plain-drop one-tenth of a second.

TOOTING CAMERA CLUB.

THE first general meeting of the above Club was held at the High Schools, Church-lane, on Tuesday evening, the 23rd ult., Mr. J. H. Beckett in the chair.

The rules as drawn up by the Committee were read and approved.

The following officers were elected for the ensuing year, viz.:—*President:* Mr. A. H. Anderson.—*Vice-President:* Mr. J. H. Beckett.—*Committee:* Messrs. W. Irwin, J. F. Child, S. J. Blaydall, and H. Berger.—*Hon. Treasurer:* Mr. C. Stowell.—*Hon. Secretary:* Mr. G. H. Dollery.

It was decided that the name of the Society, viz., Tooting Amateur Photographic Society, should be altered to the above.

Ladies and gentlemen desirous of becoming members are requested to communicate with the Hon. Secretary, Mr. G. H. Dollery, "Ivythorpe," Vant-road, Tooting Graveney, S.W.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

SEPTEMBER 25,—Mr. W. Jerome Harrison, F.G.S., in the chair.

Mr. J. H. PICKARD gave a report of the Bristol excursion.

Mr. Longmore exhibited some pictures taken in North Wales, and Mr. Leeson some of North Devon, taken with an Underwood's hand camera, which he found everything to be desired.

Mr. SERSHALL then read a paper on *Art in Drawing and Photography*.

BATH PHOTOGRAPHIC SOCIETY.

THE eighth and last of this season's excursions took place on Thursday, the 25th ult. The party left Old Bond-street by break shortly after two o'clock, for Newton St. Loe. Newton Bridge, from the city side, was the first subject chosen. The sky was overcast, but some fine effects of light and shade were obtainable. Resuming the journey, Saltford was reached within an hour of the start. Here several plates were exposed in the village and at the landing stage. Crossing by the ferry to the Kelston side of the Avon, a short journey on foot brought us to the lock and weirs facing the boating-station, and here a variety of subjects were presented, including pastoral and woodland as well as aquatic. Nearly two hours elapsed ere the ferry-boat was again called into requisition, so loth were the members to leave this most picturesque neighbourhood. The ferry recrossed, a smart drive was next taken to Swinford Weirs, a little distance up the river in a westerly direction, and here the now declining sun, with its attendant long-cast shadows, produced scenic effects of the most

charming description. Before sundown the supply of plates became exhausted, and after the party had refreshed the inner man at the "Jolly Sailors," Swinford, the journey home was made through scenery which it would be difficult to excel. Mr. H. S. P. Wells acted as leader on this occasion, and it may with confidence be said that amateurs visiting Bath cannot do better than follow the example set by the local Society.

The indoor meetings will be resumed on the 29th inst.

IPSWICH PHOTOGRAPHIC SOCIETY.

A special meeting was held on Thursday, the 25th ult. to elect a new Secretary in place of Mr. E. R. Pearce, who is about leaving Ipswich for an appointment at Sussex. Mr. Leonard Hill was unanimously elected to the vacant post.

In the name of the Society Mr. J. D. Piper, President, then presented Mr. Leonard Hill with one of Addison's camera stands on waterproof cases, a handsome address, and their artistic [illegible]. He spoke in complimentary terms of the valuable services rendered to the Society by the retiring Hon. Secretary, who was leaving Ipswich with the hearty good wishes of the members for his future success and prosperity.

Mr. Pearce suitably acknowledged the gift in suitable terms, and spoke feelingly of the pleasant hours he had passed with his photographic friends.

On Saturday an excursion took place to the grounds of the Chantry, near Ipswich, which proved very pleasant.

CARDIFF AMATEUR PHOTOGRAPHIC SOCIETY.

September 26.—Mr. S. W. Allen in the chair.

A letter was read intimating that an intimation from the Free Library Committee that they would be pleased to offer a gold [illegible] and bronze medal in connection with the County Survey, same to be open to all professionals and amateurs of the district. Also a silver medal for competition amongst the members of the Society only. Mr. W. Rees reported that the Survey had made satisfactory progress notwithstanding the bad season.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

ARTISTIC SKILL IN THE STUDIO.

To the Editor.

Sir,—I hope that the remarks of your correspondent, "An Aspiring Professional," will meet with the attention they deserve. During an experience of some years as an artist to the profession, I have frequently noticed instances where an exercise of "artistic skill" would have had the effect of rendering a picture far more pleasing to the eye and more correct in detail. I do not refer to posing, which of course requires an art education of the highest order, but to the arrangement of accessories and background in relation to the figure. The photographer has much to contend with in the conventional studio "properties," which are in themselves most awkward to deal with. The curtain and column which did duty in the early days of photography have been laughed out of existence, but what have we in their place? First, heavy, unnatural and often ugly chairs, tables, bookcases, &c., and masses of cardboard or pasteboard, supposed by courtesy to be rocks, but which would make a geologist shudder; and, secondly, painted backgrounds representing, for the most part, impossible landscapes with trees such as never grew on this earth, the scenery of one country mixed up with the buildings of another, and some which display great ignorance on the part of the person who put on the paint. Again, painted interior backgrounds are often so incongruous and badly drawn that it is almost impossible to introduce them successfully. Added to this the operator's attention is so much engaged with the figure that he often omits to consider the picture as a whole. The consequence is, we so frequently find the perspective and lighting of the background and of the figure are completely out of harmony, and that the picture violates all rules of art, and is calculated to offend the educated eye. It is only just to the profession to add that the shortcomings which have called for my somewhat severe remarks are, I am glad to say, becoming less frequent, and that there are visible signs of greater attention to artistic effect.—I am, yours, &c., Helen Wellby.

Brentwood, September 30, 1890.

THE PHOTOGRAPHIC EXHIBITION.

To the Editor.

Sir,—Could you oblige some of your amateur friends by pointing out the merits of the pictures to which medals have been awarded at the exhibition of the Photographic Society of Great Britain, as—no doubt from want of education—some of us are rather puzzled at the selection?

Highgate, London, September 29, 1890. One of the Amateurs.

[See the *Globe* critique in the present number.—Ed.]

To the Editor.

Sir,—Has our art society returned to the dark, the very dark ages of photography? I may add one who I look upon some of the productions on the walls of the present exhibition, and which are promoted (save the mark) to the distinction of a medal. Fuzziness rampant, indistinction a merit, and this after all our scientists, opticians, and chemists have done to elevate photography to a front rank, and advance the average of photographic pictures. Is this the outcome of years of thought and care of those brain workers whose names we revere? for as far as I can see (and who is infallible) some of the productions now on exhibition, from all the artistic and photographic merit they possess, may as well have been taken with a piece of bottle glass worked on a grindstone as lens, and a packing case as camera, and of course leaving out the other article, brains.—I am, yours, &c., F. M.

A WARNING.

To the Editor.

Sir,—I have made up the solution (Beach's A) mentioned by "R.J.S.S." in last week's issue, and find it is *acid* to test paper, and liberates CO_2 from a carbonate. I used *pure* sodium sulphite, and the same sample of *sulphurous* acid I was playing with last week.

My object in stating that a *fresh* sample of *sulphurous* acid effervesced with a carbonate was to point out that it was an *acid* liquid, and *not* proof of its containing *sulphuric* acid. Mr. E. Thorp has been good enough to give the equation. He also says, "I do not pretend to be a chemist." Quite so; but he does not tell us how he *proved* that *sulphuric* acid had been used instead of *sulphurous*.

Beach's A solution does not contain free sulphuric acid; but the sodium sulphate formed is not *the* restrainer in Beach's developer, and may be looked upon as an unavoidable impurity.

He would have made a much better case out of the B solution. This warning is a dig at the much advertising London dealer, and I would suggest calling on him and asking him if Beach's A solution made with *sulphuric* instead of *sulphurous* acid is a speciality of his firm. Farewell.—I am, yours, &c., Wood's Washer.

September 29, 1890.

PHOTOGRAPHIC EXHIBITION IN CALCUTTA.

To the Editor.

Sir,—Kindly inform your readers that as I am returning to Calcutta per s.s. *Shannon*, they will understand that further applications for information regarding exhibits will not find me at the address you recently published.—I am, yours, &c.,

John S. Gladstone, *Secretary, Photographic Society, India.*

September 29, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Patent American shaving chair and numerous other appliances; wanted, 12×10 folding camera and lens.—Address, G. H. Lawrence, 1, Hayes-bridge, Cardiff.

Background landscape with trees), eight by six feet, flatted off, as new, for west end of studio, in exchange for interior, same end, or studio accessory.—Address, W. Hale, Windsor Studio, Sutton, Surrey.

Will exchange twenty-four lantern slides of principal buildings in Paris for twenty-four slides of Scottish, Irish, or Italian scenery.—Address, Barker, Town Hall, Morpeth, Yorkshire.

Wanted, Lancaster's 1890 half-plate instantograph in exchange for Mackenzie's Natural Accomplishments, thirteen volumes, cost 7l. 16s., good as new.—Address, W. E. Thompson, 15, Westcott-street, Hull.

Two half-plate double dark slides, fit Lancaster's camera, quite new; wanted, instantaneous shutter. Also Singer's family sewing machine, equal to new, exchange, magic lantern or photographic accessories.—Address, S. J. Gannon, Chelmsford.

Ascent of Elburz.—A Russian gentleman, named Pastoukhow, accompanied by three Cossacks, has succeeded in reaching the highest point of Elburz, in the Caucasus—a height above sea level of 18,500 feet. The chief value of his adventure is that he has taken several photographs and made a topographical plan of the eastern and western cones—the hollow cones of extinct craters, the respective orifices of which are 150 feet and 250 feet. It is in the region of perpetual snow.

Photographing the Sky.—All over the world on these quiet moonlit nights the astronomers are busily preparing a photographic map of the sky. It will be a stupendous work of some two thousand sheets, and will exhibit a number of stars never yet suggested. Sky photography is practically a new discovery, and promises more for the astronomical science than almost any mechanical discovery which has preceded it. A "snap" exposure shows only the stars visible to the naked eye, or through a weak glass, but as the plate remains exposed more and still more stars continue to make their appearance upon it. Suppose for four or more hours with such extremely sensitive plates as are now perfected the diurnal motionless celestial globe would even the largest telescope has never revealed.—*Echo.*

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

Rev. J. D. Riley, Shepton Mallet.—*Photograph of the Parish Church, Shepton Mallet.*

Octavius Carter, Bournemouth.—*Two photographs of the Homœopathic Congress at Bournemouth.*

J. Clare, Abergavenny.—*Photograph of the laying of foundation stone of new town hall, Crickhowell.*

F. W.—Write to the Secretary, 5A, Pall Mall East, S.W.

S. WILMORE.—You are too late; the Exhibition opened on Monday last.

LIVERPOOL.—It is a little curious. Possibly it is a trade matter with the Association.

M. H. P. C.—If you ordered *Waterproof* mounts, then those sent are not so. Otherwise they seem to be good.

T. J. HUGHES.—If the formula has been strictly adhered to, success should follow as a matter of course. We cannot account for your failure.

EVA MORRIS.—We have put the name on our black list, and have written to the party. If you do not receive your specimens back forthwith, please communicate with us again. In any case let us know.

A. G. BROPHY.—The compositions referred to are all commercial preparations, and the vendors do not publish the formulæ by which they are made. They are no doubt only slight modifications of that given in the ALMANAC a few years ago.

YORK.—Write to the City and Guilds of London Institute, Gresham College, for a prospectus. Amongst professional photographers certificates are not looked upon as being of much value. However, the possession of one can be no detriment in obtaining a situation, even if it is of no real assistance.

J. C.—The best formula for the developer is that issued with the plates, though other developers can be used. If you do not succeed with the one recommended, it certainly is not the fault of the formula. It is not advisable to make up sufficient stock developer to last for three or four months at a time.

E. G. WELLS asks the reason of the flatness and map-like appearance of the portraits he encloses.—The reason is that the models are illuminated with a direct front light. If this be stopped off, and the sitter be judiciously lighted from the side, the faces will possess rotundity. Direct front light must always be avoided in portraiture, except perhaps in very rare cases.

SILVERTOWN.—According to your account you have been badly treated. We fear, however, unless you have a written agreement for the term of the engagement you have no legal remedy. All engagements for a term should be in writing. If you proceed against the employer in the County Court your difficulty, we imagine, will be to prove to the satisfaction of the judge that the engagement was for a definite term.

A. CATHCART.—The best rough paper for silver printing is perhaps, on the whole, Whatman's drawing paper. Some samples of this, when salted and sensitised, work admirably; others, however, are not quite so satisfactory. The best plan is to get a few sheets out of a batch for trial, and then, if found satisfactory, secure sufficient to last for a long time. As a rule paper, especially good quality paper, improves with age.

CANADA.—Yes; there is another way of mounting carbon prints developed on glass so as to preserve the glassy surface. Instead of applying only one piece of transfer paper apply two or three sheets, one over the other, so that when removed from the glass you have the picture really on thin cardboard. This can then be trimmed and mounted on the ordinary mounts. Perhaps this is the style you mean. If not, send us a sample.

RESIDUES inquires: "Is it necessary to use separate barrels for hypo and silver residues, or can they be all mixed up together?"—The residues can be all mixed up together if the silver be precipitated with sulphide of potassium. But it is preferable, and more economical, to keep the washing of prints, and such residues as can be precipitated as chloride of silver, from those requiring the sulphide to throw them down. We recommend the different classes of wastes to be kept separate.

T. W. KIRBY (Liverpool).—We have received from Mr. Kirby a sample of thiosinamine, as referred to in Colonel Waterhouse's articles of a fortnight ago, which he has made. We shall have pleasure in giving it a trial. Mr. Kirby also encloses a so-called "permanent bromide print" from a former ALMANAC in which the whites have become of a yellow tint. We have little doubt that this arises from the prints having been cleared with acid which has not been thoroughly removed by washing before they were placed in the hyposulphite of soda fixing bath.

D. D. (Cambridge) says: "I am an amateur, with only a few months' experience. I have just returned from Wales, where I exposed four dozen plates. One dozen I have developed, and they would be pretty good negatives except that they are all marked in the way shown in the accompanying plate. Can you tell me the reason, and how I can avoid it in the other three dozen, as I am very anxious about these?"—The cause of the mark is light getting through the hinge of the shutter. Probably the other plates are the same, and unfortunately there is no remedy.

W. BAMELL.—The lenses are in fair repute, but, like all low-price lenses, they are not uniform in quality. The best way, if possible, will be to have one on approval, or, better still, two or three to select from.

DIDO.—An arc light of five or six thousand candle power will answer very well for portraiture in the studio. The reflector depicted in the sketch is the correct form to use. The small mirror is to prevent the direct light falling on the sitter, while the major portion of it is utilised. The price seems high, and there is no question the light would be less costly if you had your own plant for generating the electricity. But it must be borne in mind that this would cost several hundred pounds, and would require attention, so that it is very questionable if, in the long run, anything would be really saved.

MOUNTANT says: "The formulæ, 4 ounces of Russian glue, 10 ounces of distilled water, and ten ounces of methylated spirit, has been recommended to me as being a good mountant for prints, and one that will keep for some time in good condition. Will you kindly say in your next issue if you have found this, or a similar formula to keep for some time? I presume it may be used until it becomes acid. Would there be any advantage in completely filling small bottles with the mountant so as to keep it free from air?"—The formula is a very good one, provided the glue is free from acidity to begin with, which is very unusual. Such a solution, by reason of the spirit, will keep for a long time without decomposition. Nevertheless, it will be advantageous to put the solution in small bottles as suggested instead of keeping it in bulk and working from that.

VERAX sends us an imperfect transparent positive, concerning which he gives the following interesting account:—"The film is one of Thomas's celluloid, and was exposed 'in the sun's eye' with a rapid shutter, and developed with eikonogen and soda. As the detail hung back through under-exposure, without thinking of the result I added ammonia, which, of course, produced fog. The shadows remained white in the developer, but were an intense copper colour by transmitted light; high lights were a weak black (or rather olive green). So far, I suppose, this effect was due to the use of ammonia with eikonogen. After washing the negative a little I put it in the fixing bath, in which other negatives had fixed all right, but at the end of an hour I found that it had not fixed out the shadows in the least (*i.e.*, the copper-coloured portion), but had reduced the intensity of the high lights slightly. I then put the film in a perfectly fresh hypo bath (one to four) and left it till next morning; but as it had still not changed, I merely rinsed it in water and laid it aside as useless. On looking at it a couple of days afterwards, I found it had turned to a positive almost, the high lights having gone almost transparent, as you see, and the shadows purple."

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, October 8, *Flash Lamps;* October 15, *Registration as applied to Photographic Printing.*

WE have received from the Blackfriars Photographic and Sensitising Company specimens of a new printing-out paper—"Celerotype"—on which we hope to report next week.

HACKNEY PHOTOGRAPHIC SOCIETY.—The programme for October is as follows:—October 9, Photographic Auction; Mr. H. J. Beasley, auctioneer; apparatus, &c., to be sent to the Secretary, together with reserve price, if any, by October 7 for classification. On view between seven and eight p.m., on October 9. October 23, Demonstration on *Alpha Printing*, Britannia Works Company's representative.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Corrected list of subjects for discussion.—October 9, First lantern night, and demonstration on *Lantern Objectives* by Mr. T. E. Freshwater. October 16, *Pictorial Definition;* adjourned discussion, resumed by Mr. W. E. Debenham. October 23, *Preparation of Dry Plates*, by Mr. W. H. Prestwich. October 30, *Photography in Colours.* Visitors cordially invited.

THE sixth of the series of One-Man Photographic Exhibitions at the Camera Club will be open for private and press view on Monday, October 6, at 7.30 p.m., and on and after Tuesday, October 7, it will be open to visitors on presentation of card. The exhibition will consist of photographs by Mr. Lyd Sawyer, of Newcastle-upon-Tyne, by whose kind co-operation we are able to exhibit a fully representative collection, including much new work prepared specially for this exhibition. The pictures will be on view for about two months.

CAMERA CLUB NOTICES.—Monday, October 6, eight pm., Opening of the sixth of the series of One-Man Exhibitions; pictures by Mr. Lyd Sawyer; at half-past eight p.m., Smoking concert. Thursday, October 9, half-past eight p.m., First technical meeting of the session; Paper by the President, Captain Abney, C.B., R.E., D.C.L., F.R.S. Thursday, October 16, half-past eight p.m., Paper by Mr. Lyonel Clark (*Further Notes on Silver Printing*). Thursday, October 23, half-past eight p.m., Paper by Mr. E. J. Humphery. Thursday, October 30, half-past eight p.m., Lantern evening. Monday, November 3, half-past eight p.m., Smoking concert. Thursday, November 6, half-past eight p.m., Mr. J. Gale (*Country Rambles with a Camera—Illustrated*).

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1588. Vol. XXXVII.—OCTÓBER 10, 1890.

ARTIFICIAL BACKGROUNDS, OR SKIES IN NEGATIVES.

It is a by no means unfrequent occurrence that the background of a portait negative or the sky of a landscape is defective; or it may be that it is desired, in the case of a group, to print a single figure and to eliminate the rest. In each instance the importance is apparent of a ready method of supplying what we may term an artificial background or sky.

Probably most practical photographers, at least those of the old-fashioned type, who have gone through a regular training in the profession, would think very little of undertaking the task in question, and would acquit themselves in a style that would puzzle many of those of less resource. The methods adopted would be simple in the extreme, and the results due rather to individual skill and care than to the mere process itself as such. In sketching out the following scheme we must therefore warn our amateur readers that care, patience, and intelligence are the chief requisites, without which it is impossible to hope for success.

We may first of all take the case of a landscape negative having a defective sky, this being, perhaps, the most frequent occurrence and the one most easily treated. In former days the simple plan of "blocking out" would have been adopted, that is to say, the faulty sky would be painted over with some opaque pigment, so as to be represented in the positive print as a broad expanse of white paper. White skies, however, have long since gone out of fashion, and even where artificial clouds are not introduced, a more or less graduated tint is preferred, to attain which requires different treatment. The simplest plan is to reproduce the negative by means of an intermediate transparency in which the necessary alteration is made.

Let us suppose a transparency to be made by contact in the printing frame; the defective sky will be masked in the ordinary manner for cloud printing, and the exposure made to a soft, diffused light, in order to avoid, as far as possible, any harshness of outline. It is not necessary in this part of the process to work strictly to the outline of the landscape, though it is desirable to do so as far as possible. When the transparency is developed, if the sky be not represented by absolutely clear glass, it should be carefully washed over, by means of a brush, with some solvent of the silver image. A favourite solution for this and similar purposes in the old wet plate days consisted of a few grains of iodine dissolved in a little cyanide of potassium; and for energy, efficiency, and rapidity of action nothing could be better. But this solution possesses the disadvantage that if a mistake be made by overrunning the outline it is irremediable, and the negative or transparency is ruined.

A far better plan is to perform the clearing in two operations and to proceed gradually, as, for instance, by first applying a weak solution of iodine, to be followed up by a second application of cyanide to dissolve the iodide of silver formed. In this manner the progress of the clearing can be closely watched, and the process repeated until the desired effect is obtained. A still better method consists in the substitution of chlorine in some form for the iodine, as then, if a mistake be made in the bleaching, it may be remedied by again reducing the chloride of silver formed, when the clearing process is commenced afresh. If a strong solution of the bleaching liquid be used carefully, it is possible the whole operation may be performed in a single application, since it is possible to see exactly what effect has been produced before clearing; but even by this method it is always preferable to proceed cautiously.

The bleaching solution may consist of chlorine water or of dilute hydrochloric acid, though the latter does not work so satisfactorily. A solution of bichromate of potash to which a few drops of hydrochloric acid have been added forms an admirable bleaching solution, as does a solution of common salt in moderately strong nitric acid subsequently diluted to a suitable strength. Solutions of some of the metallic chlorides are also available for the same purpose, as, for instance, the cupric, ferric, and mercuric, and in most instances these will be the safer as well as the more convenient to use.

In clearing the sky of the transparency it is only necessary to lay it in a sloping position, as on a retouching desk, with the sky portion downwards, and to apply the bleaching solution with a camel-hair brush. A broad wash applied to within not less than an eighth of an inch of the outline of the landscape will rapidly clear the greater portion of the space, and then the outline must be very carefully worked along with a fine pencil and not too much liquid, lest it spread over the boundary. If care be taken to manipulate the negative so that the solution always runs away from the landscape, there is not much danger of spoiling the skyline; but for this portion of the work the solution should not be too strong, or the excess will spread by absorption in the film itself, and so cause harm. If any harshness of outline be apparent after clearing, it may be softened or removed by the application of a very weak bleaching solution, followed, of course, by hypo, and repeated until the desired result is gained. In washing, let care always be taken that the water runs from the landscape to the sky, so as to carry the reagents clear away.

If this operation, or series of operations, be properly performed, the result will be a positive transparency, with a perfectly clear sky, and from this a duplicate negative is easily made. If the reproduction be made upon a gelatine plate, the exposure and development may be so arranged that the sky of

the negative is not sufficiently opaque to print white in the positive, but with a faint tint. To ensure this result however, in making the exposure the sky portion may be shaded with a sheet of tissue paper or ground glass, and, if desired, it may be shaded or graduated in any direction.

A better plan, but necessitating a greater degree of skill, is to introduce suitable clouds into the duplicate negative, when all subsequent trouble will be obviated. We have seen examples of this kind which it was difficult, if not impossible, to distinguish from direct negatives possessing their own clouds. With the film-cloud negatives now obtainable, the process is, comparatively speaking, easy, but it is not the object of the present article to go into those details.

The treatment of a portrait negative differs but little in theory from that of a landscape, though in practice it may be considerably modified. The fact that, in such a case as the printing of a single figure in a group, the portrait is one that is specially valuable, permits more care and trouble to be exercised than when merely a landscape is concerned. Under those circumstances, for instance, it is preferable to make an enlarged positive of the original, and to do the necessary work on this, afterwards producing from it a duplicate negative of the same size as the first. In addition to the greater delicacy of work thus rendered possible, the greater part of the work of removing the unnecessary portions of the image can be performed in the process of enlargement by the skilful use of screens, as in vignetting. But in this case, instead of being as much out of focus as possible, the screen must have an aperture of the precise outline or shape of the figure that is required, and this must be manipulated in such a manner and in such a position as to cut off all but the required portions without showing a harsh or unsightly outline. If this be carefully done, very little more will remain but to make the reduced negative.

For the purpose of providing a slightly tinted background in the final prints instead of a perfectly white one, as in the enlarged positive, a variety of methods may be adopted. A tint, for instance, may be applied to the enlargement itself before reduction; if on glass by means of a semi-opaque or coloured varnish, or if on paper by means of powdered crayon. Or another method we have seen successfully employed consists in interposing a sheet of thin translucent or tissue paper between the lens and the reproduction, the outline of the figure being accurately cut out. This may be allowed to remain during the whole or only a portion of the exposure, according to the effect desired.

If the work of removing the defective or unnecessary portions is to be performed by chemical means, as described in connexion with landscapes, the same materials may be used, but a slightly different method of application will be necessary. In the case of a skyline running practically in one general direction, it is easy to avoid letting the solution flow where it is not wanted; but with the outline of a portrait this is not so simple a matter. In the latter instance, therefore, in order to prevent the spread of the chlorising solution, it is better to thicken it with a little gum or similar material, and to be careful in washing to direct the stream of water right on to the figure itself, so that it washes the bleach in all directions *from* the outline.

From a defective bromide enlargement we have, as a test of the working of this plan, removed, by means of chloride of copper, the background and accessories, leaving the figure on a white ground, and from this have produced a duplicate negative representing the background as a delicate and perfectly even tint, without any sign of "dodging." In working on paper, probably the copper salt is about the worst that could be employed, as it has a tendency sometimes to leave a blue stain.

Many other methods might be enlarged upon if we had space, but those we have given will suffice to show the direction in which to proceed. But, as we hinted in the earlier part of this article, as much depends upon the individual as upon the method, if not more.

PERMANENCY OF PHOTOGRAPHS ON ENAMEL OR CERAMIC BASES.

It not unfrequently happens that the quasi-scientific writer, although knowing some few of those results obtained by workers in science, is singularly and notably blind to such facts as may easily be gathered by observation in the rounds of every-day life. As an instance of this we may mention that only a few weeks ago a technical publication, in which readers might reasonably expect to find reliable information, recommended a photograph vitrified upon enamelled copper (a very different thing from a "ceramic" photograph in the true sense of the term) as the most suitable and lasting picture for attaching to an outdoor monument, and the writer then proceeded to assert that such a production is as "imperishable as anything on this globe can be!"

A good photograph upon an enamel tablet is perhaps as beautiful a picture as can be made by the action of light, and if preserved from the action of damp and of atmospheric impurities it is unquestionably far more lasting than a silver print; but one has only to notice the condition of such enamelled advertisement tablets as have been exposed for some years to the weather to perceive that some enamel at any rate rapidly disintegrates, dissolves away, and discolours under the action of outdoor influences. A little further investigation will serve to satisfy the inquirer that even softer enamels are used in preparing the ordinary copper tablets than are used for the iron advertisement plates; and indeed we may say that owing to the low temperature at which copper softens and fuses, it is impracticable to so enamel copper that the surface shall be able to completely resist the corroding influences of rain and weather, even for so short a time as a few months.

The ordinary enamels used for copper tablets often contain about half their weight of protoxide of lead, a substance which readily dissolves in pure water, while the remaining half of the enamel is mainly compounded of borax and nitre, often without a trace of any true ceramic basis.

If a single drop of rain falls upon such a surface and evaporates with that slowness which will result from the atmosphere being damp, it will often leave a visible spot of corrosion and roughness; but perhaps the easiest way in which the experimenter can satisfy himself of the unstability of most enamel surfaces is to pour on a little sulphide of ammonium solution, when the slow darkening and ultimate blackening will tell its own tale. Indeed, a photograph burnt in upon an enamelled copper tablet is sometimes even more susceptible to the action of sulphide of ammonium than is an ordinary silver print, and this may hold good whether the sulphide is applied as a solution, or whether it is an impurity in the atmosphere.

The photographic image vitrified on an enamel tablet is ordinarily so thin that very little corrosion will completely remove it, but it is usual to cover it with a protective glaze, so

that the first inroads of corrosion do not tell upon the image, but rather upon the glaze. This glaze is, however, generally softer, more fusible, and more easily attacked than the enamel itself. A moderate red heat completely destroys an ordinary enamel photograph, owing to the melting of the enamel and the absorbtion into it of the metallic image; and those who prepare enamel photographs know what care is required not to fire beyond the temperature necessary for enabling the image to just bond with the surface of the plaque.

It is now worth while to consider the conditions under which it becomes possible to prepare true ceramic photographs having nearly the same stability against high temperature and against atmospheric influences which is possessed by the best specimens of pottery. It is difficult to see a way to say more than "nearly the same stability," except in the case of a method devised by Mr. F. Emery, of Burslem, and to which we shall allude shortly, as a photographic image is so completely at the surface of the ceramic ware that a degree of disintegration which completely removes it may leave the article of pottery which forms the base virtually intact.

The essential conditions are to use as a base a refractory porcelain, of which both body and glaze are entirely free from lead, the glaze being thin and so far vitrified with the body as to be one with it, at the same time the glaze in itself should be even more refractory than the hardest Bohemian glass. Porcelain of this kind can readily be obtained from the Staffordshire manufacturers, not only made up into articles of use, but also as plaques, similar in form to the ordinary enamelled copper tablets.

If upon such a ceramic basis we mount the collodion film, in which the silver image has been replaced by palladium or iridium, and instead of firing at the cautiously regulated red heat, beyond which the enamel worker dare not go, we fire at a full white heat only just short of the softening temperature of the ceramic body, the metallic image sinks into the glaze and stains it, forming as durable a photograph as one can reasonably hope to obtain, and one unlikely to deteriorate by an exposure to the weather during several generations.

If preserved in a dry atmosphere, such a photograph would probably be in excellent preservation even after a lapse of thousands of years. Similarly by the dusting-on process, or the gelatine pigment process. Equally durable ceramic photographs may be made provided care be taken to use suitable metallic pigments free from fluxing materials. Although in the course of a single article it would be quite impracticable to give full working details of one of these methods, we may here give a reliable formula for a tissue composition adapted to the latter method, so that any person practically acquainted with the working of the carbon process may readily experiment with this very easy method of ceramic photography.

A soft soap gelatine, such as that of Cox or Nelson, forms the base of the mixture, and a quarter of a pound of this is soaked in nine ounces of water, and when softened, two ounces of sugar is added, after which the mixture is melted and made slightly alkaline by the addition of about twenty drops of liquid ammonia. We now stir in three to four ounces of the finely divided peroxide of iron sold as jeweller's rouge, this being a convenient and inexpensive pigment to use for first experiments. Although at this stage it is desirable to pass the mixture through an ordinary paint mill in order to thoroughly break up the pigment, well grinding in a warm mortar is a fair substitute. If necessary, the mixture is now thinned by mixture with a little water, and is then squeezed through a piece of muslin, after which paper is coated with the mixture to form the tissue. The sensitising in a bichromate bath, mounting on the porcelain bath, and development in hot water, are done just as in the usual carbon process; and with a tissue made as recommended, there is but little probability of the film scaling off in the firing process.

Almost any metallic pigment which will stain a glaze may be made up in the tissue in place of the jeweller's rouge, and it is very convenient to use the *underglaze* colours sold by the manufacturers of pottery colours, these being compounded either without any flux or with a minimum of very hard flux. Overglaze colours, enamel colours, and the common glass painters' colours, on the other hand, are mixed with abundance of a soft flux, and are quite inadmissible when reasonably permanent results are required.

We referred to a device of Mr. F. Emery, by which a kind of ceramic photograph is obtained which is even more permanent than any mere surface image can ever be. Mr. Emery makes a high photographic relief by the Woodbury process or the swelled gelatine process, and from this a plaster mould, in which the article of pottery is made. In this way a solid photograph in a ceramic body is obtained, the varying intensities of light and shade being represented by proportionate degrees of relief—a solid photograph in the most lasting of materials. In some cases Mr. Emery fills up the hollows with a coloured glaze, so as to heighten the decorative effect; but this glaze may go, and the solid photograph in clay will remain. We remember seeing some of Mr. Emery's productions about ten years ago at a meeting of the Society of Arts, and he also exhibited them at the Photographic Club. Here we have the ceramic photograph in its most lasting form.

WORK FOR THE WINTER SEASON.

We are now rapidly approaching the end of the photographic season. In two or three weeks we shall enter the month proverbial for its fogs, when photography either ceases to be practised, or is practised only to a limited extent, and then under difficulties, both by professionals and amateurs. It is true that both classes are fully occupied just now, for it is a tolerably well recognised fact that the autumn is usually the most busy season of all the year with portraitists, alike in London and the provinces. With outdoor workers there is still plenty to be done, and up to the present we are favoured with a capital light for the month of October. Soon, however, the run of business in the studio will be over, while outdoor work amongst amateurs will, for the most part, be abandoned. Yet there is plenty that can be done by both classes of workers during the winter months.

During the winter season professional photographers might often materially add to their business in ways they now neglect. It may be fully expected during the coming winter that artificial light will be used more extensively than ever it was before, simply from the fact that there is scarcely a district of London, or few provincial towns, where electricity is not now as available as gas. Not only is the current available, but most of the electric lighting companies will install the light and provide the necessary lamp, or lamps, free of expense, and charge only a moderate rate for the electricity supplied. This being the case, the only outlay on the part of the photographer will be that for the reflector and its fittings—a mere bagatelle. We may here repeat what we mentioned a short time back: those

who intend adopting the electric light ought to lose no time in getting the matter forward, as all the companies have, and are likely to have their hands full of orders for some time to come.

With artificial light at command, sittings need never be refused by day or night. A considerable amount of business might be done in the evening if a specialty were made of taking portraits of sitters in full dress. Ladies would often like to have their portraits taken if this could be done by making a short call while on the way to the opera, or to a ball, though they might not care to dress specially for the purpose. We are of course aware that there are some studios where this can be done by appointment, but their number is very limited.

Few professional photographers, we imagine, will adopt the flash light for the better class of portraits, on account of the unsatisfactory expression generally obtained. It is true the sitter may not have time to alter during the flash, but there is often an expression of anxiety or fear on the features caused by the anticipation of the painfully strong and sudden light. This becomes more pronounced with each successive portrait that may be taken of the same sitter. There is also the annoyance of the fumes from the combustion of the magnesium in the room.

When the electric light is installed it may be utilised for enlarging, and in urgent cases for printing, also for copying. Indeed, nearly the whole of the copying during the winter for photo-mechanical work is done by the aid of the electric light. But for this source of illumination the business could not be carried on, as most of the work has to be executed at very short notice, which would be an impossibility if daylight had to be relied upon. There is one thing in connexion with the electric, or, indeed, all artificial lights in portraiture, namely, that in very foggy weather brilliant negatives cannot be obtained, however strong may be the light. It is obvious that if fifteen or twenty feet of yellow fog intervene between the lens and the sitter it will have its influence on the brilliancy of the negative. This difficulty may however, to a great extent, be overcome by employing plates which have been orthochromatised. Plates made sensitive to the yellow and red rays almost ignore the presence of fog in the studio. Even with natural light a great advantage will accrue from the use of such plates when the studio is charged with a yellow London fog; not only will they yield more brilliant negatives, but they will prove more sensitive than similar plates without the treatment.

There are several ways in which portraitists might profitably extend their business during the dull season. At present they content themselves principally in introducing enlargements from the negatives taken during the summer. But even this business, we conceive, might be materially extended. Now the trade is chiefly confined to pictures that the photographer usually has to put out to be executed. But there is very little question that a considerable business might be done with smaller enlargements, such as could very well be done at home in spare time, say from cabinets to the ordinary imperial or panel size, on a matt or rough surface bromide paper. As the enlargement is not great, and is made direct from the negative in one operation, if this be good, little or no retouching will be required. With artificial light a dozen or more enlargements may be made from a negative in a very short time, and at a small cost. Pictures of this class mounted as engravings have been produced for years past, but they have not been so popular as they ought to have been, principally on account of the cost when the work is put out to be executed.

Here is another direction in which a winter trade might be created, namely, enlargements from cabinet negatives to the sizes just suggested as transparencies. There is always a charm about a transparency that is not obtained in any other form of photograph. Very effective yet inexpensive frames, fitted with finely ground glass, and well suited to this class of picture, are now in the market. The enlargements might even be made on opal glass, when, if in the development the density were regulated to the thickness or opacity of the plate, the picture could be viewed equally as well by reflected as by transmitted light. This would be a novelty in many quarters.

Portraits with seasonable mottoes and greetings, as Christmas and New Year's cards, either on "ivorine" or celluloid, which latter may now be obtained in thin sheets almost undistinguishable from ivory itself, would often command orders if introduced. Although we have not alluded to all the directions in which business might be profitably increased by portraitists during the winter months, we have indicated some in which it is often neglected.

We had intended to have said something with regard to winter work for amateurs, but that must be deferred till a future occasion.

From an official announcement on another page it will be seen that the judges at the Photographic Exhibition have amended their awards, and have given medals respectively to Messrs. Green, Cross, and Bevan for their exhibits of diazotype printing; and to Mr. Andrew Pringle for his exhibit of photo-micrographs.

We have from time to time, as they have appeared in the technical journals, reproduced in our pages various methods for the detection of the haloids; and we have this week to describe a singularly simple and neat process for recognising the presence of iodine in the presence of much chlorine by Mr. Alexander Johnstone, F.G.S. "To the properly prepared solution to be tested add a single drop of a saturated solution of silver nitrate in strong, pure, ammonium hydrate. If iodine is present, even in the minutest quantity, the characteristic pale yellow precipitate of silver iodide will instantly form. Confirm this indication by pouring in—after having mixed the precipitate through the liquid by inserting the test tube with the thumb on the orifice—pure concentrated sulphuric acid, which first deepens the yellow of the precipitate, and then, when sufficient has been added, liberates the iodine, which is readily and infallibly recognised by its unique appearances, whether precipitated to the bottom of the tube, suspended in the liquid, or dissolved through it to form a pink solution. If not a trace of iodine is present in the chloride tested, the latter will give no precipitate, or, at most, only a faint whitish cloud, that will immediately disappear on the first shake given to the tube in the subsequent mixing." In a further note Mr. Johnstone suggests that the iodine may be shown in the usual way by shaking up the mixture containing the precipitated iodine with a few drops of bisulphide of carbon, which will, of course, take the characteristic pink tint.

This test, the *rationale* of which is obvious, points afresh a moral in the mode of collecting residues. In the washings from prints most photographers find little difficulty in separating the silver as chloride, common salt being the precipitant most usually employed. But, as we have repeatedly urged, the plan is wasteful in every way, the chloride of sodium solution being capable of taking up so large a proportion of chloride of silver, which thus gets wasted and lost in the "water" poured off from the precipitated chloride. The best precipitant to employ is crude hydrochloric acid, commonly sold as "spirit of salts" or "muriatic acid" at drysalters or the chemists. In quantity it can be bought for threepence or fourpence per pound.

The *Journal of the American Chemical Society* contains in a recent number a very interesting discussion upon a paper on the *Fixation of*

Atmospheric Nitrogen, in which some photographic chemicals are referred to. As they alone interest us, we only extract the remarks applying to them. One speaker, Mr. Sabine, said (it will be remembered the speaker was in the United States), "I doubt whether any cyanide manufacturers in this country, with one exception, are making a paying business of it, as such large quantities of cyanides and ferrocyanides are imported." Another chemist, Dr. Alsberg, said, "We are on the eve of a complete revolution in prussiate processes; cyanides and ferricyanides are manufactured in Germany from gas-purifier waste in such quantities as to have reduced the price twenty-five per cent."

The mention of the latter chemical naturally leads to Mr. Howard Farmer's excellent method of reducing the intensity of negatives by a mixture of solutions of hypo and of ferrocyanide of potassium. We have met with complaints of its inefficiency, but they must be founded on carelessness or imperfect reading of the simple instructions. It is no use to keep the two solutions ready mixed in one bottle, it is essential that they be mixed at the time of using, and if to keep the action down they are made weak, fresh quantities must be mixed rather than allow the plate to be immersed for too long a time, for the action of the solution very rapidly ceases. Further, the longer the plate is left in the mixture the more yellow does it become, this yellowness being the one drawback to the method which a long experience enables us to speak most highly of. The yellow stains may be entirely removed by immersing the plate in a weak solution of citric or other acid. But, and here is the unfortunate part of it, when sufficient washing is given to the negative to render it safe for storage, the whole of the discolouration gradually comes back again. We have, however, not tried whether very long soaking in acidified water would entirely remove the stain-producing substance.

THE CAMERA CLUB ONE-MAN EXHIBITION.

The annual display of the works of one exhibitor, who this year is Lyddell Sawyer, Newcastle-on-Tyne, opened on Monday last at the Camera Club with a private view, and probably never before has so many photographic pictures been seen together which have been produced in so short a period of time. Mr. Sawyer being comparatively young, he is not only an indefatigable worker, but possesses the true artistic faculty of seeing in one moment of time that which is good and pictorial both in fixed and in moving objects, and then the photograph is taken and a picture produced.

It is very interesting to study these yearly collections of pictorial photographs which the Camera Club has instituted, because the onward progress of artistic culture is very marked in these particular exhibits, where higher aims at composition, and the successful carrying out of the same, are very pronounced, and show how rapid must have been the study which results in such advanced work year after year.

We should define Mr. Sawyer's greatest talent to be the capacity for arranging moveable objects, so that the outlines form a true artistic composition.

In his first efforts these points were studied from their own particular value, but his later works go still further, and carry a meaning in them which enables him to suggest emotion by arrangement of position; most of his photographs now shown at the Camera Club have been seen before, but it is a very pleasant thing to renew their acquaintance, as for example the picture of *Tam o' Shanter*, which, when it was first exhibited, gave the intimation that there was another artist photographer in our midst.

His early productions showed the tendency which all young artistic picture makers fall into, of crowding the space with detail which photography so easily produces—this is shown in *She Stoops to Conquer*.

Then we see the clever arrangement of figures in the picture *On their own Hooks*. These were followed by some very carefully studied picturesque productions, such as *On the Quay Van Dyke, Antwerp*; then we have his studies of steam vessels *On the River Tyne*, and others full of movement, but well chosen for the right point of time, followed by his artistic choice of some of the old picturesque houses which abound in Newcastle; here again great value has been conferred upon such pictures by the figures having been well placed and showing much artistic design; then we have some few duplicates of his Pall Mall exhibits which have gained him a medal, which show a more advanced capacity for pictorial design and expression.

Altogether this exhibition is very interesting, and is worthy the closest study of those who desire to produce something more than mere facsimiles of objects.

The photographic rendering of so many specimens of industry (being somewhat more than 100 in number) has been most carefully attended to, and the collection should most certainly be seen and studied by those who desire to produce pictures by the agency of photography.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—I.

We now commence our remarks upon the exhibits to which medals have been awarded.

G. Davison (No. 55), *An Old Farmstead*.—Medal.—This photograph will probably be the battle-field for the two conflicting sections of photographic art which the progress of time has brought so prominently forward. The armies consist of those who adhere to the normal outcome which the scientific development of photography has created, and those who attempt a certain result by studiously illuminating that superb characteristic of sun-pictorial work, distinctness of form with elaborate detail, the result suggesting the "Columbus" method of getting over an apparent difficulty by first degrading the "egg" and then claiming honour for the deed.

There are other pictures in this exhibition which have been produced upon the same line of treatment, but we now consider this one alone. The first sensation of disturbance to the vision is very trying, and increases in intensity whether the picture is seen from a distance or otherwise. There is much artistic skill displayed in the construction of the various sections of this work, which consists of a sky, some cottages, a middle growth of some never-to-be-distinguished vegetable, and a foreground of another. These run in lines almost parallel to each other, and thus divide the composition into four parts, which, if photographed altogether, evince considerable skill, and if produced from more than one negative also demand much praise; but it would be most interesting to know the absolute fact one way or the other. One dark section, we think, can be determined forthwith, and that is some dark clouds which so kindly come in contact with a portion of the farm buildings, with trees above. These dark clouds just help the otherwise abrupt contrast which must have arisen from the termination of the trees; however this may be, the result is effective. There is another point we must notice, and that is the right side of the unknown vegetable, the top outline of which comes into contact with a dark portion of the distance. This ought surely to be subservient to the top bits of the unknown, and not protrude itself as almost a straight line. This vexes the eye of the observer, and adds to the disquietude caused by the out-of-focus treatment of the subject. The normal condition of eyesight is to see distinctly, when it is not so there is a defect. Photography has so many and good artistic capabilities that it is to be regretted that works like this one should prevail, which evincing much, very much, so artistic in conception, should be, as we think, jeopardised by so marked a departure from the accepted outcome of photographic research.

There is one matter in this exhibit which we specially commend; we allude to the framing, which is direct on to the photograph, so that at once the picture asserts itself to be of a higher grade than others which are surrounded with light-coloured mounts, at the same time the frame converging to the print presents a powerful glare of yellow light, so that "purple," the compensating colour, is seen to be on the photograph. All this intensifies the disturbance of the vision previously alluded to.

Lyddell Sawyer (No. 122), *Two's Company*.—Medal.—This picture displays a considerable amount of artistic skill in its composition. Two aspirants for one of Eve's daughters, one of whom is enjoying the felicity of a bit of flirtation, whilst the other, not so fortunate, is leaning moodily against a wall which forms part of an enclosure. This wall is crossed by some stone steps, on the top of which sits the much sought-after damsel. The background consists of trees and

sky. These materials have been very carefully utilised, and the point of view well considered for the telling of the story, the three figures being posed very nicely, especially as regards the balance of lines, both for harmony and discord. The background (with three trees) shows consummate skill in the choice of position, but, as we have previously remarked in our opening notes, this result, praiseworthy as it is, seems to point to this fact, that the artistic arrangement of the position of the figures has been made to agree with the background. Whether this is a difficulty which must be, perhaps is not of so much consequence; it only emphasises the artistic faculty displayed in fitting the moveable figures to harmonise with the fixed background.

J. B. B. Wellington (No. 166), *The Latest News.*—Medal.—This is a small photograph, but very nicely arranged for effect, the subject being two young country girls who, with newspaper in hand, are reading the latest news to their father who is returning from work. This photograph is effective from only half of the figures being shown, arising from the shape of the picture, which is rather different from the usual run, the width being greater than the height; the figures are placed against a background of trees, which do not come too forward, and there is evidenced some thought and a pleasing naturalness about the whole picture, simple as it is, which demands attention.

Shapoor N. Bhedwar (Nos. 184 to 189), *Feast of Roses.*—Medal.—Six pictures of young females arranged to personify the idea suggested by the title, constituting a series of exceedingly clever and artistically interesting photographs, where the pervading sensation is that of delicacy of conception, combined with softness and refinement of treatment. These pictures are really very clever in idea, and evince a remarkable amount of skill, both in the arrangement of the figures and the photographic rendering of the same. As might be concluded from the title, each picture illustrates the progressive action of the "Feast of Roses," where the models, all young females, have been well posed, the attitudes exceedingly chaste and pretty, and the details of the white draperies (which pervade the entire series) most admirably treated, both artistically and from the photographic point of view. There is poetry both in the idea and in the treatment, and most certainly shows that with artistic perception, and the right choice of models and drapery, photography when governed by the genius of art can produce a charming pictorial outcome without the aid of colour.

John E. Austin (No. 221), *The Love Letter.*—Medal.—This is another small picture, the subject being three girls, fisherman's daughters, reading a love letter; the arrangement of the figures shows an appreciation of lines which combine well together, and form a very pleasing picture, showing design and study to perpetuate an idea; the background of cliffs and cottages seems apparently to have been printed from another negative. However that may be, it retires, and that is sufficient praise, the result being an effective photograph as well as a very pretty picture.

Lyonel Clark (No. 232), *Dedham Bridge.*—Medal.—Another of those out-of-focus photographs which puzzle the staid and vex the purist. This annihilation of distinctness will degenerate into something which may possibly eradicate the fever. Now here is a pretty bit of nature treated in an unnatural way, because there are a quantity of outlines mixed up with all those on the negative, and this causes the tumult before alluded to. A scientific interest attaching to this print is, that it is toned with palladium and intensified with silver.

R. H. Lord (No. 330), *Study of Two Children.*—Medal.—A portrait study where the white draperies have been very well managed, and the faces in perfect harmony with the same. This is decidedly a strong feature in the study, the form of the photograph being another instance of departure where the width of the picture is greater than the height, all conducing to a happy result.

Ralph W. Robinson (No. 332), *The Pedlar.*—Medal.—This consists of the pedlar seated on a box displaying his goods for the appreciation of some women folk, whilst at the rustic entrance other figures are arranged examining his wares. This is a very pleasant composition in both ways, both artistic and otherwise, for evidently some few negatives have done duty in the work. This evinces much ingenuity, and is a most successful production; the balance of light and dark portions have been well studied, and the result is a very pleasant picture. It is much to be wished that subjects for photographic production could be designed from a more imaginative source; for instance, this picture, excellent as it is, becomes somewhat too realistic. This is where photography suffers. This very same photograph, if it could have the charm of colour added to it, would rise in value; possibly, if the tone was warmer, the result would have been better in all respects.

B. Gay Wilkinson, jun. (No. 365), *Sand Dunes.*—Medal.—This picture is very good as depicting the utter loneliness of such a scene. One is attracted to it by its carefully managed manipulation, but driven from it by its suggestiveness of desolation, so that much praise is due to the exhibitor for the treatment of such a subject. The contrast of the darkest portion of the scene with the lightest, where the top of a post comes against the lighter portion of some most effective clouds, adds to the artistic perception of the picture, which consists of nothing but some sand, some dark posts, and a forlorn bit of vegetation. And yet there is expression in the same.

Harry Tolley (No. 399), *Bantry Bay.*—Medal.—A highly effective view—where distance lends enchantment; this is intensified by the clouds being taken at a time when they covered part of the distant hills. This photograph is very effective, consisting of foreground. The bay in the centre, and beyond another set of hills rising, very simple in outline, but very suggestive—all this has been carefully treated, and the result is very good. Here again the sentiment, inspired by the truthful rendering of the scene, has been well preserved. But whilst admitting all this, we must also say that the question arises whether in such scenes, where all should be lifeless, whether such a cold tone as the picture presents is quite suitable to the subject. The view may have been taken in the daytime, yet we have the sensation that it is night. We surmise that this arises solely from the cold tone of the print, which suggests melancholy. This might have been altered by a warmer tone, the foliage in this otherwise effective view being far removed from nature's colour.

W. J. Byrne (No. 411), *W. K. Selle, Mus. Doc.*—Medal.—This is a very good portrait, 24 × 15, taken direct, where the treatment of pose has been scupulously in harmony with the individuality of the original. The whole is a very careful study.

H. Vander Weyde (No. 600), *An Invitation to Supper.*—Medal.—Quite an interesting photograph, being most carefully printed from four negatives; the size is peculiar, being 24 × 5, and contains sixteen figures dressed in the costume of one hundred years ago; the design of the entire procession, and the careful and very artistic arrangement of each set of two figures, is very pretty; these, possibly, would have been inherent difficulties. At the same time, if the print could have been enlarged to double the size, the interest would have increased very much; as it is, however, the picture is very attractive.

CURRENT COMMENTS.

Is it not a rather unusual effect to find an absolutely opaque substance (in this case the silver wires of the slide), when interposed between lens and plate, instead of leaving a perfectly transparent reflex of itself on the exposed negative, excluding all light during exposure as it does, showing on development greater density than any other part of the image, and having no other effect whatever? Such has been the experience of a very careful worker friend of mine during the last few days.

As it is necessary when anything unusual is found occurring, like Captain Cuttle, to make a note of it, and this is done with the added query, why or how did it happen?

The plate was an ordinary Ilford, and the developer the usual pyro with ammonia accompaniments with the usual care. The negative in other respects is perfectly good. The likely answer is that by some accident the usually careful worker had got the silver wire supports contaminated with some active substance which was as capable of clear bright reduction as was the action of light on the bromised film.

This may not be a contribution to the expiscation of the theory of the latent image, as in this case other substances—this one—show themselves capable of producing a developable image. There would, undoubtedly, be the pressure exerted by the spring upon the back of the bromised plate, but why did it happen in one instance out of many, and in this one only, and nothing being known or suspected of any possible contamination? I think we may leave it to your correspondent, Mr. Brebner, to apply his superanalytical skill to solve the problem, and perhaps make it out to be pressure-creating forces that translate into electricity, and so by the conversion of force producing developable action, which is—what?

Talking of electricity, I note that several times in recent numbers you have touched upon the forms of lightning flashes, and the need there is to have a true as against an artistic and inaccurate representation of that nearly most powerful, but certainly all-pervading agent; and as a contribution towards that desirable end, I cannot accept the theory as quoted by you on page 486, of Eric Stuart Bruce, to the effect that sheet lightning as seen by us is not the electric fluid itself, but a reflection seen through cloud openings, which means, of course, that we never see direct sheet lightning. I happened to be at Port Glasgow photographing on the 24th of April sixteen years ago; the weather had been beautifully clear, although not clear enough to light up a very dark but gorgeous staircase in the centre of the building, so I had to use magnesium ribbon for that. Towards night the wind veered round against the sun to the east, accompanied with sharp cold. About nine o'clock in the evening we had what I have called a noiseless thunderstorm (an electrical one), without rain or wind to speak of, but in front of and all around there passed continuously, sometimes more quickly, but often very slowly, flash after flash of pale grey light or lambent flame, always coming from the east and passing westwards in the form of great clouds of sheet lightning, leaving quite time to observe their beginning, passing, and disappearing, and these were at times so low in the air that they came well down between the steeple of the parish church and the observer. The whole scene lasted considerably over an hour. The young foliage on the hedges which faced the east were on the following morning found to be blackened, dry, and shrivelled, not a green leaf left: they looked like so many dry tea leaves. The electrical stream in passing had withered them hopelessly.

Here the fluid was sheet lightning, slow and perfectly visible, as well as leaving its visible traces behind it; and to show that I am not the only observer who has noticed a like quality about lightning, take this from Commander Cameron in his *Across Africa*, where, in describing the forms of lightning flashes and speaking of the effects of a terrific electric disturbance during an African thunderstorm about the region of the equator, he says, Vol. II., page 77, that in some instances the lightning seemed to be occasionally *slower* than at others:—"Some flashes lasted an appreciable time, being wide and having an appearance of rippling like a running stream." I have also noticed this form, especially once; when looking for more than a mile from my dark-room window a flash was distinctly seen travelling in the rippling fashion with a ball in front, which burst before reaching the spectator. The quivering tail here seen was most likely due to the persistence of vision, the eye not being able to follow the initial "bolt" rapidly enough. In the same connexion Major Serpa Pinto, writing in Vol. II., page 154, *How I Crossed Africa*, of that tropical home of thunderbursts, says, "It was an awful and sublime spectacle. For the first time, also, I there beheld the lightning divide itself. What appeared to be a ball of fire separated when near the ground into five, which darted almost horizontally from their centre and struck five different points. Others, again, I saw separate into four, into two, and many of them into three. Zigzag flashes of fire played about the atmosphere in every direction until the upper one seemed to be ablaze." What a pity so careful a meteorological observer had not had his camera ready to catch these resplendent effects. *Science Notes* says: "E. L. Trevelet, a Belgian astronomer, has published three pamphlets on this subject. He holds that the lightning flash is not so quick as we generally think."

Over twenty years ago Professor James Dewar, now of Cambridge, and Professor McKendrick, now of Glasgow, both then young men, in carrying through some valuable experiments on light, in which I assisted, showed what may help to explain what are called the dark flashes. A long, strong, glass box was constructed and made as nearly as may be into a perfect vacuum; this was left absolutely still for a number of days, or until the remaining infinitesimal particles of dust had fallen to the bottom, when the electric beam was sent through this while it was quite visible in the dust-laden atmosphere of the room: it remained perfectly dark or invisible within the case, which had been pumped dry and allowed time to settle perfectly on the floor and walls of the case.

May it not be that one or several of the flashes having burnt up all the floating atoms in the immediate vicinity, the succeeding flash or discharge of electrical fluid, if of the nature of light, and so of itself invisible, would only render visible that portion of space filled with particles which made the portion having none dimly visible?—perhaps this is only a dream!

W. H. Davies.

POSSIBILITIES OF PHOTOGRAPHIC PRINTING.

A week or two back, when mentioning the introduction in France of an iridium chloride paper, prints on which were stated to exhibit a fine and particularly delicate tone, the writer of "Foreign Notes" asks, and very pertinently, How about the price? The paragraph, like several others that have appeared at different times in the same column, has duly "gone the round" in the time-honoured style, and is now reproduced in a photographic contemporary which italicises its receipt from a paper that is itself a borrower. But this by the way. As iridium chloride is quoted in the wholesale lists at about ninety shillings the ounce, it is hard to understand how at such a price, and despite the utmost economy in coating the paper, any such process can have the remotest chance of commercial success, unless, indeed, it is calculated that metallic platinum will soon be exhausted, and that iridium will be the best substitute for it. But in such an event, which for the sake of the perpetuation of our most beautiful printing processes let us hope is not likely to come about, I fancy there are several other substances which would stand before iridium, both as regards price and adaptability for the purpose. There is, besides, a still more cogent reason adverse to its ultimate adoption, namely, that it is less plentiful than platinum itself.

An iridium printing process may in practice be a novelty, but, if I am not mistaken, Mr. Willis, in one of his earlier specifications, alleges that the metal, or rather its compounds, can be used to form the image in the same manner as platinum. That gentleman would not, I presume, found such a claim without due experiment. Photographic images have also been experimentally made of palladium, an analogous substance, and the salts of which cost between five and six pounds per ounce. The high price of iridium and palladium reduces their photographic properties to the level of mere curiosities, and in all probability they are never destined to be of practical service to us.

Nevertheless, besides platinum and silver, there are several other metals which are capable of forming the photographic positive, judging by the extent of our knowledge of them as revealed to us by past experiment. It is interesting to know that a picture in pure gold, of a beautiful purple colour, may be obtained by treating a ferrous image with a solution of auric chloride, and it is therefore feasible to suppose that various colorific modifications in the appearance of the picture would result from the use of the alkaline gold baths employed for toning albumen silver prints. It is surprising what a large number of prints a single grain of gold chloride in solution will give. That quantity is sufficient to tone a sheet of albumen silver paper from which something like thirty *cartes-de-visite*, or three twelve by ten, pictures could be cut, and assuming the paper to be coated with ferric oxalate and exposed, the gold would develop the same aggregate area of image. Gold chloride on paper is decomposed by light, and mixed with ammonium oxalate yields purple-red images.

Many of the mercury salts are decomposed by light, although to what extent such properties could be availed of for printing purposes has yet to be ascertained with more precision before any definitive idea of their value can be gained. A solution of mercuric chloride in potassium ferrocyanide when acted upon light gives a greenish-blue precipitate, and of this reaction Herschel took advantage to produce blue prints, of which I presume metallic mercury formed no part. The yellow oxide blackens strongly in violet light, and the iodide also darkens, but has a greater range of sensitiveness. Possibly the mercury salts, in conjunction with other metallic compounds, are more likely to be of service than by themselves. Thus we learn that cuprous chloride is darkened by light; and according to Schultz-Sellack and Becquerel, if a copper plate is treated with iodine or bromine vapour in the same manner as a Daguerreotype plate, and exposed in the camera, an image may be developed with vapour of mercury. This being so, we may infer that if a paper is coated with one of the copper haloids, or a combination thereof, exposure behind a negative and development with mercury will give a positive picture. But this does not exhaust the possibilities of copper. According to some writers the double oxalate of sodium and copper in the presence of a ferric salt is sensitive to light and deposits metallic copper. Here there seems to be scope for experiment in copper development and printing-out processes. As a matter of fact, pictures in deposited copper were produced by Obernetter twenty-six years ago. He coated paper with a mixture of ferric and cupric chlorides and hydrochloric acid, and developed with a similar solution in potassium sulphocyanide and sulphuric acid. The image was formed of cyanide of copper, which could be varied in tone.

The properties of the uranium salts always struck me as being capable of useful application, and if I had to provide a substitute for platinum, I should certainly select them for experiment; not only can we print provisional uranous pictures, but if we wash a solution of uranium nitrate mixed with oxalate of potash over a ferrous image, we get a deposit which at the first glance would be difficult to tell from platinum or silver. The salts of uranium are cheap, and we know from the experiences of former years that excellent pictures can be produced with them.

An important principle of photo-chemistry is that both negative deposits, as in the case of intensified negatives and paper positives, such as toned silver prints, are producible by a combination of metals, and I believe that the principle is capable of great extention in photographic printing. Palladium images may be toned with gold; ferrous oxalate deposits a beautiful picture in combined uranium and gold; silver pictures can be toned with either platinum, gold, uranium, palladium, and, I think, iridium. This principle of combining metals, either in deposition or toning, should give us command of a large number of diverse printing methods, each with its own peculiar merits and effects.

A study of such data, however imperfect they may be, must inevitably suggest to us that the possibilities of photographic printing are very great. It would be rash to imagine that printing in silver will ever be discontinued, but if that fate overtakes platinum, I do not think that there would be any insuperable difficulty in finding a substitute for it which could fulfil the primary conditions of success.

THOMAS BEDDING.

OBTAINING PRINTS TO SCALE AT THE ORDNANCE SURVEY OFFICE.

THE large-scale maps of the Ordnance Survey are printed on double elephant machine-made drawing paper, the expansion of which, due to humidity, is greatest in its length. Being a hard paper, it is necessary to print from the zinc plate on damp sheets, which contract on drying, in length chiefly; consequently, the form on the plate should have a similar elongation.

The negative is taken true to scale, and a photographic transfer prepared, after the Southampton method, on Evans' double elephant thin paper, which likewise has its greatest expansion in length. Previous to transfer to zinc, the transfer is damped until it has expanded to a certain convenient length—in practice, about a quarter of an inch beyond its correct size—and quickly passed through the zincographic press; the scraping action of the press increases the length of the transfer by a slight variable amount, which can be determined by experiment. The printer then obtains a stock of paper for printing that has been damped to such a degree of expansion as will contract on drying to the correct scale.

In the paper-damping department a stock of printing paper is kept sorted in various degrees of expansion to suit the variable sizes of form on the zinc plates. Every sheet of paper used for printing is measured before being damped, after being damped, and again after being printed. Prints with over $\frac{1}{100}$ or ·16 per cent. of error in scale are cancelled.

It is found that the elasticity of paper, *i.e.*, its capability of regaining its original form on drying after being damped, depends on its maturity, and that the maturity of a sheet depends on its age, and to a certain extent on its position in the ream.

C. E. HAYNES, Capt. R.E.

ON SULPHITES, THEIR STABILITY AND PRESERVATION.

[Lecture delivered at the London and Provincial Association.]

WHEN we burn a piece of sulphur in air or oxygen, there is formed a suffocating gas of a sharp, penetrating odour; freely soluble when brought in contact with water, producing what is known to chemists as a solution of sulphur*ous* acid, according to the following equation:—

$$\underset{\text{Sulphur.}}{S} + \underset{\text{Oxygen.}}{O_2} + \underset{\text{Water.}}{H_2O} = \underset{\text{Sulphurous Acid.}}{H_2SO_3}.$$

Now, although sulphurous acid (H_2SO_3) is the principal body formed, yet some is carried a stage further in oxidation, resulting in the production of traces of sulphur*ic* acid (H_2SO_4) which always accompany sulphurous acid prepared by burning sulphur in air or oxygen, and dissolving the resultant products in water. This aqueous solution of sulphurous acid is very unstable, and, when exposed to free access of air, is gradually converted into the more stable and permanent body, sulphur*ic* acid, or what is commonly known as oil of vitriol.

The facility with which sulphurous acid combines with an additional atom of oxygen is a property also true to a greater or less extent of its salts (sulphites). [Here sulphur was burnt in a bottle containing air, and the gaseous product shaken with water.] The presence of sulphur*ic* acid was clearly demonstrated by the following experiments:—

1. With a little of the water from the bottle in which the sulphur had been burnt, the formula "H_2SO_4" was written on a piece of blotting paper, and warmed over a spirit lamp, when the presence of sulphuric acid was rendered evident by the formula being charred upon the paper.

2. It was shown that a precipitate of sulph*ite* of barium was soluble in a solution acidified with hydrochloric acid, but sulph*ate* of barium was not. The presence of sulphuric acid in the liquid, from the bottle in which the sulphur had been burnt, was then demonstrated by acidifying a portion of the latter with hydrochloric acid, and adding barium chloride, when the precipitate of barium sulphate was produced.

When sulphur dioxide (SO_2) is brought in contact with nascent hydrogen, this latter body is oxidised with formation of water, by combining with the oxygen of the first-mentioned body, whilst the sulphur combines with hydrogen, forming sulphuretted hydrogen, thus:—

$$\underset{\text{Sulphur dioxide.}}{SO_2} + \underset{\text{Hydrogen.}}{3H_2} = \underset{\text{Sulphuretted hydrogen.}}{H_2S} + \underset{\text{Water.}}{2H_2O}.$$

This is an instance of a reducing agent becoming an oxidising one. All bodies capable of evolving SO_2 under the circumstances stated (hyposulphites, &c.) give this reaction, but we are at present only considering sulph*ites* which are detected by this reaction, even if present in very minute quantities; for if we allow the sulphuretted hydrogen produced to impinge on a piece of filter paper soaked in lead acetate, it is immediately turned brownish-black or black, from the formation of lead sulphide. Sulph*ates* do *not* give this reaction. [Here the experiment was shown by adding a little sodium sulph*ite* to a test tube in which hydrogen was evolved from pure zinc and hydrochloric acid.] A solution of iodine is decolourised by sulphur dioxide, a reaction which also enables us to detect minute quantities of the latter.

Sulphurous acid is a bi-basic acid, *i.e.*, it contains two atoms of replaceable hydrogen; when one atom is displaced by a monad element we have a *hydrogen* or acid salt produced; when two atoms are displaced we have a normal, or what is commonly called neutral salt. Of those salts of sulphurous acid which are soluble in water, we have the acid sulphites of barium, strontium, calcium, and magnesium, and the neutral and acid sulphites of lithium, sodium, potassium, and ammonium. Most other sulphites are insoluble.

The sulphites of sodium and potassium are mostly used by photographers, especially the former, of which there are four in number:—(1) Normal or neutral sulphite, Na_2SO_3+7Aq; (2) the acid or bi-sulphite, $NaHSO_3$; (3) meta-sulphite, $Na_2S_2O_5$, or $Na_2SO_3SO_2$; (4) sesqui-sulphite, $Na_2SG_32NaHSO_3+nAq$; this latter discovered by Mr. J. B. Giles, F.I.C.

The neutral sulphite of sodium of commerce is prepared by saturating the carbonate in solution with sulphurous acid, and adding to it, while warm, as much sodium carbonate as it originally contained; consequently, through carelessness in manufacture, many samples show a large excess of the latter, and although the sulphite crystallises better from a solution containing a small quantity of sodium carbonate, still, in a carefully manufactured sample, this should never exceed one or two per cent. A pure salt of this description is manufactured by Messrs. A. Boake, Roberts, & Co., of Stratford, E.; also a "special photographic salt" and alkaline meta-sulphites. I am requested to mention that these sulphites are patent articles, and can only be obtained from or through this firm. By their kindness I am able to show you these fine specimens of sulphite and meta-sulphite. [Here the specimens were exhibited, the lecturer dilating upon their great purity, and recommending them as standard articles in preference to making allowances in the commercially impure samples.]

The presence of an excess of sodium carbonate in the sulphite causes great annoyance to photographers, as, by its varying amount, they are unable to make any allowance in their formula, which demands an addition of a definite amount of the former in conjunction with the latter for developing. The presence of carbonate in sulphite of sodium is easily detected. The method depends upon the fact that carbonic acid gives a beautiful red colour with an alcoholic solution of phenolphthaleïn, whilst sulphurous acid produces no action in this respect. [Here the experiment was shown.]

If, then, we dissolve some of the sulphite above referred to containing only one or two per cent. of carbonate, add a little alcoholic phenolphthalein, we shall have a red colour developed due to the carbonic acid, and, on adding carefully a solution of the meta-sulphite —preferably potassium meta-sulphite, as this crystallises much more freely than the sodium salt, and is more stable—till the colour just disappears, the result is a pure solution of neutral or normal sodium (potassium) sulphite, the SO_2 radical combining with the sodium which was previously combined with the CO_3 radical. The question,

therefore, of obtaining a pure solution of normal or neutral sulphite of sodium need no longer perplex photographers.

I pointed out in the first part of my lecture that sulphurous acid gradually became oxidised to sulphuric acid, and that sulphites oxidised more or less rapidly to sulphates, which latter, of course, affects the purity of the salts when stored; and I suggest, as a means of preservation, that a pure sample, such as that referred to, and manufactured by Messrs. A. Boake, Roberts, & Co., should be kept in well-stoppered bottles with the crystals covered with pure ether, which procedure, I am of opinion, would prevent oxidation: the ether being very volatile, when the crystals were wanted they could be removed from the bottle and placed upon blotting paper till they became dry preparatory to dissolving. [Here crystals were shown in support of this which had been kept under ether for six months.]

To summarise: I have pointed out (1) that the sulphites oxidise more or less rapidly, forming sulphates, and (2) have suggested a means of preserving by keeping the crystals below the surface of ether: (3) I have mentioned and demonstrated simple tests within the capability of any photographer to perform for recognising the presence of sulphates and sulphites, and the detection of carbonate in the latter; and, lastly, by the use of the meta-sulphite, how to obtain a pure solution of the neutral or normal sulphite.

In conclusion, I desire to acknowledge my thanks to Professor Lewes, Royal Naval College, for the loan of his apparatus, which has enabled me to illustrate these experiments, and to sincerely thank my friend, Mr. Holden, for suggesting the subject of this lecture, which has given me such pleasure to deliver to you this evening, and your very kind attention and manner in which you have received me. I particularly wish to acknowledge my indebtedness and thanks to Mr. J. B. Oakes, F.I.C., for much information given me concerning the sulphites manufactured by Messrs. A. Boake, Roberts, & Co., whom I have also to thank for their courtesy and kindness in supplying the two specimens of sulphites. JOSEPH C. BELCHER.

DR. E. HARTNACK'S NEW APLANATES AND PANTOSCOPE.

THE celebrated firm of Dr. E. Hartnack, of Potsdam, recently forwarded two of their new objectives to the Imperial Photographic Institute in Vienna, for testing and examination.

The first of these was a symmetrical aplanate for landscapes, buildings, and instantaneous work, and was constructed of lenses manufactured from a special glass of considerable hardness, and completely unalterable by external atmospheric conditions.

According to information supplied by Dr. Hartnack, the lenses are ground and polished in such a way that perfectly spherical surfaces and correct curvature are obtained.

The second objective was a "wide-angle" (pantoscope), in which the lenses and the methods of manufacturing them employed are similar to those made use of for the aplanate.

A.—LANDSCAPE APLANATE.

This objective, which was inscribed "Dr. E. Hartnack, Potsdam, No. II.," was provided with a so-called iris diaphragm, regulatable in the ordinary way. The diameter of the diaphragm aperture could be read off a scale arranged on the tube, on which it was indicated by a pointer attached to the diaphragm lever, the divisions of the scale expressing the diameter of the diaphragm in millimetres. These mechanical arrangements were all executed with great care and precision.

The diameter of the front and back lens amounted to 25 cm. The largest aperture of the middle diaphragm was only 12 cm. The focal length was ascertained by focussing for infinity, and then so as to obtain an image of the same size as the object, and was found to be 123 mm., which is sufficiently near the focus indicated in the catalogue (120 mm.) for practical purposes. The objective was free from spherical aberration and focus difference (for visual and chemical rays), and showed no appreciable astigmatism or distortion of straight lines.

The effective aperture was found by Steinheil's method, and employing the largest diaphragm aperture (12 mm.), to be 13·5 mm. The relative aperture, that is to say, the ratio $\frac{\text{aperture}}{\text{focus}}$, was, in the case of the largest diaphragm aperture $\frac{1}{10\cdot 2}$, whereas in the case of the effective aperture it could be represented by the fraction $\frac{1}{9\cdot 1}$.

The diameter of the maximum circle of distinct definition amounted to 160 mm., and consequently covered a plate of 12 × 24 cm.: the image, when a small diaphragm was employed, being perfectly sharp up to the very edge. The instrument works very well for stereoscopic views with full aperture, while with medium stopping down it gives good *cartes-de-visite* of 9 × 12 cm.

The angle taken in was about 75°, and, when well stopped down, quite rectilinear.

The instrument is especially well suited for instantaneous work, more particularly for the so-called detective cameras, the above-mentioned size of plates, of course, being taken into account.

Instantaneous exposures with the Frahnert shutter of animated scenes and landscapes, views of animals in motion at a short distance, gave very good results, the great depth and its equable distribution throughout the field, as also the size of the available angle, being especially noticeable. The intensity is also very equally divided, and the objective is altogether very well suited for groups, buildings, landscapes, and instantaneous work.

B.—THE PANTOSCOPE.

This objective is also, like the aplanate previously described, provided with an iris diaphragm. The front and back lens have a diameter of 23 mm., exclusive of the setting, and the focal length was 136 mm. The largest diaphragm aperture is 8 mm., from which the relative aperture f-$\frac{1}{17}$ may be derived.

The effective aperture, *i.e.*, the diameter of the largest effective pencil of light was 9 mm., and the relative effective aperture consequently f-$\frac{1}{15}$.

The diameter of the largest circle of distinct definition was 300 mm., corresponding to an angle of about 98°. The largest plate over which complete definition was obtained was 18 × 24 cm., and adequate depth extended right up to the edge. The time of exposure with the smallest diaphragm (f-100), with a well-lighted landscape, was 4–6 seconds.

This objective has no "light spot," and is free from spherical aberration and focus difference. Further, the depth is very evenly distributed from the centre to the edge of the field, and the image is quite free from distortion and astigmatism.

This instrument is excellently suited for landscapes, buildings, and interiors where a wide-angle is required. DR. J. M. EDER.

—*Photographische Correspondenz.*

ON THE NATURE OF THE INVISIBLE IMAGE.*

SCHNAUSS (*Jour. of Photo. Soc.*, 1885, p. 229) thus refers to iodo-nitrate of silver: "It rapidly becomes intensely black when exposed to daylight, far more so than its two constituents separately. . . . Every drop of water added to it immediately decomposes a portion of the crystals, which then become coated with a yellow crust of iodide of silver. . . . The only solvent for this compound appears to be a concentrated solution of nitrate of silver." The note, it may be remarked, begins thus: "When a photographic layer on paper or glass is to be very sensitive, it must be arranged so that the light first passes through a stratum of nitrate of silver, dissolved in water, before reaching the iodide of silver in the collodion or paper."

Now the writer in a most unexpected way met with a rather curious confirmation of the general truth here stated. Roughly testing films and precipitates of the three silver haloids by covering them with drops of solutions of such reagents as H_2O, HNO_3, NH_4HO, KBr, NH_4Br, KI, NH_4I, $AgNO_3$, and $Na_2S_2O_3$, he found that when on a dry plate film he let fall a drop of water so as to form an elliptical "blob," and in the axes of this placed a crystal of $AgNO_3$ and KI respectively, the salts dissolved without at any time forming AgI. The slightest touch of the point of a fine No. O camel-hair pencil was sufficient, however, to determine the instantaneous formation of a small particle of the iodide of silver, which generally, apparently on account of the obliquity of the touch (for when the point was carefully brought down perpendicularly only a "dot" of iodide was formed), shot out into a thin line or wall, invariably arranging itself at right angles to a line joining the crystals.

This wall, as long as any crystal remained undissolved, not only showed no sign of increasing in size or of darkening, but slowly disintegrated at both sides, and the particles, at first floating slowly off, soon "swam" rapidly towards the crystals, and were speedily absorbed into the colourless nucleus; but the moment the fluid was stirred about, a copious precipitate of AgI was formed, which became less and less flocculent as the agitation continued, till finally it assumed the appearance of a *bonâ fide* film. It was then left alone as an additional test of the discolouring power of the sunlight, but apparently did not darken at all. On running water over the film, however, when some parts had darkened sufficiently to show the tendency of the liquid, this precipitate floated off, but left a fine dark slate colour to mark the spot it had occupied. On repeating the experiment on several different surfaces the same phenomena almost invariably recurred, and it was seen that a film of bright yellow iodide might superficially mask and conceal a strong discolouration, if indeed it did not initiate and continue it. It may be added that the films under concentrated nitric acid either did not darken at all, even in the most powerful sunshine, or, if they did, darkened so that the eye, in the light necessary to compare an unaffected film with that experimented on, failed to detect the slightest difference. When the nitric acid was diluted the films discoloured to a very pale grey, but when nitrate of silver was added to the acid a milky scum was formed, in which the little bubbles that arose from time to time from the film or

* Concluded from page 631.

precipitate gave rise to minute fungus-like discs, which darkened to a palpable pale purple or grey-violet. The "restrainers," viz., the bromides and iodides of potassium and ammonium, when they did not "fix" the film or precipitate, "restrained" the darkening of both. Ammonia when strong fixed the film, but threw off a dark purple solid; when dilute the film darkened under it. It also showed another peculiarity, of which we must take notice later on.

HUGH BREBNER.

STEREOSCOPIC WORK FOR AMATEURS.

III.

HAVING exposed and carefully developed his first stereoscopic negative, a beginner will naturally proceed to give some thought to the printing and mounting of his picture; and whether he elects to print on paper or on glass, he would do well at this stage to study minutely some points connected with the negative pictures he has produced, for at this juncture much may be learned anent the distances the various objects in the picture will assume, and to enable him to do so he would do well to provide himself with a pair of compasses and a rule. These at hand, let him lay the negative down before him in such a manner as to be able to carefully measure the distance which separates the same objects in both negatives. On his doing this it will be found that objects in the extreme distance will measure less than those in the foreground, and if the worker has given any study to binocular vision he will have learned the reason for this, viz., that distant objects which are viewed by parallel vision require less convergence of the optic axes than do objects in the near foreground, where the convergence is greater. So much for the negatives; and were any one to proceed and print from such in the customary way he would find he had made a serious mistake, for the picture taken with the right-hand lens would be mounted eventually on the left hand of the card. What is required is that the picture taken with the right-hand lens be mounted so as to be viewed with the right eye through the stereoscope, and the same with the left-hand picture being viewed with the left eye.

A very little consideration will suffice for any one to understand that to overcome this some system must be adopted whereby the negative is so treated as to permit of the prints being produced so as to be seen stereoscopically, or else some method adopted of cutting and transposing the prints from right to left. Some workers adopt the former, and some the latter plan of producing the desired result. As a rule, amateurs do not print very many pictures from any one negative, and therefore, all being considered, perhaps it is desirable that I deal with the latter method, viz., printing from the negative just as it is, and afterwards transposing the left picture to the right side of the mount, and the right picture to the left.

There are numerous ways of going about this operation, but perhaps as simple a way as any to describe, and for a beginner to understand, is as follows:—After his double prints are toned and washed and ready for cutting and mounting, let him take a lead pencil, make a rough line along the middle on the back of the print extending into each picture, but not from end to end. This done, he will be able afterwards to tell the right from the left with the greatest ease. I have said that when a negative is examined, objects in the foreground will be viewed at greater distances apart than those objects in the distance; but once the prints are cut and transposed, a little thought will show any one that this state of matters becomes altered, and the objects in the foreground assume their proper position, and come nearer together; and this is just what is required for viewing the pictures through the stereoscope. So much for the necessity of transposing the right picture to the left, and *vice versâ*.

The next thing a student should do is to give some thought to the size of the picture he intends to mount, and here, in a sense, he is limited to the breadth, if not to the height. At the start, however, I believe it will be found best for a beginner, when making paper prints, to confine himself to cutting his prints to two inches and five-eighths wide, and a smaller size in height. Later on, when dealing with the printing of glass transparencies, I may offer some remarks on a different size, but, to begin with, let the prints be cut to this size. When such is done, the pictures can be mounted on the ordinary stereoscopic card. To do this, get a cutting glass made two inches and five-eighths square, and also one five inches and seven-eighths long, and two inches and five-eighths wide. Any glazier will cut these for a copper; there is no need of going to the expense of costly cutting glasses. When provided with these, a beginner is ready to go ahead to turn and mount his pictures.

Let the print be taken and laid face down on a glass or other cutting block, and draw the pencil line previously referred to extending a little way into each picture. Now turn the print face up, and with the long glass place it over and adjust it, so that the top and bottom edges of the glass run exactly through the same objects in both pictures. This done, make a clean cut all round the cutting glass. Next take the small glass and lay it on the right-hand print, face up and upright, which is to be eventually the left picture, and cut it in such a manner that there be less subject on the left-hand side than will be the case when he comes to cut the left-hand print, which will eventually be the right-hand picture. The reason for this is, that when the picture comes to be viewed through the stereoscope it will be observed to stand away and beyond or behind the mount. So much for the cutting of the print. Now a few remarks will be necessary anent the proper distances at which to separate the pictures, so as to have them mounted at two and three-quarter inches centre. To do this, it will be obvious that there must be a separation of an eighth of an inch between the two prints, and in practice it will be found that such will combine well in the stereoscope. Just a word as to the colour of the mounting cards. Let these be of a dark shade of colour, there will then be a decided margin visible all round the picture, and the effect when viewing through the stereoscope is much heightened by the appearance of the picture being away behind the mounts.

As previously stated, there are many other ways of transposing prints for the stereoscope, but whichever method be adopted the two main things to be borne in mind are: first, cut the prints so as when mounted and in position on the card there will be less subject on the left-hand side of the left picture than there is on the left-hand side of the right-hand picture; and, secondly, mount them at two and three-quarter inches centre.

Having once mastered the rudimentary stage of stereoscopic work, it is more than likely a beginner will fly at higher game, and not rest contented till he prints from his negatives transparencies, and here at the outset let me state that there need be no hesitation on the part of any one to undertake this, the most fascinating of all stereoscopic pictures. Somehow or other I believe it is pretty generally thought that to make stereoscopic transparencies it is absolutely necessary to have a binocular printing camera. This is by no means absolutely necessary for any one to possess, even should it be decided to print smaller-sized transparencies than the size of the negative. Such can be done with the aid of a special printing frame and a series of masks cut to shield off those portions of a negative it is desired not to embrace in the picture. Before, however, that a beginner undertakes printing small-sized transparencies from larger-sized negatives, let me advise him to begin and print, first, transparencies the same size as his stereoscopic negatives, and when once he has become proficient at this work he will be able to undertake the reduction of his pictures with far greater certainty.

In my opening article I recommended half-plate to be used as a suitable size upon which to make the negative, and provided such has been adopted by a beginner, all that will be required to enable him to print glass stereoscopic pictures by contact is a special printing frame. This he can either get made by a handy joiner, or perhaps, what is better, he can buy one ready made from any photographic dealer, or, what is better still, let him write to Chadwick, in Manchester, where he is sure to get everything needed in stereoscopic work.

In my next I hope to refer to the printing of glass transparencies for the stereoscope.

T. N. ARMSTRONG.

LIGHTNING PHOTOGRAPHY.

AT this season of the year thunderstorms are not at all uncommon, and in the hopes that many of the readers of this paper may be encouraged to try and obtain lightning photographs next time a storm occurs near at hand, I have penned the following lines.

In England we are not greatly favoured in the way of thunderstorms, and though in the course of a year we may have seen a large number in the distance, yet as a rule one good storm is about the average for any particular place, and as we have not yet had any severe night storm in this locality—south-west London—this year, we still live in hope that we may have the opportunity of adding to our stock of lightning negatives.

It is now over three years since I made my first attempt to catch a flash, and although I secured a fine specimen of the meandering type, it was on a plate spoiled by an accidental exposure to light. However, it was to me as the first taste of human blood is to a tiger, and I most anxiously looked for another storm to come drifting my way, but it was not until two years after that another night storm occurred. Of this I greedily took advantage, and secured some very good results. I say greedily advisedly, for when a really good storm is raging close at hand, all one's spare plates are soon used up, and an insatiable longing for more takes hold of one. For this reason my first piece of

advice to tyros is that each individual should limit his stock of plates according to the capacity of his pocket.

As storms take place at so long intervals, every little piece of experience should be treasured up and brought to bear upon each succeeding effort in this direction, and as many have had no opportunity of gaining personal experience, it is for this reason that I propose to give mine in detail.

Let us begin by considering what advantages are to be gained by obtaining lightning photographs.

In the first place a good flash, mounted in an album amongst a collection of pictures, is an unfailing source of interest; but as it usually deprives the person who you are regaling with your choice bits of his appetite for pictures when he has once caught sight of it, and leads to a long conversation on the subject, it is as well, if you wish to have the satisfaction of hearing your artistic attempts execra——, no! no!! *praised*, to place it on the last mount in the book.

But, again, in securing lightning photographs, a photographer, if he will send prints to persons who make a point of critically examining them, has it in his power to materially help to develop our, at present, very limited knowledge of electricity. Every photograph I have been fortunate enough to obtain so far possesses some distinguishing mark of interest which is in every case different.

One of the more notable discoveries that have been made in lightning photographs is that of the "dark flash." At first sight it would appear that it had been produced by an abnormally bright flash which had caused over-exposure, but I think it was in the first negative, in which it appeared that another flash, causing a dense image throughout its course, had crossed it. Thus it could not be due to over-exposure, or at the point of juncture the second flash would have been severed. Several theories have been advanced to account for this phenomenon, but they are all more or less unsatisfactory, and we must wait until more light has been thrown on this subject—by photography, let us hope—for a really lucid demonstration of the cause.*

In one of my negatives is a curious effect which has undoubtedly some connexion with the phenomenon of the dark flash. I send a copy, No. 1, to the Editor, and he will be able to trace a complete but very irregular loop near a fine ramification of the flash, but separate from it. It prints dark, and is intensified by being surrounded by a lighter ground than the rest of the picture. Again, near the strange loop, and completely surrounding the ramification, is a circle made by a dark development, through the centre of which the fine flash passes. This flash is full of interest; twice it dives behind a large fleecy cloud, and fine, clear ramifications run up to the main flash from all directions like the tributaries to a river, while near one ramification is the curious marking I have described.

Another flash is of very ordinary appearance, but is rendered remarkable in that it terminates abruptly in three or four spots, which in the print are black. Most flashes which terminate on the negative wander away and are lost in the distance, or disappear below objects on the horizon. These black spots again may have some connexion with the "dark-flash" phenomenon.

There are various types of flashes; some are meandering, others straight and thick, some with ramifications, others absolutely devoid of them, &c. When the first photographs of lightning were produced there were some very remarkable ones, which excited a great deal of discussion. They were composite flashes, in which a number of flashes side by side following an identically similar course, but each one, starting from the brightest, was fainter than the preceding one. Sometimes the flash thus repeated itself six or eight times, and in some cases each flash was separate and distinct from the others, while at other times the separate flashes were connected by a blur, especially noticeable at the brightest points.

In print No. 2, the Editor will see instances of both these peculiarities. One flash repeats itself distinctly three times, and a second flash is composed of two parallel streaks joined by blurs. The cause of this strange result is of very simple origin. It is due to the movement of the camera; but why should there be a distinct reproduction of the flash, and not merely a blurred image?

Now here we can illustrate the great importance of lightning photography, for we have an instance of how it has helped forward electrical research.

Physicists had almost established, before these composite flashes were obtained, the theory that an electrical discharge is oscillatory, that is to say, a flash of lightning, instead of consisting of a stroke in one direction, is composed of a number of pulsations of electricity between the striking points, each pulsation being of less intensity than the one preceding; in fact, it would behave like a pendulum—it would oscillate until it was brought to rest. In the case of the flash the electrical discharge would cease when the points of discharge were brought to the same potential. These pulsations are of wonderful rapidity, for the whole discharge is over, generally speaking, in a fraction of a second, but it is easy to understand how a quick movement of the camera would take each oscillation separate and distinct. That the movement of the camera is the cause of the multiplication of the flash is well established, as some scientists have tried the effect of deliberately moving the camera, and this has produced the multiplication when the movement has not been too rapid, but when the movement is too great the flash comes out simply as a general smudge across the plate. Others have taken the same flash upon a stationary plate in one camera, and on a mechanically rotated plate in a second specially arranged camera, with the result that on the moving plate the repeated flash has been produced, while on the stationary one a single flash has developed out.

This then is, without doubt, the solution of the mystery, and, thanks to photography, we have a visible demonstration of the truth of the oscillatory theory of the electrical discharge.

A few hints as to manipulation. From what I have said about the movement of the camera there may exist, in the minds of some, doubts as to the advisability of holding the camera in the hand when exposing, but we have seen how that which would have been deemed carelessness in the taking of an ordinary photograph has led to a discovery, so we must hardly judge of the methods of taking lightning photographs from an ordinary standpoint.

If any one has tried to fix a tripod and camera at an open window, for it is generally from such position that attempts are made, particularly when it is raining, they will understand why it is preferable to use the camera in the hand; but if it should be considered desirable to fix it, I have no doubt that one of the special clips used for yachting would prove invaluable for attaching the camera to the window frame or ledge. If care is taken to rest the camera when holding it against the window-ledge or other support, the chance of movement is minimised. When exposing, the camera should point upwards, so that the horizon forms a line along the lower edge of the plate, and the plate should be used with the long side in a horizontal position.

It is necessary, I need hardly say, to wait until nearly dark before attempting to do any work, as the method of procedure is to have everything ready—dark-slide shutter drawn and cap off, and to wait with the camera pointed in the direction where most flashes occur until a flash stripes across the field of view. For purposes of scientific research the cap should be replaced immediately a flash occurs, or a second flash may be secured on the same plate, and this will lead to confusion.

When a flash has been secured, the time should be accurately noted, the direction in which the camera pointed, the colour of the flash, and any particular which may seem to be of the very least value. In putting the plates into the holders they should be numbered in pencil in one corner, always the same, and the numbers should correspond with the dark-slide numbers. When all the plates in the dark slides are used they should be changed for a new batch, and the plates numbered as before, but care should be taken to keep the batches separate and in the order in which they were exposed. By marking the plate in a fixed place the top is always known, and this is of importance, for it rarely happens that any ground is included which would enable one to distinguish between top and bottom of the picture, and by numbering the plates as the dark slides the statistics for the various plates will not be mixed. It is a good plan to cut a row of notches corresponding in number to the dark slide along the lower edge or end of the dark slide, so that the number of the plate can easily be distinguished in the dark by running a finger-nail over the notches. For instance, if plate five is going to be used, in passing the finger over the row of notches, five will be counted, and no doubt is left as to its number. Another point to be most carefully observed is seeing that the back of the plate is perfectly clean, that there is no emulsion on the back.

In print No. 2, which I have already described, are some peculiar marks, which might represent, to a person of rather strong imagination, clouds dropping rain. These are due merely to the absorption of the light, which reaches the back of the plate, by emulsion smudged over in the coating process. I would strongly recommend backing the plates, although this is not necessary if the plate is really clean, and the black material separating the plates is uniform, so that no uneven absorption of light takes place.

* When the above was written I had not seen an account of Sir H. Trueman Wood's experiments on this subject. These were described a few weeks ago in *Engineering*, and certainly help to account for this phenomenon, but at the same time I cannot see how the theory founded on these experiments will account for the dark loops I have described below.

Some means must be provided to enable focussing to be done at night. I have a little notch cut in the side of the baseboard of my camera which the back frame can be racked out to in the dark with the certainty that objects at two hundred or three hundred yards are in good focus, and, of course, anything beyond. The operator should be careful that the camera does not rack itself out of focus when in use. This is quite possible if the rack and pinion gear rather loosely, especially when using the camera in the hand.

If it is raining when waiting for a flash, take care that no rain-drops fall on the lens, for being good lenses themselves, they will produce peculiar defects on the negative by distortion. If possible the photographs should be taken from a window towards which the rain is not drifting.

In the absence of having tried any other make of plate for this purpose, I can give no advice upon the subject of choice, except that the Ilford "Ordinary" are safe. If at any time I am able to make experiments with various brands of plates, I shall consider it my duty to communicate the results to this paper, as it is desperately disappointing on developing carefully exposed plates, perhaps taken in the middle of the night after one has retired to rest, to find that the plates have not recorded any impression.

Much depends upon the printing for securing the best results. Ordinary albumenised paper is disappointing, for much fine detail in the negative is lost in the print, and I have always advocated up to the present time examining the negative for special peculiarities, but lately I have done some printing in chloride of silver emulsion paper, and for the purpose of printing lightning photographs I have found it fill every requirement. The detail is brought out splendidly if the print is squeegeed on to glass to give it a brilliant glaze. Although I have not tried it, I have no doubt that aristotype paper will prove most satisfactory for this purpose. Transferotype paper squeegeed on to glass should give good results, the glass given by contact with glass helps considerably to show up detail. The Editor will see that the prints enclosed, which are on chloride emulsion paper, leave little to be desired.

The Royal Meteorological Society has expressed its willingness to receive lightning photographs, however poor in general appearance, and I would recommend sending two carefully prepared prints on chloride emulsion paper from each negative, for then any defects in the one print would be at once noted as being absent from the other, and so no mistakes could be made.

If any one can secure a good photograph of a flash actually striking a building, tree, or any other object visible in the picture, he will reap a rich harvest. The only one I have seen is a very poor production.

W. P. Adams.

APPARATUS FOR TESTING THE RAPIDITY OF DRY PLATES, BROMIDE SILVER PAPER, ETC.

The question of testing the sensitiveness of dry plates for scientific, and for practical every-day work, as done by professional and amateur photographers, may be divided into two groups. In the first group, the manufacturers ought to be included, and it would be a great benefit to all the consumers if the manufacturers would come to an understanding and adopt an universal standard of sensitiveness. But this latter suggestion, presumably, will remain a desideratum still for many years to come. And, therefore, let us lay in a good stock of good natured patience, in order to go on and be satisfied with the different styles of denominations for rapidity such as they now still come to us.

I now must mention how I arrived at the original idea of my contrivance, which herewith I humbly offer to the fraternity, hoping that it may meet with a benevolent criticism. About seven years ago, when I was a resident of Havana, island of Cuba, I was practising the carbon process, and being in want of a photometer, which I could not obtain from the stock dealers there, I constructed the so-called sun's photometer, making it, the first number or square, with four pieces of uniform paper, the second with six, and so on till the twelfth square was covered by twenty-six thicknesses of the coloured paper. At that time my friends and I often had to avail ourselves of dry plates of European and American makers, and it rather frequently happened that, when using a new brand, we either under or over-exposed the plates to a rather discernible extent. The idea struck me that in using the photometer scale I might find out which of the various plates was the slowest or fastest. I thought the matter over, and came to the conclusion that I would have to adopt:

1st. A standard light. 2nd. A standard distance to expose the plate from the light. 3rd. A standard time of exposure. 4th. A standard developer. 5th. A standard length of development. 6th. A standard photometric scale.

Of these six items, the first and the fourth offered the greatest difficulties, however, after some further meditating and researches, I arrived at a *practical* good and satisfactory result. The construction of the whole apparatus was soon complete, but the results as yet were not that what I had anticipated, a further advance was made by adopting an Argand burner. Flat burner, Duplex, as well as olive oil, colza, &c., and even gaslight, did not give so much satisfaction as the Argand burner, which I adapted to a petroleum (student) lamp, and this light I found to be all that may be desired for uniformity and power. Closer examination of the flame showed that that part of it which is about one-third to three-eighths of an inch above the wick—being the blue part—in turning the flame up or down as far as admissible, always showed the same intensity, at least as far as the eye can perceive. Now, in order to regulate the amount of power coming from the said part of the flame, which is not much larger than about one-third of an inch, and also to cut off all the other rays of the flame, I determined to use a sheet-iron chimney, providing it with a little window of about one-third of an inch in diameter, placing it just at the very height of the referred part of the flame. The lamp arranged in this way, I placed it exactly three feet from the printing frame which held the photometer scale, and after some trials I found that an exposure of three minutes, and a development of five minutes, with a pyro, potash, and soda formula, gave me very nearly exact results. My first trials were to expose for half a minute then for one minute, but I soon found that three minutes was the best length of time, since the error in withdrawing and closing the slide being the same for a longer or shorter time of exposure was comparatively smaller for a long exposure than for a short one. Development was timed exactly five minutes, but although I always used the same proportion of pyro and alkali solutions, I soon found that there was, nevertheless, a sensible difference as soon as (with the month of November) the temperature went down as far as 45° Fahr. With the cooler weather, the same plates gave a lower photometer test than they had given when the temperature had been above 80° Fahr.

I now decided to test the developer always with the hydrometer, at 70° Fahr., and this, since then, has always been my rule. I further found out that certain plates (those called tropical and a few of American fabrication) did not give the photometer test in accordance to the results obtained upon them by instantaneous exposures made in the same way as with other plates which showed the right test. A more prolonged development of these plates (photometer tests) brought out the numbers perfectly well, and it appeared that these tropical plates, although they were just as rapid as the other plates (which sometimes frilled nicely), did not develop as quickly—in consequence of the large amount of chrome alum they contain, and the great amount of hard gelatine used in their manufacture. Previous soaking in water did not give the anticipated result, I therefore always develop the tropical plates (and those others which I know contained more chrome alum) for seven and a half minutes instead of five.

Max. Bogen.

Foreign Notes and News.

Some time ago we had occasion to point out that Baron Nathaniel Rothschild is a distinguished amateur photographer. On a recent occasion it fell to his lot to figure as a professional, at least, so we learn from the *Vienna Tageblatt*, and that under circumstances of a decidedly amusing character.

He was staying in the Ampezzo Valley, where it appears some military manœuvres were going on, and he had just got his camera nicely focussed upon a distant vidette who had taken up a particularly picturesque position. The hand the valve of whose signature to a bill is "above reproach" was about to press the trigger when it was arrested by cries of "Hi! Mr. Photographer just wait a minute!" and thereupon with more haste than elegance, there entered upon the scene Herr Schultze, of Berlin, and his better half, who desired to be photographed amid such picturesque scenery for the benefit of uncles and aunts at home on the Spree.

Various did Baron Rothschild contend that he had focussed his lens for landscape, and not for figures; the Berliner after the manner of his kind, insisted. The Baron at last good-naturedly consented, and the Berliner was about to hand him a substantial honorarium when, on asking the name and address of the supposed professional photographer, and learning with whom he had to deal, he became so paralysed with astonishment that Baron Rothschild had no difficulty in recussing the sum.

The next day they punctually received their proof gratis, and the likeness was so good that the "aunts and uncles at home" were highly delighted.

Professors Vogel and Eder appear to be constantly engaged in a noble competition as to which can contribute the most to the progress of photography and its application to the advancement of science and art. A short time ago we chronicled the triumph of one publisher, Dr. Vogel, who displayed by photographing the comet upon the person of a bustle. We have now to record an equally conspicuous victory achieved by Professor Vogel in the realm of astronomy.

It is unnecessary to remind our readers that the spectroscope many years ago enabled astronomers to demonstrate that certain of the fixed stars are in a state of motion either towards or away from the earth. The evidence supporting this conclusion was furnished by the displacement of the principal lines in the spectra of the different stars. A large number of spectral observations of all the leading fixed stars have been carried out in the Potsdam Observatory by Professor Vogel, in conjunction with Dr. Scheiner, for a considerable time past. The result of these observations went to show that the displacement of the spectral lines was subject to periodic variation.

Professors Vogel and Dr. Scheiner came to the conclusion that this variation was due to the motion of the earth to her orbit, as she is at one time of the year approaching certain of the fixed stars, and at another time receding from them. The practical outcome of the displacement of the lines was accurately measured, and from the data thus obtained the velocity of the earth in her orbit was calculated. The result arrived at agreed, within a few fractions of a kilometre, with the velocity as ascertained from other sources. It would not be true, by two months to say that no greater triumph of the scientific application of photography has been achieved within the year.

Dr. Stolze has recently been contributing an interesting series of papers on [illegible] to the *Photographische Mittheilungen*. In his last contribution he touches on a difficulty arising from the fact that where lights contrast in the subject to form white, the corresponding pigments continue to form black or grey.

To overcome this difficulty he overlooked means instead of by retouching. Dr. Stolze suggests that in addition to the negative made behind coloured screens for subsequent printing one hydrometric negative should be taken on a film, and the high lights well brought out. From this negative should then be superposed upon each of the prints negatives when printing on to the sensitised surfaces of the tissue. By this means shades and all the high lights would be brought out in those pieces intensely by a purely mechanical and consequently accurate process.

We are also glad to find that Dr. Stolze sees much objects to the employment of natural rock. All the great difficulties attached to artificial rock, I hope to be entered into in detail in a paper by F. Wynn, and there is no necessity for it before, unless she is suffering from a London fog.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 15,[illegible]. "[illegible] Camera." J. Gore. *Dated September 30, 1880.*

No. 15,[illegible]. "Improvements in Photographic Detective Cameras." W. J. [illegible]. *Dated October 1, 1880.*

No. 15,[illegible]. "Improvements in Portable Photographic Cameras." A. Jones. *Dated October 2, 1880.*

No. 15,[illegible]. "A New or Improved Organism in Photographic Plate Holder and Dark Slide or Plate Holder for Photographic Cameras." F. Lucas and S. L. [illegible]. *Dated October 2, 1880.*

No. 15,[illegible]. "Improvements in the Method of and Means for Packing Photographic Prints or Cards or other Pictures." F. W. Cheesman. *Dated October 4, 1880.*

PATENT COMPLETED.

Improvements in Photographic Cameras.

No. 15,[illegible]. Antoine Prosper Lionel Ville, E. Z. Vanderpool, Amsterdam, Photographer. September 18, 1880.

The object of my invention is to be supported and fit, and with such appliances, [illegible] and especially those of a portable character, that the [illegible] can only readily be securely fastened, but the operator or the assistant during exposure can be seen at the ground glass, and thus an attractive way [illegible] in the subject of such [illegible] to see by such movements of those parts to the camera that alone the exposure, and I receive all those advantages in a very simple and effective manner.

To carry out this object the camera frame or is placed on a preferably rectangular casing of the desired size, the top [illegible] of part of the lens may be seen as capable of being opened, and the lens is passed at or near this opening, preferably being so fixed as to work in a tube, and when the lens is behind the opening this tube can be secured in and to a partition placed transversely to the casing, and a rack and pinion movement is provided which can be operated from outside the casing, and by which this partition may be moved or the tube may be elongated or shortened to bring the object into focus, and suitable stops, preferably diaphragmatic, may be fitted to the lens or to the lens tube. Where the partition is to be so moved, suitable opaque bellows can very conveniently be fitted between and to the opening of the casing and the partition round the lens tube to make this partition light-tight. The proper distance behind the lens is horizontally and transversally parallel to the casing and near the upper part of the same by its upper and further edge, a mirror corresponding therewith a piece of ground glass is secured [illegible] the top of the casing, and this mirror when inclined downwards at the proper angle receives the image through and from the lens and transmits it to the ground glass. The mirror and the ground glass are suitably surrounded by opaque bellows, and when the same are extended or pushing more to the front part thereof corresponds with the lens. Below the mirror is fitted in the casing an intermediate packet or other [illegible] which can be operated from outside the casing by a [illegible] ball, and is connected by a lever or otherwise with the mirror in such way that when and as the mirror is extended the mirror is lifted up against and parallel or thereabouts with the ground glass. Behind the mirror is inserted in the casing the dark slide that holds the sensitive plate or plates. All these parts are so arranged that when the image has been focussed on the ground glass it will also be exactly in focus on the sensitive plate, or a certain [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] known the exact focussing will be effected. Any suitable shutter may be used in and with my camera that will give a [illegible] of an instantaneous exposure may be desired, and I particularly use what is known as a tilted shutter placed behind the screen and immediately before the sensitive plate, and more especially the [illegible] shutter is combined in the patented specification accompanying another application for a patent which I have made this day.

For [illegible] I proceed as follows:—When the image has been duly focussed on the ground glass, and the [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

year in that way, and, on recently trying, found it work well. He now produced the bottle with crystals of sulphite in gas.

Mr. BELCHER thought that pure hydrogen would be better than coal gas. He then tested Mr. Atkins's sample, and found a considerable amount of sulphate present, which might, however, have existed in the salt when first put into the bottle.

The CHAIRMAN said that as there must at times be carbonate in sulphite, if only in consequence of the fact that the manufacturers found that crystallisation went on better when it was present, it was certainly the best thing to do to neutralise it with sulphurous acid, and that was most conveniently done by the addition of meta-sulphite, as recommended by the lecturer. He was sure the members would unite in thanking Mr. Belcher for his lecture and demonstration, and this was done by acclamation.

Mr. R. ROBERT then showed a repeating flash magnesium lamp of French construction, and a photograph of the members present was taken by its aid. He also introduced a new single-solution developer which, it was stated, was particularly useful for flash-light pictures and other cases where the exposure had been scarcely sufficient for ordinary developers.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 3, Mr. Edwards presiding, was a lantern evening, the lantern being lent and worked by the Treasurer. A very good series of slides was put through, amongst them being a quantity taken by the "Ideal" hand camera, which caused much amusement.

Members' attention is specially called to the President's demonstration on *Alpha Paper* on Friday, October 17.

BERLIN PRACTICAL PHOTOGRAPHERS.

SEPTEMBER 24,—Herr C. Suck in the chair.

The proceedings were commenced by Dr. MIETHE, who delivered a discourse on *The Preparation of Duplicate Negatives*. He commenced his remarks by observing that the process was still of sufficient importance for it to be worth while to spend a good deal of time on it, and went on to point out that the frequent failures encountered were probably due to variation in the emulsions employed, an emulsion weak in gelatine being, as Herr Schaarwächter has discovered, better than one with much gelatine. Highly sensitive plates, too, are better suited than plates of medium sensibility. Dr. Miethe then proceeded to perform some experiments, producing two duplicates from a negative he brought with him, and then developing them. The negatives turned out satisfactorily, although some of the character of the original was missing, it being a well-known fact that experiments of this kind usually succeed better in the laboratory than in the lecture room.

Herr SCHAARWÄCHTER stated that he had also occupied himself with similar experiments, employing iron as a developer. He did not find the results satisfactory, and the fact that the negative is reversed was a decided disadvantage. It would be of much more importance, proceeded Herr Schaarwächter, if these duplicates could be produced in the camera. Unfortunately, the trials he had hitherto made in that direction did not turn out satisfactorily. He concluded his remarks by suggesting that plate makers should turn their attention to manufacturing plates specially adapted for this very useful process. Herr Schaarwächter also exhibited a number of excellent enlargements, some of which had not been retouched. These exhibits excited general admiration, in reply to which Herr Schaarwächter explained that for enlargements he always used contact transparencies in which the density was regulated by the degree of enlargement contemplated. From these he makes the enlargement by means of camera and portrait lens without diaphragm. If an aplanate were used and stopped down *too great* sharpness is obtained, and a disagreeable grain and want of brilliancy produced.

A number of other exhibits were then shown, and remarks made by different speakers, after which Dr. MIETHE described some experiments he had made with Mercier's new osmium toning bath, concerning the merits of which, however, he did not seem to have come to a decided conclusion.

Votes of thanks then closed the meeting.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE EXHIBITION AWARDS.

To the EDITOR.

SIR,—It is a sound rule in judges to give your verdict, but not your reasons. If, as one of the judges, I depart from this wholesome rule for once, in reply to two of your correspondents, it must be distinctly understood that I do so in my individual capacity, and without the least authorisation from my colleagues. I reply because "One of the Amateurs" seems to regret his want of education, and "F. M." seems to be so short of the same desirable endowment as to suppose that some of the medalled pictures could have been taken with a packing case for a camera and a bit of bottle glass for a lens.

The first medalled picture in the catalogue is 55, *An Old Farmstead*, by G. Davison. This, I presume, is the picture which gives the most offence to your correspondents, as well as to others, and in some degree I am glad to see it, for nobody can be more opposed to the "fuzzy" school than I am, but I hope I am able to see artistic merit, *when it exists*, in methods to which I may be most opposed. I cannot admire the egotism of any man who says "my way is the only way." I see many excellent, and some rare, artistic qualities in Mr. Davison's picture, although I should have preferred to see these qualities combined, as I am sure they could be, with better definition, for I hold that definition is the photographer's birthright—not that it need take the acute form. If there is no composition in the picture I cannot help admiring the selection, and can only imagine one improvement, the addition of a suitable figure or figures. We must take into account the evident intention of the artist. His scheme did not seem to contemplate more than the production of a pleasing impression of nature embodied in a picturesque subject. Now nothing can be more difficult than this, if we may judge from the lamentable attempts that have been so prominently forced on our attention during the last two or three years. Here Mr. Davison has succeeded where all others have failed; and he has done so partly because he has departed from the naturalistic doctrine of differential focus—sharp in one patch, and chaos in another—and diffused his focus equally, to too great an extent I have admitted. Nothing could be wider apart than the two principles. The light and shade is most satisfactory, and the picture has "feeling," a quality rarely present in a photograph.

So much for the artistic. But the picture has also a scientific recommendation. It shows what can be done with a pinhole in place of the lens; a matter of curiosity, perhaps, which will have little further application; but are not many results of science matters of curiosity only? May I add, without offence, another use I see in the picture? It is an example of what to avoid, especially by young amateurs; for failure, as we have seen, is disastrous, and success is only possible to supreme skill. Mr. Davison is the only one who has succeeded.

I do not intend to deal with the other medalled pictures, as I presume that this is the only one aimed at, except perhaps one other (232), *Dedham Bridge*, by Mr. Lyonel Clark. This photograph is undoubtedly out of focus, and it must be apparent that this was medalled for more than the quality of the negative. It indicates a new and beautiful method of printing, producing an artistic colour which may be of the greatest use. Beyond the works of these two gentlemen I look in the exhibition in vain for prominent evidence of the spread of out-of-focus photography.

Now I am writing, there is just one other subject connected with the exhibition I may allude to. I have heard that there are some pictures hung which have been previously publicly exhibited in London. The exclusion of pictures previously *publicly* exhibited within the London postal district, as set forth in the prospectus, of course applies to public exhibitions only, and was never intended to exclude pictures previously shown at private exhibitions, such as those of the Camera Club and private firms. Yet there are, no doubt, pictures on the walls which have passed the Committee of Selection undetected. The Committee is not infallible, nor of universal knowledge. It is not possible to remember every little picture exhibited at a large and miscellaneous exhibition, such as that, let us say, held at the Crystal Palace, and the Committee have to rely greatly on exhibitors carefully reading the conditions, and honourably complying with them.—I am, yours, &c., H. P. ROBINSON.

Winwood, Tunbridge Wells.

FURTHER MEDAL AWARDS AT THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—I am requested to state that the judges have awarded a medal to *Green, Cross, & Bevan* for their exhibit of diazotype printing; also to *Andrew Pringle*, photo-micrographs,—I am, yours, &c.,

EDWIN COCKING, *Assistant Secretary.*

5A, Pall Mall East, October 7, 1890.

ALLEGED UNFAIRNESS *RE* THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—I beg to enclose for your perusal, and for publication if you think fit, a correspondence between myself and the Assistant Secretary of the Photographic Society of Great Britain. By it you will see I forwarded for exhibition at Pall Mall two pictures which were "not hung." On making inquiries as to the reason of their exclusion, I am informed, as you will see, one was coloured by hand, and therefore, as clearly stated in the rules, not admissible. The one picture in question was coloured by means of the "air brush," the other, also furnished as crayon in black and white by same means, the particulars being fully set forth in the entry-form and on the back of the pictures. That the "air brush" can be anything but mechanical I positively deny. Hands are certainly needed to use it, but what can be done without them? I claimed to exhibit under the rule which says, "Pictures coloured by scientific *or mechanical* means will be admitted." Now, sir, if the rules of the Society are to be enforced (and they were without justification in my case) let them be carried out in their entirety, and in justice to the profession and for the honour of their reputation enforce another rule against the medalled picture of Mr. Van der Weyde, which was on Alcove K, No. 304, of the Crystal Palace Exhibition this year, and also remove the

exhibit of Mr. F. Whaley, whose picture, No. 578, in present exhibition was on Screen 25 of the Sydenham exhibition of 1890. I quote these two instances; that there are others as flagrant any one visiting the recent exhibitions must admit. I do not wish to appear invidious regarding the exhibitors I have named, the recollection of seeing their pictures before was impressed on me, and which a reference to the Palace catalogue confirms. I have been connected with the photographic profession some years, and think it a lamentable thing, after existing so long, the Council of the Society (of whose exhibition you speak in your current issue as the *most important* in the world) should have no better regulation for the reception or rejection of pictures sent to adorn the walls in the Pall Mall Gallery, to say nothing of the fact that in every case exhibitors receive with their entry-form a copy of the rules, and therefore in sending their pictures which had before been publicly exhibited within the London postal district could not have been in ignorance that they were acting in direct contravention of those rules.

We cannot all be on the top rung of the ladder, but let the same measure of justice be meted out to all, and if the rule was enforced (although unjustifiably) against me, let the other regulation be enforced against those who have transgressed the rules without *any justification*.—I am, yours, &c.,

ANNIE E. BLAKE.

Bedford, October 4, 1890.

COPIES.

"*October* 2, 1890.

"SIR,—On September 13 last I forwarded to Mr. J. Bourlet, per Midland Railway, a case containing two pictures for exhibition in Pall Mall, also sending at same time entry-form, and requisite cash for wall-space. Last week I received the formal card of invitation to the *soirée*, also a season ticket, and was much astonished on visiting the exhibition yesterday to find my pictures were not there, neither was my name in the catalogue. I have received no intimation of their being not accepted, neither have I had the cash returned. I therefore demand an explanation of this unbusinesslike proceeding. I think it only due to me if they were rejected I should have been informed such was the case, but as they were exhibited at Falmouth, I fail to see why they should be rejected in London. Please say to whom I can apply for their immediate return.—Yours obediently,

"ANNIE E. BLAKE."

"*October* 2, 1890.

"MADAME A. E. BLAKE,—In reply to yours of October 2, I beg to state that your work could not be exhibited as it came within the prohibited clause of pictures coloured by hand, so that in sending our tickets to exhibitors I did not take notice that both your frames were not accepted. However, we are glad to have given you an opportunity of seeing what our exhibition is like. We never send any notice respecting pictures which are not hung, and there is so much to do, that the matter of returning the cash has not yet come into my work—this I will do in a few days. I will send orders to our agent, Bourlet, to pack and return your work as soon as possible. If you attentively read our circular you will find the clause I have alluded to *very clearly stated*.—Yours faithfully,

"EDWARD COOKING, *Assistant Secretary*."

"E. Cooking, Esq., "*Bedford, October* 3, 1890.

"SIR,—I beg to acknowledge your reply, and thank you for your attention. I had already before sending my pictures *attentively* read your circular, and claim to exhibit the coloured picture of little girl under this rule:—'Photographs coloured by scientific or mechanical means will be admissible.' That the 'air brush' can be anything but mechanical I positively deny, and the only construction to place on its exclusion is the person or persons who decided against it were ignorant as to what an 'air brush' really was. But the question of colouring has nothing whatever to do in the case of the enlargement of that finished as crayon in black and white. If 'dry-point' finishing is admissible, why not an enlargement finished by the *air brush*? The *whole* of the work is mine—negative, retouching, enlarging, and finishing. How many of those whose enlargements are on the walls of your exhibition can say the same?

I shall forward this correspondence to the photographic press, as I consider it an unjust attempt to exclude 'air brush work.' I have no interest whatever in the Air-brush Company. I purchased my instrument solely because I saw in it a wonderful ally to the production of artistic work.—I am, sir, yours obediently,

"ANNIE E. BLAKE."

CUTTING PRINTS.

To the EDITOR.

SIR,—I see in THE BRITISH JOURNAL OF PHOTOGRAPHY this week an announcement of an approved appliance for cutting prints, &c., as a patent. This seems to me a small matter to patent, as the appliance can be so simply made by any one using the cutting shapes by fixing a small portion of postage-stamp paper at each corner of the plate, an arrangement I have used for years with perfect result, an idea so simple that I have never thought it worth mentioning. This idea may be of use to some amateurs wishing to use their cutting shapes without going to additional expense.—I am, yours, &c.,

WILLIAM GOODE.

Sutton, Surrey, October 7, 1890.

NEW YORK PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—It may interest amateurs and others in England and elsewhere to know that one of the largest and most important public photographic exhibitions held in this country will occur from May 25th to June 6th, 1891, inclusive, at the Fifth-avenue Art Galleries, on Fifth-avenue, near Thirty-fifth-street, New York, open to exhibitors (either amateurs or professionals) from the whole world, under the auspices of the Society of Amateur Photographers of New York. It is probable that medals instead of diplomas will be awarded.

A special circular, giving information as to rules, forms, &c., will be issued shortly. Exhibits are invited from abroad, and will be carefully attended to. It is also hoped that specimen sets of lantern slides will be sent, as it is the intention of the Committee to have lantern-slide exhibitions frequently during the exhibition. Arrangements have been made here with the Customs authorities by which slides sent to the Society will be admitted free of duty.

Intending exhibitors desiring further information should address—

Yours, &c., F. C. BEACH, *Chairman of Committee on Arrangements*, 113, *West Thirty-eighth-street, New York.*

September 30, 1890.

MOUNTING PRINTS ON REPELLENT SURFACES.

To the EDITOR.

SIR,—I noticed in a JOURNAL of recent date an inquiry by one of your readers as to how successfully to mount photographs upon mounts having a repellent surface. Now, having had a precisely similar experience myself some months ago, I can feel for your correspondent, and as I completely mastered the difficulty I am glad to aid a brother photographer. My method may or may not be original, but I thought it out for myself, and this is how I managed to overcome the difficulty.

I prepared a solution of Coignet's gold medal gelatine of the strength of one ounce gelatine to twelve ounces water, and when filtered brushed it over each mount, keeping the gelatine solution hot during the time I was doing so. After brushing the mount with the gelatine solution it was laid flat on a shelf to dry, and as many mounts were done that way as were required for the next mounting: after they were thoroughly dry they were gathered together, and whenever my boys had nothing to do, that was their job until all the mounts had been done.

In mounting I used a stiffly made starch, and never experienced the least annoyance from mounts which at one time I thought completely useless.

Trusting some of your readers will find the above welcome,—I am, yours, &c.,

W. G.

29, *Triangle, Clifton, Bristol, October* 3, 1890.

Exchange Column.

Will exchange Remington typewriter, having capital and lower-case letters, cost 21*l.*, not much used, for No. 4 Kodak (size 5×6 preferred).—Address, Rev. F. E. WALDIE, Ashworth Vicarage, Rochdale.

Answers to Correspondents.

PHOTOGRAPHS REGISTERED:

H. Hinchcliffe, Liverpool.—*Two photographs of the Everton Association Footbal Teams.*

A. B. White, Cricklade.—*Two photographs of baptisms in the Thames at Hatchett's Bridge.*

D. R. T.—The *Autotype Manual*, published by the Autotype Company.

INQUIRER.—So far as we are aware, anglol is still supplied by Messrs. Hopkin & Williams.

T. C. H.—The fault in the negative sent is under-development. It has been returned as requested.

B. J. LATHAM (Howden, East Yorkshire) is thanked for three unmounted whole-plate prints of the interesting old parish church of that town.

G. C. J.—Stout white paper up to, we think, sixty inches wide may be had in any length from artists' colourmen, under the name of "cartoon paper."

BOB.—Study the best pictures in the present exhibition. You will learn more from them than from any work on posing, even if there were such a work.

J. N. D.—The premises appear to be excellently designed for the purpose. The studio is also well calculated for the production of high-class work. It cannot be well improved upon.

R. BURROWS.—The length of camera necessary to copy a picture the same size as the original with a lens of fifteen inches focus is thirty inches. For convenience' sake it had better be not less than three feet, so as to allow of a little margin.

W. A. (Liverpool.)—So far as we are aware, the collotype process is not used for the production of maps. Photo-lithography or photo-zincography are the processes generally employed for this class of work. All the Government maps are produced by the latter process.

W. REED.—The addition of citric acid to the sensitising bath will confer keeping qualities upon the paper, but it somewhat retards the toning. Floating the back of the paper on a weak solution of citric acid will prevent its discolouring for a long time. Those who prepare the commercial sensitised paper do not publish the formula by which they work.

E. BILLINGS.—A lens of the ordinary rapid type, of thirteen inches focus, will not cover a 12×10 plate with the full opening, that is if you want good definition all over the plate. A small stop must be used, and then it is doubtful, unless it is an unusually good one.

A. O.—The simplest method of testing the lenses in your case is to take a negative of the same subject with each and then compare the results. No single lens will give straight marginal lines. The front lens of a rectilinear is no better in this respect than any other.

SILVER PRINT.—Many complaints have of late been made of spots appearing in prints under conditions similar to your experience, and we have recommended a change of the sample of hyposulphite of soda used with seeming success. In making your change see that it be of a different manufacture.

ONE IN A FIX.—But for the very complete washing you say the plates receive we should have said the fault lay in that direction. With plates specially made for lantern slides there ought to be no veiling of the lights, and, consequently, none to remove. We should advise you to try a different brand of plates.

W. HOSKINS.—1. If the sensitised paper is covered with minute spots before it is printed it should be returned to the seller. If the spots exist in the paper there is no way of avoiding them in the prints.—2. Four ounces of hyposulphite of soda to the pint of water is the best strength to use for fixing.—3. The time of immersion is correct.

C. W.—Haing obtained paper of the requisite roughness, first salt it by immersion in a dilute solution of chloride of sodium—say thirty grains to the pint. When dry, sensitise with a sixty-grain solution of nitrate of silver for sepia tones, and with a similar strength of solution of ammonia-nitrate of silver when black tones are desired. Print and tone according to the colour required.

SERENO inquires: "Is the Copyright Act as respects photographs in force in the Crown colonies of Malta and Gibraltar? In the other colonies having their own legislature I am not so sure, but think it must be in force in the colonies above named. If you could answer this question you would much oblige."—Perhaps some of our readers know how the copyright laws stand in the countries named.

BELGE.—We are not aware what the working hours are in similar houses to yours, but we imagine they are about the same. Some large printing establishments we know have slightly shorter time than that you mention; but it is quite a matter of arrangement between employers and *employés*. The best way of putting the names on negatives is to write them on neatly with a sable pencil and black varnish, so that they print white, as in most of the published landscapes.

CELT writes as follows: "In the spring I engaged an operator for the season, the engagement to terminate at the end of this month; on my offering him a further engagement for the winter at a rather lower salary he told me he had already got another appointment. I now find that another photographer in the town has engaged him for a year. Now, he knows all my customers, and will probably get some of them to go to the other place, and as this will injure my business, can I do anything to prevent it? I am told that sometimes an operator can be prevented from entering the service of another photographer in the same town."—As the operator terminates his engagement, he is free to go where he likes, unless there be a written agreement that he is not to take another appointment in the town.

C. BENNETT puts the following query: "What is the safest way to remove a figure from one negative, without distorting the film, in order to place it on another negative, a piece of film being removed to receive it?"—The best way, perhaps, will be to thoroughly alum the plate, wash, and dry it; then cut neatly round the figure to be removed; next strip the film by Plener's method, that is, immersing the plate in a dish of water containing a few drops of hydrofluoric acid. In a few minutes the film will loosen. The plate is then transferred to a dish of clean water, when the film will float off and can be caught on the other negative. If the detached film expands at all, the water must be poured off and the dish filled with methylated spirit; it will then contract again; but it must be watched that it does not contract too much.

K. E. N. writes: "Can you tell me the reason of my platinotypes turning yellow? Is it usual for a properly printed and after-treated print in platinum to lose the least shade of its original whiteness after a few weeks' exposure to sun and air? Mine have changed very much when exposed to both, but when in a frame as a framed picture, not so much. The portion sent you is a piece exposed under glass to strong light for a fortnight or three weeks; part remained covered, this seems unaltered; the uncovered has gone yellow. After developing, all the prints receive changes in three baths of one in sixty hydrochloric acid and water."—The effect complained of is produced by the whole of the iron not being removed from the print. It is clear that the action of the acid was not complete, or the prints were not sufficiently washed afterwards.

C. says: "I blackened two years ago the rabbet of some dark slides with artists' oil colour, thinned I think with turpentine; plates or films left in the slides sometimes get fogged black at the edges on development, as enclosed film (which has not been exposed) shows; but the lines across the film show also that the shutter hinge is made of improper material. Will you kindly tell me what to do to cure (1) the blackened rabbets; (2) the shutter hinges? (3) Do you think any light gets in to the dark slide, also at corner?"—In reply: 1. The present blacking should be removed by scraping and the slides reblacked with lampblack mixed with very dilute shellac varnish.—2. The material of the hinges must be replaced with other that is inert. This the camera maker will do.—3. Light has certainly had access to the film at one corner.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, October 15, *Registration as applied to Photographic Printing;* October 22, *Photographic Copyright.*

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—The next meeting will be held in the Mosley-street Café, Newcastle, on Tuesday, the 14th inst., at half-past seven p.m.

WE last week acknowledged receipt of specimens of celerotype paper from the Blackfriars Photographic and Sensitising Company. We have now given it a trial, and find that it has a good surface and prints quickly, yielding prints of an excellent tone.

RETAINING SPECIMENS.—A correspondent, dating from Tufnell-park, N., complains that he sent, at their request, specimens of platinotype and silver printing to a firm in Northamptonshire and cannot obtain their return. We have placed their name on our black list.

RECEIVED.—Six pictures—*The Feast of Roses*, by Shapoor N. B. Nedwar; *La Photographie appliquée aux Arts Militaires et aux Arts Civils*, par Leon Gody; *Dictionary of Photography* (second edition); *The Photographic Quarterly;* and others. These will be reviewed next week.

THOSE who wish to take up the popular art of photography will do well to attend the lectures which commence next Saturday evening at the Birkbeck Institution, and which are delivered by Mr. Hepworth. The course is thoroughly practical, and embraces all that one need know for the ordinary practice of the art. The lectures commence every Saturday at six p.m.

EDINBURGH PHOTOGRAPHIC EXHIBITION (November, 1890-January, 1891).—Mr. T. Barclay (Secretary) writes: "I am glad to be able to say that the space at our disposal is very well taken up, and the exhibition promises to be a very good one, many of the best photographers in the kingdom having expressed their intention of showing examples of their productions. The Right Hon. the Lord Provost of Edinburgh has kindly consented to perform the opening ceremony.

LANTERN AND MUSICAL ENTERTAINMENT.—Under the auspices of the Photographic Club there is to be a most attractive entertainment, given in aid of the funds of the Photographers' Benevolent Association, in the Masonic Hall, Anderton's Hotel, Fleet-street, on Friday, the 24th inst., at eight p.m. Talented musicians will assist, and choice lantern slides will be shown. Tickets, 1*s.* each, may be obtained from Mr. F. A. Bridge, East Lodge, Dalston-lane, N.E. (under whose direction the entertainment is given), and from Mr. H. J. Beasley, 65, Chancery-lane, W.C. The object being so good, the entertainment so choice, and the accommodation rather limited, early application is necessary.

THEFT OF LENSES.—From two sources do we learn this week of lenses having been stolen. The first theft occurred in the office of Mr. Wray, optician, Highgate. A young man (name and address unknown) called in one evening for a set of stops, and was not left alone for an instant, the back of the proprietor being only once turned upon him. After leaving it was found he had managed to purloin a 6½×5 rapid rectilinear (No. 3410), with iris diaphragm. Mr. J. Hubert, too, has had a similar experience in an intensified form. He gave employment to a man whom he describes as of respectable appearance and good address, face and neck florid, hair and moustache red. He suddenly disappeared, taking with him two portrait lenses, one a half-plate Lerebour and Secretan with tarnished mount, the other being a whole-plate cone-shaped lens. The publication of these cases will put opticians, dealers, and photographers on their guard.

AT Wandsworth County Court, before his Honour Judge Holroyd, Messrs. Byrne & Co., photographers, of Richmond, sued Lord George Hamilton for the value of five photographs. Mr. Grain was counsel for the Defendant.—Mr. Byrne said that in 1885 he requested Lord George Hamilton to favour the firm with a sitting. The request was granted, and five portraits were sent to Lord George, who kept them, and did not forward the money for them.—The Defendant said that in 1885 he received a communication from the Plaintiffs, asking him to give them a sitting, as they were anxious to complete a set of public men. Witness wrote back, regretting that he could not, but he received another letter from the Plaintiffs, asking him to allow them to come to the Admiralty and photograph him there. Witness agreed to give them a few minutes, and they came to the Admiralty and occupied his time for five minutes. He gave no order for any portraits. A few days after the sitting he received proofs, which were complete failures. No invoice accompanied them, and there was not the slightest indication that payment would be required. The portraits were perfectly useless, and he threw them away. He thought the charge of 5*l.* 5*s.* extortionate, and hence his appearance at the Court. Seven months after the receipt of the proofs an account was sent in, and he at once wrote repudiating all liability. He thought the sending of the account a piece of impertinence, and he took no notice of it.—Mr. Grain said he had witnesses to prove that persons of notoriety were taken free of charge, and had the photograph given them.—His Honour gave judgment for the Defendant, with costs of counsel, solicitor, and Defendant.—*Standard.*

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1589. Vol. XXXVII.—OCTOBER 17, 1890.

THE PRIMULINE PROCESS IN ACTUAL PRACTICE.

New Developing Agents.—Production of Ink Black Tones.

This method of photographic printing—a method more especially adapted for the production of photographs upon textile fabrics—was made public at the recent meeting of the British Association for the advancement of science, and we have already published such particulars as to give our readers a general knowledge of the method. What has hitherto been made public has been largely calculated to mislead rather than to instruct, especially the erroneous statement as to the exposure being made on cloth simply dyed with primuline, this misstatement having not only appeared in several newspaper reports of the British Association meeting, but it was also actually reproduced in the editorial columns of one technical publication.

We did not attempt to deal exhaustively with the matter, either on the strength of such vague reports as we received from Leeds during the session of the Association, or on the somewhat scanty information which we could gather from the paper of Messrs. Green, Cross, and Bevan, and from Mr. Green's recent demonstration of the process before the Photographic Society of Great Britain, especially as on this latter occasion Mr. Green showed but little inclination to enter into the chemical questions involved, or to go beyond the limits of his prearranged demonstration, he probably considering that in an assembly of photographers, scientific details would be considered tedious or out of place. As a matter of fact, we noticed that there were several chemists present who have made an especial study of the benzene derivatives, and we fully expected a discussion of interest.

Primuline, as sold by Messrs. Brooke, Simpson, & Spiller, of Hackney, is the sodium salt of the sulphonic acid derived from a base which appears to be dehydrothio-toluidine, or a condensation derivative of this amine. This new colour of the coal-tar series is now used as a starting-point in producing several tints on calico, and although it is not necessary for us to enter into any elaborate discussion as to the chemical constitution of the benzene derivatives, we may point out that the new body can be regarded as a derivative of cresol, C_7H_7HO, the next homologue above phenol or carbolic acid; or one may regard it as a substitution and condensation product of toluidine, C_7H_9N, the base standing next above aniline in the homologous series—methyl-aniline, in fact, $C_6H_4CH_3H_2N$. Just in the same way cresol may be regarded as methyl-phenol, $C_6H_4CH_3HO$. A sulphonic acid may be looked upon as sulphuric acid, SO_2HOHO, in which one of the hydroxyl groups, HO, is replaced by a monovalent radical. Thus, phenyl sulphonic acid would be $SO_2C_6H_5HO$; but in the case of a divalent radical like ethylene, C_2H_4, two of hydroxyl in two of sulphuric acid are replaced, and we obtain ethylene di-sulphonic acid $(SO_2HO)_2C_2H_4$. Sulphonic acids can be obtained by several generic reactions, the most common of which is heating the hydride of the radical with ordinary or fuming sulphuric acid. As an example, we may refer to the production of phenyl-sulphonic acid by the reaction of benzene and sulphuric acid—thus, $C_6H_6H + H_2SO_4 = SO_2C_6H_5HO + H_2O$.

We propose now to give working details of the primuline process as applied to the production of prints on calico, but the same details will serve for working on paper if the difference in texture be taken into account, and the manipulation be modified accordingly. At the same time, we may remark that there appears but little inducement to use primuline for paper prints.

A hundred and fifty grains of commercial primuline are heated to the boiling temperature with ten ounces of water, a glass flask or beaker heated on a sand bath being used. The liquor is now poured off from any undissolved matter, on sheets of calico laid in a porcelain dish, the above quantity of dye being sufficient for sixteen pieces of rather thin calico, whole-plate size. When in the dye, the sheets should be constantly turned over one by one, as in toning prints, and if kept moving in the warm dye for ten minutes they will be sufficiently stained. The dish should be kept warm during the operation of dyeing.

When ordinary calico from a draper's shop is used, it is necessary to boil it in water and thoroughly knead or "dolly" it to remove the dressing, a troublesome operation, which is avoided when one can obtain clean calico from a print works.

The dyed calico is now rinsed in water, rung out, and the pieces are immersed singly in the following solution, the quantities being reckoned for the sixteen pieces, whole-plate size:—

Commercial nitrite sodium	100 grains.
Commercial hydrochloric acid	½ fluid ounce.
Water	36 ounces.

The nitrite of sodium can be obtained from an operative chemist, or it may be readily prepared in a sufficient state of purity by heating nitrate of sodium to low redness in a silver or porcelain capsule till the loss in weight is a little more than corresponds to the reaction.

$$NaNO_3 = O + NaNO_2$$
$$(85) \quad (16) \quad (69)$$

Care must be taken that the nitrate is quite dry when the first weighing is made.

Under these circumstances the primuline in the cloth will rapidly change into a corresponding diazo derivative, the fabric taking at the same time a reddish-brown tint. It is now sensi-

tive to light, exposure serving to destroy the azo derivative, and so prevent its reaction with certain "developers," and it will thus be seen that the process is one giving a positive from a positive.

The pieces of cloth should be turned over a few times in the nitrite bath, and they are then rinsed several times in water to remove the free hyrochloric acid; after which they are laid in a blotting folio to dry. Overdrying with heat is undesirable, as tending to lower the sensitiveness, and, moreover, it would cause any trace of hydrochloric acid to react on the fibre.

The exposure is perhaps rather less than for ordinary albumenised paper, and its progress is indicated by the bleaching of the reddish-brown azo body to a dingy yellow; and to get the full vigour which the method is yielding, it is necessary to have originals which are somewhat denser than are required for most other analogous copying methods. Indeed, we may at once say that the method appears to us to be more suitable for copying from very dense tracings, or such opaque objects as leaves and twigs of plants, than from ordinary half-tone positive transparencies, or the comparatively light tracings which are often employed in making reproductions by the Pellet process (cyanofer). When the sensitive material permeates the whole substance of the support, as in the case of cloth sensitised as now directed, it is extremely necessary that the original should be dense and opaque in order that the light may decompose the sensitive azo body all through the substance of the fabric; should, however, the original not be so completely opaque as to allow of this, it is an advantage to give the back of the cloth a short exposure to light—say, equal to one-fifth or one-sixth of the total exposure. This clears the ground at the back, and does not sensibly affect the vigour of the image. Before development, it is well to thoroughly wet the cloth and wring out the excess of water, otherwise, in order to secure equal action all over, it may become necessary to wring it out while saturated with the developer—a course not always agreeable, especially when the naphthylamine developer is used; this base having a very persistent and characteristic odour, which Dr. A. W. Hofmann used to describe in his lectures as "agreeable and resembling narcissus," although one of the newspaper reporters of the recent British Association meeting characterises the odour simply as "evil."

The following developers have, among others, been indicated by Messrs. Green, Cross, & Bevan, although as far as we know they have given no definite instructions for compounding developers, an omission which we now supply.

DEVELOPER FOR RED.

Beta-naphthol	40 grains.
Caustic soda or potash	60 ,,
Water	10 ounces.

The alkali is dissolved in a small quantity of the water, rubbed up in a mortar with the naphthol, and the rest of the water is now added.

DEVELOPER FOR ORANGE.

Resorcin	30 grains.
Water	10 ounces.

Dissolve and add

Caustic potash or soda	50 grains.

DEVELOPER FOR PURPLE.

Alpha-naphthylamine (ordinary naphthylamine)	60 grains.
Commercial hydrochloric acid	1 fluid drachm.

Mix the naphthylamine and the acid in a mortar and add

Water	10 ounces.

Other developers containing phenols, amido-phenols, and alkaline salts of sulphonic acids of phenols have been indicated by Messrs. Green, Cross, & Bevan, but it is sufficient to give the above selection of developers compounded from ingredients to which they refer. The strangest thing, however, is that we cannot find any mention of the use of such benzene derivatives as are strictly in range with the chemicals they indicate, and are now in every-day use by photographers for developing purposes. We allude more especially to the sodium salt of amido-beta-naphthol-beta-monosulphonic acid which is sold under the name eikonogen, pyrogallic acid or pyrogallol, and hydroquinone, two of which, at any rate, we find not only to have a powerful developing action on the azotised primuline image, but to possess very evident advantages over the developers made with the ingredients indicated by Messrs. Green, Cross, & Bevan, advantages so notable that for much of such commercial work as the method is capable of, they will probably be employed to the exclusion of others.

The following are the developers made up with "eikonogen" and "pyro" respectively:—

DEVELOPER FOR INK BLACK TONES.

"Eikonogen"	60 grains.
Water	10 ounces.

Grind the eikonogen in a mortar, add the water, put in the exposed cloth, and keep all in motion till the development is complete. In this case the dissolving of the "eikonogen" and the development of the image proceed simultaneously. The white, crystallised "eiknongen" should be used.

DEVELOPER FOR BROWN TONES.

"Pyro"	50 grains.
Water	10 ounces.

In every case the full density is completely brought out by the developing solution in a few minutes, and the development being finished no fixing is necessary, mere washing being required to remove such soluble chemicals as remain; but after rinsing, it is desirable to wash in soap and water, as this serves to clear the ground somewhat and brighten the image. Ironing between sheets of paper, best done before the prints are absolutely dry, is desirable.

We experience especial satisfaction in having given particulars of a developer capable of producing the ink black tones which were referred to as so desirable when the primuline process was brought before the Photographic Society, and we would point out that whatever patent claims Messrs. Green, Cross, & Bevan may have on the process generally, it is quite difficult to suppose that such claims can cover the use of the "eikonogen" developer, unless indeed this agent is distinctly specified in some claim not yet published. It may be pointed out that no general claim, such as "phenol derivatives," or "aromatic sulphonic acids," can be valid unless everything included under such heading will serve the purpose. We may incidentally mention that we have experimented with other developing agents than "eikonogen" and "pyro," among which we may mention orcin (a substance homologous with the resorcin used by Messrs. Green, Cross, & Bevan), and catechu; but we do not consider these to have such definite advantage over the developers indicated by Messrs. Green, Cross, & Bevan, as to justify our giving them that prominence we have given to "eikonogen" and "pyro."

There is much yet to be said about the various applications and modifications of the primuline process, especially as regards

the fastness to light of the various tints. We are now making experiments which seem calculated to cast a completely new light on the method.

BACKGROUNDS AND HOW TO HANG THEM.

The woeful state of crease and dirt and stain that characterises so many of the backgrounds in use at the present day is familiar to all who have had the *entrée* into a variety of studios, and such will unite in saying that it is not in second or third-rate studios alone that room exists for improvement in this once most important part of a photographer's outfit. The time is well remembered by old workers when, especially at the beginning of the *carte-de-visite* mania, it was the exception, and a rare one, to see a portrait without a pictorial background, the choice of surrounding being shrewdly chosen with an eye to, and too frequent, possible spot and comet, which, in the intricacies of a forest, the tracery of a Gothic window, or the architectural detail and adornments of a palace, could be ignored when not too prominent. The gradual supplanting of the *carte* by the cabinet, and the less frequent choice of full length portraits, has led to great disuse of these gorgeous pictures, another cause also being increased taste in both public and photographer. But there are still large numbers of backgrounds, pictorial and plain, in various tints, made use of in studios of the highest class, and it is with regard to the mode of hanging them that some remarks will not be inopportune. Perhaps the commonest mode of all that is adopted is the old theatrical plan of a roller and cords to wind up the scene when not required, or to make room for another. Where many are in use, the plan is good, save for the awkward shadow cast on the upper part by the projecting rolls when a scene at or near the back of the set is used. A very ingenious stand was devised some years ago for avoiding this drawback, and it can still be purchased at the leading photographic dealers. It is, comparatively speaking, costly, and requires a certain height of room to work it, but with sufficient space it would be difficult to find a better method of quickly and easily changing a set of backgrounds. Any one can instantly be brought into position, and the whole surface included, without any cast shadow from the support or its contained rolled-up scenes.

There are photographers who pooh-pooh "backgrounds" altogether; but, although it is no part of the purpose of this article either to uphold or decry their use, it may be said, on the other hand, that nothing can be more chilly, inartistic, or devoid of invention (which should characterise all works of art) than the dead blank monotony of the once familiar grey background. Devoid of light or shade to suggest roundness or distance, this blank patch has often utterly damned many an otherwise attractive work of art. Let Rejlander's pictures be examined—for their design and invention, not their *technique*—and how often shall be found such a meaningless patch! Adam Salomon's photographs, too, which marked an era in photographic taste and design; was not the manner in which his backgrounds formed part of the picture one of his distinguishing characteristics? Directly after his works were seen in this country there were silver prints on the walls of the Parent Society's exhibition that were every whit equal in technical excellence to his, but which were utterly killed by this meaningless blank that, according to the fashion of the day, surrounded them, and destroyed all suggestions of atmosphere or distance. That this feeling to which we have attempted to give expression has been in the minds of many workers of the present day seems highly probable from the immense number of those exceedingly effective "graduated backgrounds" that are now to be seen. Almost every studio possesses one or more, and although they may be used mechanically, they mark a change for the better in what may be termed the multitude of photographs.

It is of course not impossible to so utilise a plain background by lights and shadows as to produce really artistic effects with its aid. Such, indeed, is its only use where anything but vignetted busts are required. With this end in view, the fixed cord and pulley system of hanging is perhaps least adaptive, and a great advantage will be found in a system which shall permit the ground to be shifted at an angle to the light in one or other direction. Those who have had no experience of this convenience are surprised at the variety of effects produced by it. A group of a medium tint can, by setting it askew in one or other direction, be made to give a medium, or a very light, or an extremely dark, effect. And if this be broken by a light reflected from a mirror or a cast shadow from a screen, a considerable step is taken towards increased effect. This can be done with a plain, non-graduated ground; it need not be said that still more can be done with the ready-graduated background we have referred to. The tilting or sloping, however, involves a moveable background, with its many disadvantages and inconveniences. We have lately seen a practical way of overcoming these, which, as it is neither costly or difficult of execution, we purpose to describe in a further article on this topic.

ENLARGED NEGATIVES.

At the present time, when bromide enlargements are so much in vogue, and so easily and cheaply produced, the necessity for enlarged negatives may not be at first sight very obvious. But there are frequent instances where for special purposes it may be more convenient, if not absolutely necessary, to make an enlarged negative than to produce a number of enlarged positives from the original.

In the days anterior to the introduction of the modern rapid paper the exposures were so long, even under the best circumstances, that where more than one impression was required from the same negative it was often preferable to make a negative from which the proofs might be printed direct; and in the case of carbon enlargements, so much admired for their combined beauty and permanence, this course was invariable. At the present day, however, "bromide enlargements" have almost universal sway, and yet even now there are instances where a large number of prints on silver paper may be required of a size intermediate between the quarter-plate and the dimensions that are usually understood as enlargements proper.

For instance, an amateur has produced a successful portrait of diminutive size which he is desirous of reproducing on such a scale as to make a good "cabinet" bust, of which he is desirous of presenting a dozen to the original. In a very large percentage of cases of this sort the lay public are not yet educated to the difference in style represented by platinotype, bromide, and other modern types of prints, hence the reproduction above referred to must be on ordinary silver paper, and an enlarged negative becomes an absolute necessity. Or again, an enlargement in platinotype may be required, and here again the amateur or small professional will find it greatly to his convenience to perform the work himself through the intermediary

of an enlarged negative, rather than to send the work to the professional enlarger, who is duly fitted up with the necessary electric-light appliances.

In this, as in most other matters, there is a great choice of methods varying only in their degrees rather of convenience than efficiency. The first to suggest itself will perhaps naturally be to make a positive by superposition or contact printing, and from that to produce an enlarged negative upon a gelatine or collodion plate. A variation from this plan, which will perhaps be preferred by many, is to make an enlarged transparency direct from the original negative, and from this to produce a contact negative. This method has the advantage that the final negative may be made in carbon or even on ordinary albumenised paper, which for this purpose is capable of giving very excellent results with the least possible trouble.

It is needless here to enter into the details of the enlarging process or the manipulations, beyond giving a brief description of the production of a negative on albumenised paper. Supposing a good vigorous transparency to have been obtained, or what will answer nearly as well, a deeply printed positive on bromide paper, this is used as the *cliché* from which a very deeply printed negative proof is produced upon the ordinary commercial ready-sensitised paper. The printing should be carried on until the high lights are deeply bronzed, and only very deepest shadows are discernible on the surface, though when examined as a transparency, even in this state, the complete picture will be visible. The subsequent operations will considerably reduce the density, hence the need for such deep printing.

The negative is then treated in precisely the same manner as if it were a positive, except that it is not absolutely necessary to tone it. It is better, however, to do so slightly, as the partial substitution of gold lessens the degree of reduction the image undergoes in fixing; thus, if the printing should have been carried scarcely far enough it ought to be well toned; while, on the other hand, if over done, the toning may be entirely dispensed with. After fixing and well washing, the negative is placed finally for a few minutes in very hot water to remove what size is so removeable.

To render it translucent and destroy the "grain" of the paper—though in the case of paper of good quality this is scarcely, if at all, visible—the print must be dried and impregnated with wax or "oil-vaseline" in the ordinary manner. But the best result we have been able to obtain in the direction of transparency is by freely applying "oil-vaseline," or even the ordinary vaseline, to the paper side of the negative immediately on its removal from its hot water bath, the excess of water being removed by means of blotting paper. By thus applying the greasy material to the wet paper, the latter on drying is more thoroughly impregnated and rendered translucent, the vaseline, as it were, slipping into the pores and swollen fibre of the paper as the water vacates them by evaporation, and before they have time to close and become impermeable. Negatives so impregnated print nearly as quickly as those on glass, and retain their translucency for a very long time if properly taken care of by suitable protection from the atmosphere.

The same method may be adopted, omitting of course the immersion in hot water if gelatino-bromide paper be substituted for albumenised, and here it may be remarked that the smooth-surfaced kinds of bromide paper answer for the purpose equally as well as that especially prepared for negative work, if the exposure and development be carried far enough. The gelatino-chloride "printing-out" papers do not answer so well, as owing to the delicacy and thinness of the image it is difficult to get sufficient density with contrast.

We have referred to the production of negatives in carbon, but it is scarcely necessary to minutely describe the process, since so comparatively few of our readers have a practical acquaintance with that method of printing. For the benefit of those, however, who do practise the process, we may say that though the "transparency" tissue is preferable, still most excellent results can be produced on the ordinary portrait tissues if the printing be carried far enough. The print is simply squeegeed on to collodionised glass for development, and remains there as its final support, but it must be remembered that in order to produce a negative in true position as regards left and right, the enlarged transparency must be reversed. Some of the most beautiful results are obtained with carbon.

But the methods already described necessitate a double operation, which in many instances will be considered an objection, and any method that will produce an enlarged negative direct from the original is of course preferable if it can be compassed. Fortunately, such methods are possible, but they require a greater degree of skill and judgment than the foregoing. Foremost among these is the plan, frequently alluded to in recent volumes, of removing the image formed by the alkaline developer on a collodion emulsion plate, and then, after a brief exposure to light, reapplying the developer in order to reduce the remaining silver bromide. For this purpose the emulsion described two or three weeks back in connexion with lantern slides answers admirably; the exposure should be full, and the development carried further than would be done ordinarily, or until it is considered that the shadows of the positive have been reduced through the whole thickness of the film. This is indeed the main point, and the one which only experience will enable the operator to attain.

After washing, the plate is next treated, without fixing, with a strong solution of iron alum, or of persulphate of iron, the former is preferable, say about sixty grains to the ounce of water. This dissolves out the silver forming the positive image, and leaves a negative impression composed of unreduced bromide of silver. It will be obvious that if the development has not been carried far enough to reduce the whole of the bromide in the deepest shadows, these will now be represented by a slight veil instead of by clear glass; while if it has been carried too far, the result will be a hard negative, in which the finer details of the shadows have been eaten away. These form the Scylla and Charybdis between which to steer.

The final operation consists, after a thorough washing, of a short re-exposure to light, followed by a second development to reduce the bromide and form a printing negative, which only now requires to be washed, dried, and varnished. The chief, if not only objection to this method, especially for enlarging, lies in the protracted exposure necessary, except in a very good light.

To obviate the unnecessary length of exposure, the most natural step would appear to be to apply the method we have just described to gelatino-bromide plates, but, unfortunately, as we have previously explained, it will not work with gelatine. However, a very similar process, fully described by Mr. Thomas Bedding a few weeks back, in which dilute nitric acid is used instead of iron alum, the gelatine film having been first thoroughly hardened, would most likely prove an efficient substitute.

The last method we shall describe in which gelatine plates are used is based upon the reversing action of light itself.

Some three or four years ago we showed how a reversed image—that is to say, a positive from a positive, or a negative from a negative—could be produced with almost absolute certainty by vastly over-exposing an ordinary dry plate, and developing with a most powerfully restrained developer. Our experiments at that period were confined to the direct exposure of plates under a negative in the printing frame to daylight, and the degree of over-exposure given was enormous. This, however, in subsequent trials, we found to be unnecessary, and we succeeded in producing direct positives in the camera by means of exposures between twenty and thirty times in excess of what was required to form a fully impressed image. This, more especially in enlarging, is a serious increase in the time of exposure, and when working from a dense negative, or with a lens of narrow, angular aperture, would no doubt put this method out of court. Different plates—even of the same maker—vary, too, very considerably in their behaviour in this respect; but with a fairly good light and negative of moderate density, there is no reason why the process should not be available. Rapid dry *plates*, it should be remembered, are infinitely more sensitive than the positive papers employed for enlarging purposes, and it is possible, therefore, that the increase of exposure would not, under some circumstances, be very great. For instance, under conditions requiring with ordinary paper, say, one minute's exposure, a rapid plate three or four times quicker would only require from seven and a half to ten minutes in order to produce a reversed negative, and that can scarcely be called an abnormally long time.

The conditions to be observed after the increase of exposure are simple in the extreme, merely consisting of a very large increase in the quantity of restraining bromide, this being to some extent dependent on the length of exposure and the kind of plate. But where a sufficiently long exposure has been given, it is scarcely possible to use too much restrainer, the function of which is to kill, or at least so retard the formation of a secondary image that the primary one has time to gain density. Possibly the best method of applying the restrainer is in the form of a separate bath previous to development.

One final suggestion may be made. It will be within the recollection of some of our older readers that upwards of fifteen years ago Mr. R. W. Foxlee demonstrated before one of the London societies—the South London, if we recollect rightly—the possibility of producing direct positives in the camera by the following method:—A collodion plate was sensitised in the ordinary way, exposed for a very brief period to light, washed well in the dark room, and flooded with an aqueous solution of soluble iodides and bromides, after which it was ready for exposure in the camera, and on development gave a positive result. Fox Talbot many years previously published a similar method of producing direct positives by the calotype process. Why should not a similar mode of treatment be applicable to gelatino-bromide?

It will be in the recollection of our readers that we were the first—now some few years ago—to advocate the adoption of sepia and engraving-like tones in place of the red-brown tints of albumen paper for the better class of photographs. We also predicted that matt surfaces (such as those of the platinotype process, &c.) would eventually be preferred to the garish ones of albumen by the more artistic portion of the public. Each succeeding exhibition has proved the truth of our surmise, and the present one far surpasses any of its predecessors in the number of pictures of the engraving character shown. As one enters the room the first impression is that a large number of the examples exhibited very closely resemble some of the old mezzotint prints, both in colour and in effect, and that albumen prints are conspicuous by their absence. This is also borne out by the fact that the Photographic Society have thought it necessary at the commencement of the catalogue to state that "pictures not otherwise specified are by the platinum process." A glance through the list shows that this was quite a necessary notification on account of the very small proportion of silver prints amongst the number. Out of the total of 658 frames shown, only sixty-three are credited to "silver"—less than ten per cent.

It must not be imagined from the above that silver printing on albumen paper is likely to become extinct, for it will not, at least for a long time to come. Silver printing will still continue to be practised as much as formerly for the more popular style of portraiture, and by tyros, until it is superseded by some simpler and more inexpensive method by which equally as effective pictures can be produced. There is no question that the production of prints of the class just referred to require more skill and a better quality of negative to produce than is necessary for ordinary silver printing.

Last week we gave a report of a County Court suit in which a firm of photographers sued Lord George Hamilton for five guineas for portraits which, at their earnest solicitation, they were permitted to take. The verdict was against the photographers, with cost of counsel, solicitor, and defendant. At this decision no one will be surprised, indeed the surprise would have been were it otherwise. It appears that summonses of a similar nature were also heard against Sir George Russell, Lady Russell, the daughter of Admiral Derryman, Major Dennythorne, and the Duchess of Marlborough. It is needless to say that judgment was the the same in each case, with the exception of the Duchess of Marlborough's, which was not gone into on technical grounds.

It is certainly a novelty in the photographic profession to solicit sittings from distinguished people, and when such, often at serious inconvenience, are accorded, to demand payment for the portraits they have, as a favour, been permitted to take. We know scores of photographers who would only be too glad to obtain sittings from far less notable personages than duchesses and cabinet ministers, majors, &c., to say nothing of "First Lords," not only without any expectation of payment, but would also "beg the acceptance" of a goodly number of proofs, and still consider themselves under great obligations to their distinguished sitters.

Some of the daily press have had pretty severe comments upon the subject, at which we are by no means surprised. A local paper heads their report of the case, "Lord George Hamilton as a Photographers' Victim." We cannot help thinking that the firm in question were very ill advised as to their proceeding, for it must necessarily not only act prejudicially in their obtaining sittings in future from distinguished people, but will possibly throw obstacles in the way of others securing similar favours.

The Literary and Artistic Congress which met last week in London concluded its sittings on Friday last. From all quarters protests were loud and deep against the pirates of America—both literary and artistic. It will be remembered that the States was the only country of note that held aloof from the Berne International Copyright Conventions. English authors cannot make their works copyright in America, and consequently the Americans pirate them without let or hindrance. In this photography is largely employed by them, even to the extent of reproducing entire books by its aid.

A paper was read claiming for photographs the legislative protection accorded to works of art. In the discussion upon the paper, the Conference agreed that there is ground for extending without restriction to photographic work the benefit of the legal provisions applicable to the graphic arts. There is no question that many photographs are better

works of art than some engravings; why, then, should not photographs have the same legal privileges as the work of engravers?

It is an unfortunate circumstance that there is, practically, no copyright here in England in photographs taken in the ordinary course of business, except by a very roundabout proceeding. And, what is more, there is very little prospect of immediate legislation on the subject. This is unfortunate; but it may be partly accounted for by the fact that photographers themselves are very apathetic in the matter. As none of the existing societies will take the subject in hand, professional photographers might combine and form a society amongst themselves for the protection of their mutual interests in the same way that the manufacturers and dealers have just done. In the question of copyright they would no doubt receive the co-operation of the photographic section of the London Chamber of Commerce, which would be of material assistance.

Since we established a register of defaulters in the return of operators' specimens, we are pleased to know that the system has borne good fruit. We have been the means of securing the return of many specimens which would otherwise be lost to their owners. In almost every instance the excuse made by those retaining them has been that the pictures were entrusted to an assistant to send back, and he, or she, had neglected their instructions. This may have been the case in some instances, but the hardship on the owner of the pictures is just the same as if they were kept for other purposes. He is prevented from obtaining an engagement upon which he depends for a livelihood.

Some for whom we have obtained the restoration of their pictures have not communicated with us as they ought to have done on their receipt. In all cases where our influence has been the means of obtaining back specimens, the recipients should at once report to us, and, where one is given, let us know the reason assigned for their detention. Whenever specimens are detained unduly long, we invite the owners of them to communicate with us, giving full names and addresses, also all particulars, that they may be entered on the register.

A correspondent, "an operator," writes taking us somewhat severely to task for the paragraph in a leader last week in which we suggested that business might be done in the evening with the aid of the electric light by taking portraits of persons as they were attired for the opera or ball. He says the hours of operators are long enough already, and if night work be introduced they will become longer still, and without extra pay. The hours are at present long enough, no doubt; but we imagine that no employer would be so unreasonable as to expect extra services from his *employés* without adequate remuneration.

A NEW STYLE OF FRAMING PHOTOGRAPHS.

What some one did with the album with interchangeable leaves a few years since Mr. Henry Stevens has done with the picture frame. Circumstances may and frequently do arise in which one desires to frame a picture, either to note its effect when framed, or to do transient or permanent duty on the wall. The new frame of Mr. Stevens places a great power in these respects in the hands of its possessor, and its extreme simplicity is also a point in its favour, as will be seen from the following description. Imagine then an ordinary picture frame, formed of gold or plain beading, or in any kind of wood and design of moulding that suits the taste. We have said an "ordinary" frame, but while it is so in all respects when looked at from the front, it is found when examined from behind to possess a slight peculiarity: the rebate in which the glass and pictures are held is deeper than usual, so deep indeed as to hold a dozen or more mounted photographs, or any correspondingly greater number of prints that are unmounted. A selection of prints cut to a uniform size having been placed into this shallow case, of which the glass of the frame forms the bottom, a flat backboard is introduced which is pressed against the prints, thus keeping them all quite flat. This backboard is retained in its place by spring catches at the side. The operation of framing a picture is thus reduced to a state of great simplicity.

The selected print is laid face down upon the glass, and the others, with the backboard, then inserted, and it is completed. However, the rebate need really be no deeper than suffices to receive a single print and the removeable backboard. In this case, as the rebate does not act the part of a reservoir, the prints must be retained in a separate case for selection. Of course, a mat can be inserted between the glass and the picture, should such be desired. In a 15 × 12 frame Mr. Stevens has several mats, with apertures of various dimensions, down even to quarter-plate size.

By having a selection of pictures cut to one size, or mounted on boards of similar dimensions, one may, by aid of frames of this class, alter in a few minutes the nature of the subjects by which his parlour walls are adorned. When the rich uncle from India is suddenly announced, what more easy than to displace the pet actress from the frame that hangs in such a conspicuous place on the wall and insert that of dear, wealthy, Uncle John before that gentleman has had time to be ushered upstairs after his announcement, and with what gratification must he observe his counterfeit presentment hanging framed on the wall! But apart from questionable applications of this handy frame, such as those of which the one hinted is a type, there are numerous other occasions in which it may prove very useful.

ON THINGS IN GENERAL.

If evidence were wanted of the value of medal giving at the exhibitions of the Photographic Society of Great Britain, it is conspicuously given by the excitement, the mild *furore* indeed, created by certain of the Pall Mall awards, criticism being, as it were, crystallised round pictures displaying characteristics quite at variance with those usually connected with photographic prints. Mr. Robinson, in his well-timed and, from the personality of the writer, interesting letter in this Journal last week, says he "looks in the exhibition in vain for prominent evidence of the spread of out-of-focus photography." Quite true. But he will not say that, if in twelve months from now he undertakes to give a review of the year's exhibited work. Prophecy is always unsafe, except under Artemus Ward's well-known conditions, yet I venture to say, so like a flock of sheep are photographers, that I think we shall be flooded with imitations more or less weak or strong of the now famous two medalled pictures by Mr. Davison and Mr. Clark. Decidedly it is, to a great extent, feeling and artistic conception that gives such interest to these two pictures. I do not think the fact of Mr. Lyonel Clark's picture being the outcome of a new method of printing alone, either entitles him to, or was the cause of his being awarded, a medal. In both pictures —but prominently in the *Dedham Bridge* of the latter gentleman— a comparatively new mode of *technique* is shown as regards both delineation and printing. To this, equally with, if not more than, cultivated taste and true feeling may fairly be attributed their success. If my criticisms may be accused of robbing them of some of their merit, I would put this question, Would the two pictures, if done by an unknown man, have even been looked at had they been printed in silver on albumenised paper? They would scarcely have arrested a passing glance. This leads me to draw attention to a point with regard to their execution that I have not hitherto seen mentioned. In both cases, while the vulgar glaze of albumen paper is avoided, there is yet just such a *soupçon* of reflective power on the surface of the papers used, that the strongest shadows, instead of being heavy opaque masses, are lightened up in a very charming manner by flicks of dull, reflected light, which render them tender and almost as transparent as a sepia drawing. In *Dedham Bridge* we have an effect closely resembling a mezzotint form, or rapidly executed yet fairly finished sketch in monochrome. The same effect, less successful it is true, is to be observed in an old man's head at the opposite end of the room done by the same artist, for such, indeed, Mr. Lyonel Clark must be called. I trust it may not be considered a carping criticism, but I am bound to call attention to the fact that the excellent *chiaroscuro* of his medallist picture owes a great deal of its merits to effects that are certainly not produced by photographic methods. Let any one scruti-

nise the highest lights of the arrangement—the white reflections under the woodwork—they have no counterpart above, and are so crisp that pigment on the negative can alone explain them, or account for the semi-light on the top of the post. Finally, at the opposite end of the scale the valuable points of dark in the print are emphatically due to the tools of the painter or draughtsman, and not to those of the chemist. We are told, if I remember aright, that this print, which is in every sense a picture, and a beautiful one, is a silver print toned by palladium and intensified by silver. What does this mean?

The naturalistic school, which these two pictures certainly do not belong to, seems to be extinct so far as the Pall Mall Exhibition goes, and perhaps for a while it may be as well that such should be the case; for, whatever the pictorial merits of the photographs to which the name is given, the physiological and optical arguments advanced in its favour are singularly weak and untenable. When, for example, its exponent at the meeting on September 4 of the London and Provincial Photographic Association is driven to such extremes as to endeavour to make a point of the "blind spot" (which none of the great painters of the middle ages ever heard of, and which is a name and nothing more to most people at the present day), we can look with equanimity at the display of pseudo-science which toys with the effect of the *macula lutea*, binocular vision, phosphorescence, astigmatism, &c. "In place of universal sharpness the naturalistic school advocates that only the principal object should be in focus, and that only as sharp as the eye perceives it in nature," says the report of Mr. Everett's remarks in this JOURNAL. It is obvious that a photograph never can give more sharpness than actually exists in the original, and this criticism suggests that when the eyes look at a photograph—say of the one allowed sharp part of a photograph—they see more than they do of the original, which, taking a proper standpoint for observing from, is of course untrue. Further, when we hear the glib platitudes about only objects in one plane being in focus, it is quite ignored that we are only presented with sharp objects in a particular portion of a plane, and not by any means is sharpness given if objects in that plane are near the margin of the photograph.

I cannot see why such quick objection should have been taken to Mr Debenham's statement that "depth of focus," to use an old expression, was dependent merely upon the absolute size of the diaphragm if the standpoint was the same. It is a very simple piece of mathematics to prove it. Sharpness depends upon the diameter of the depicting cone of light at the place where it cuts the picture plane, *i.e.*, in this case the photographic film; and although it is true that with a certain size of diaphragm we get a narrower cone of light, the longer the focus of the lens, the picture plane cuts, in-an-out-of-true-focus instance, that cone at a point proportionately further from its apex, according as the focus is longer, and so the depicting pencil is used of the same sharpness or bluntness all through.

I should like to allude to one or two other items of interest that have arisen during the month, but my present lucubration being already so long, I will conclude by reference to a recently described patent, where the inventor grinds depressions in his glass cutting-shape and fills them with cork, &c., to prevent slipping over the surface of the print that is being trimmed. Long years ago I saw at Messrs. Forrest's well-known establishment glass cutters made for one of their customers in which the whole surface on one side was roughened. This simple plan effectually prevents slipping, the roughened side being, of course, placed upon the print; it is quite transparent enough for the print to be seen through with perfect facility.

FREE LANCE.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—II.

J. GALE (Nos. 18, 19, 20, 31 to 35).—A series of seven small photographs, all selected with great care for the harmonious effect of opposing outlines in the various pictures. We see this in the design, and appreciate it, but when we come to look more closely at the photographic work, we are led to make a remark upon some very dark hues of colour detail in some of the pictures, causing the balance of far away and near objects to be somewhat strained. In these days of such extreme sensitiveness of photographic plates, such portions of natural objects, if not capable of being translated into the black-and-white language of our art science, should have been left for less advanced workers. No. 32 (*The Ferry*) is a simple bit of picturesque matter which has been made the medium of constructing an effective picture by the careful artistic arrangement of two figures, who thus form the living interest, which makes out of small matter that charm which causes it to be of large value, the scene being a bank on a river, where a traveller waits for the boat woman, who has just neared the stopping place, whilst the man is waiting, in most carefully arranged position, to go on board. These are very simple materials, but have been very artistically treated, the result being a pleasing picture, which, if double the size, would have derived considerably more power and photographic interest.

H. P. Robinson (Nos. 96 and 109).—Two rather large photographs, 19 in. × 12 in., the construction of which, whether by one or more negatives, need not trouble us, the result being two very good studies, where composition, balance of light and dark portions, and the arrangements of the figures, all combine to make a couple of most pleasant pictures, the scene being on the sea-shore, where fishermen and their young daughters are very artistically arranged. As of course there are no difficult masses of dark, the pictures are very light in effect, but at the same time very pictorial. Nos. 358 to 363, by the same exhibitor, are six exceedingly carefully studied pictures, 14 in. × 10 in., where, in well-chosen bits of landscape, the foliage has been well considered, and some figures most judiciously arranged. These pictures, being taken direct, are very pleasant specimens of the true usage of the scientific materials which have been so carefully constructed for photographic picture making. In two of the series, Nos. 359 and 363, we especially direct attention to the very careful study of the right kind of clouds introduced in both these pictures. Note how carefully the leading lines of the clouds have been fitted to accentuate the form of the landscape outline, and it is just these apparently small matters which in exhibited work at once reveal the artistic and the opposite section of photographic workers. All this exhibitor's work is marked "not for competition," otherwise most assuredly these pictures would have gained their just reward.

William Bedford (Nos. 51, 52, 92, 93, 304).—Five very good photographs of river scenes, some of which have the stems of trees in the immediate foreground of the picture. This accentuates the near from the far, but at the same time hardly quite represents the original effect, which derives so much of its charm from the local colour of the foliage; nevertheless, there is much very good work in these exhibits, which represents a conscientious usage of the scientific means placed at his disposal, the result being the true outcome of nature pure and simple. An important feature about all these photographs is the large scale of tones which they possess, arising from the prints being produced by the carbon process, which most certainly carries the palm for that particular quality. Observe what a large amount of gradation of the light portions of these pictures is recorded, all which show the exceedingly careful and masterly usage of the instruments upon which the photographer has played the solos, as represented by these carefully executed pictures.

R. Slingsby (Nos. 159 and 229).—Two pictures, each with the same three young girls idling away their time close to the sea-shore. Photographed in bright sunlight; very good specimens of work done under such conditions. These studies are much smaller than this exhibitor used to produce some few years ago. No. 159 is the best, where some pains have been taken in arranging the pose of the figures; but some dark wave-lines of the distant sea disturb the composition of the picture, and antagonise the otherwise carefully executed work.

F. M. Sutcliffe (No. 252), *The Last of the Daylight:* (No. 256), *Manure*.—This exhibitor seems to have retired from his hitherto well-known sea-side studies, and has gone inland. At present we are somewhat dubious as to the policy of this change. There are seven pictures, but only two to which we can allude. The first, taken at decline of daylight, is somewhat flat in effect, owing to the supposed absence of actinic power, but the clouds have been well selected, and assist the intention of the subject. The other picture, *Manure*, consisting of a man, a cart, and two horses, has also been taken at the decline of day, as shown by the long shadows thrown on the field. The detail has been well looked after in the photographic

rendering of the scene, which is one not at all worthy of being subjected to the realism of photography.

W. T. Kimberley (No. 273), *Christmas Eve at Kenilworth.*—Hoar-frost views, exceedingly well manipulated, where the whites have been very tenderly rendered: at the same time, those portions not touched by the hoar frost are full of detail. The points of view have been well chosen, resulting in six really very effective photographs, which would have derived considerably more value if they had each one been in its own frame. The sight wants some repose before it can investigate the whole one after another. If each of these studies had been by itself, the whole would have been increased in value.

R. S. Redfield (Nos. 274, 275, 276).—We have here three very carefully executed pictures of English scenery by an American exhibitor. The first one gives the locality as being taken in this country—*A Berkshire Hillside.* These exhibits consist of very well-chosen points of view, very delicate in detail, and in 275 some oxen posed as pulling a plough, the arrangement being very good; but to some extent the tenderness of the treatment rather weakens the effect, which, nevertheless, is very attractive. There is one point about these three pictures deserving of special attention. We allude particularly to the artistic arrangements of the highest lights in each photograph, where the white dresses of some boys and men, as also the white portion of the animals, have been made use of most effectively.

Gambier Bolton (Nos. 347 and 389).—These two frames contain studies of the *Zebra.* The first picture has only one animal, the second picture contains three in a group. They are very powerfully rendered, and certainly show a vast amount of skill on the part of the exhibitor in securing so sharp a representation of such apparently very determined animals. Much credit must be due to the patient attendance upon these fierce-looking creatures which the photographer must have given to have secured such results.

J. Pattison Gilbert (No. 369, and seven other similar pictures).—This exhibitor's work evinces a very considerable advance in treatment when compared with former exhibits. Those now in the Gallery are exceedingly delicate in choice of subject matter, and are rich in well manipulated detail. They consist of bits in the North country. There is a warmth about these pictures which is very agreeable to look at; they have a peculiar tint, which, whether it arises from their having been printed on "platino-black paper," from the colour of the mounts, which are of a warm, greyish tone, or arises from the local colour of the print itself, the effect is equally pleasant. The first picture, No. 369, is the most pleasing bit, where the highest light has been concentrated on a road gate placed so that the bars are the lightest portion of the view. The result is very good, and similar effects in the other pictures point to an advanced rendering of pictorial studies.

Miss Florence A. Harvey (No. 436), *Dutch Fisherfolk.*—This is a frame containing four 12 × 10 pictures of Dutch fisherfolk. This exhibitor evinces power in her work, which advances year by year. These consist of studies taken on the sea-shore, where by her very careful choice of figure arrangements, or by a keen perception of what is effective and composes well, has resulted in some very vigorous and powerful representations of fisherfolk, who seem to be perfectly unconscious of what she is doing. There is just one matter which, with all apologies to the exhibitor, we must allude to, and that is, two sets of clouds have done duty for the four pictures. The negatives may have been taken very rapidly one after another; at the same time, the clouds suggest another way. Under whatever conditions these photographs may have been taken, it would have been as well if the two pictures had been separated.

A. Horsley Hinton (No. 444), *The Path to the Shore.*—This view by the sea-shore might have been made more pleasing if the path which is in one corner of the picture had been looked at from another point of view; as it is, it appears equidistant half way up the side of the mount. The eye perceives this at once, and is offended. The picture has been otherwise carefully selected for near and distant objects, which suggest a notion of space. This is not always apparent in similar pictures. This is one of those subjects where a satisfactory result can only be obtained by perceiving what can be done to assist the general subject; in this instance, by a judicious usage of a boat close at hand, and some figures in the middle distance, a value has been given to the picture which would have been increased by a still further study of the path which suggested the title.

Rev. H. B. Hare (No. 457), *Under the Mendips.*—We notice this picture more especially from its scientific point of view than for anything else. At the same time the scene is interesting, if not picturesque. It is stated that the print is made with silver, toned with platinum only, the result being a very nice colour, neither so warm nor so cold in tone as many other exhibits in the exhibition.

J. Bracebridge Hilditch (No. 474), *A Quiet Pool at Goring.*—This is a photograph of a rather pretty bit of Goring, where the strictest attention has been given to every portion of the scientific side of photography—at the same time the point of view has been well chosen for the high lights, which come in the right place in the picture, the scene being the side of the river, a pretty residence, and the church, all suggestive of repose, which the photograph produces.

R. H. Lord (No. 478), *Work and Play.*—This is evidently an enlargement, the subject being a rural cottage with a mill behind—work, being the cottager hanging out some clothes; play, some children at their ease, marbling on the ground—all very simple and natural, where the carefully executed work meets its own reward, but conveys no idea beyond a representation of objects which must exist, but which need not have been perpetuated.

H. Flather (No. 535).—A small carbon enlargement, with what is designated "Dry point needle finishing." The interest attaching to this and some other portraits arises from the artistic way in which a peculiar addition has been made to the surface of these carbon prints by some needle work having been put on the whole surface of the photograph, the result being very good examples of the power of art culture in increasing the photographic value by the addition of some alteration of the surface, considerably increasing the normal condition of a good photograph, where artistic perception, combined with a well practised usage of the materials, must be forthcoming.

Dr. G. Lindsay Johnson (No. 575).—Copy of a painting by Van Eyck. This is a very carefully executed copy (including the frame) of a *Madonna and Child* by the painter. We know how difficult it is to translate the colours which these early painters used; this photograph is therefore deserving of praise for the very successful way in which such difficulties have been conquered. Exhibits like this one are exceedingly interesting from the scientific side of photography, as showing the advances which are being made in the translation of the painter's work.

Fred Hollyer (No. 569, and four other exhibits).—Also copies from the work of modern painters, and are still more advanced outcomes of the photographic copying of coloured work. The original is by E. Burne Jones, and is a large specimen, being 36 inches in height by 13 inches in width. This is a very fine example of the skill which this exhibitor has so carefully cultivated, and with results which these exhibits show may be said to have almost arrived at perfection.

LANTERN LENSES.

The subject of large-diameter objectives having recently created some interest at the London and Provincial Photographic Society's meeting, and brought out some valuable information and explanatory diagrams by Mr. Traill Taylor, it will perhaps be as well to enlarge somewhat on the remarks I made during the discussion that followed the reading of the paper and demonstrations then given, for I feel sure the larger audience of lanternists appealed to in your paper will at this season of the year be interested in the same, especially as in a discussion one is reluctant to enter too fully into the subject, or absorb more than one's share of the time.

Starting with *condensers.* Shall they be of various foci for different objectives, or will one do for all purposes? Theoretically, each objective used should have a condenser to suit its particular focus; but, practically, it will be found when using the limelight that a good compound condenser of about 3½ inches combined focus will answer for all objectives from 6 to 12 inches focus. The *form* of lenses is not of so much moment as their correct working and true centring, but I prefer a meniscus back and double convex front for limelight work, and *size*, 4¼ inches diameter. The back lens may be a 4-inch plano, if preferred, and the front a 4¼-inch double convex. For the oil light, where the flame is large, and a 4-inch condenser employed, the two plano-convex lenses of 6-inch focus, each mounted with their convex surfaces nearly touching, and giving a combined focus of 3 inches, are as good as can be desired, and the flat surfaces being outwards

permit of the lens coming close up to the slide—a very important point, for it is only by this means a cushion-shaped slide can be well covered and projected by a short-focus objective.

The Condenser to move to and from the Slide.—This in my judgment is an adjustment that should be provided in the better class of lanterns, for the cone of light can be made by this means to just cover the photograph, and so concentrate all the rays; whereas, if stationary, a considerable number would be wasted when showing circular pictures if the distances were arranged for square or cushioned matted ones. The slide can be moved forward by an adjustment of the stage, or a double stage can be arranged, the same as was done in a "Bridgman" triple lantern made for the Rev. C. H. Turner some years since; or, what perhaps is a better plan for a slid-fronted lanterns, the condensers can be moved in their tubes slightly by means of bayonet catches or a spiral adjustment. This latter method has been very well developed in a triple lantern recently made for Sir David Salomons, for a ready and very convenient adjustment is obtained by simply touching some non-conducting heat knobs attached to the cell of condenser, the spiral allowing of the most delicate movement. It will be readily conceded that an adjustment of this kind could not be made continually during an evening's entertainment, for it would involve manipulating the light in the latter case, or re-focussing in the case of the double stage; but if all square or all round pictures were to be shown, the adjustment could be made to suit either at the commencement, and so ensure the best light possible.

Objectives.—Theoretically, if one is using a point of light, or a perfect light, as it has been termed, small lenses for the objectives answer, providing the condenser is of a focus to converge the rays so as to fully illuminate (after passing through the photograph or picture) the lens when at its proper focus. In practice one does not get a point of light, for with the limelight the incandescent area is comparatively large, and with the electric arc light there is a certain amount of flame caused by the combustion of the carbon. Hence the rays coming from the luminant and passing through the condenser are not all focussed together, and consequently there is a secondary area of illumination which, in the case of long-focus objectives, is of considerable moment. It is well known, the line or luminant has to be nearer the condenser when the long-focus lenses are used, and the rays are then approaching towards the parallel; consequently, those straying from the true path after converging through the condenser will be lost unless the back lenses are large.

It is easily proved how much stray light is coming from a large luminant by using a pair of 2-inch plano-convex achromatic lenses as the objective, say, of 6 inches equivalent focus, with a 3 or 4-wick lantern, and unless a small stop is inserted in front of them it will be found the projected picture on the screen is all fuzzy; while with the identical lenses in the same position when using the limelight it is quite clear and sharp. Now, if the rays from the oil lamp and condenser are received by a correcting lens of 2 inches diameter, which is nearer the slide, and then passed on to the achromatic front lens of the combination—on the same plan as the portrait lens—the resultant picture on the screen will be satisfactory. The limelight works, when set for long-focus objectives, somewhat in the same way, although in a lesser degree, and unless a large-diameter lens—say, 3 inches for 12 inches or longer-focus objectives—is used for the correcting lens, all the rays are not gathered up and passed on to the achromatic lens. For objectives of 7, 8, and 10 inches focus the size recommended is 2½ inches diameter, and for the 6 inches focus, 2 inches diameter. If large-diameter single lenses, say 2½ or 2½, are used of the plano-convex form of short focus, such as I have seen sometimes in apparatus, the result is generally bad definition, no matter what size stop within reasonable limits is used. This applies to those of 7 inches and shorter focus; therefore nothing larger with this form than 2 inches should be used, and then better results are obtained by combining two longer-focus plano-convex lenses to give the same focus—say two 14 inches to give 7, or 14 and 10 to give 6 inches focus. The very short-focus ones require special correcting. G. R. Baker.

ANENT MOUNTING.

We have had so many articles upon the production of photographic proofs, that one on their mounting and preservation may safely be indulged in, and as I have had recently to prepare and mount a lot of prints to be bound up with letterpress in book form, and as several unexpected mishaps have occurred, it may be well to note them, preventon being always better than cure.

The series operated upon were illustrative of the scenery and antiquities of the Border towns and district, and comprised not only photographs specially selected and taken, but also such things as woodcuts from the *Illustrated London News* and *Graphic*, as well as several of Miller's exquisite steel engravings after Turner's pictures, &c. Here it may be noticed that in all the qualities which go to make a picture in black and white, the latter stand pre-eminent in all respects over the photographs, whether it be in choice of subject, or making up what may be unavoidably absent to make a good artistic composition—in fact a picture, the trained eye and skilled hand being visible from the slightest woodcut up to the most imaginative flight of Turner's genius.

Their dead matt surface, and that of several of the platinotypes, shows to great advantage beside the meretricious gloss of the albumenised paper silver prints.

Being culled from many sources, they were also of many sizes, but all had to be made to suit the same size of page, so that the larger ones occasionally suffered (in size) from this curtailment, although the effect was sometimes enhanced by judicious trimming.

One point on which many photographers err is that of using every portion of the negative as if each was of the same artistic value; probably the set, fixed sizes of cameras, glass, mounting boards, and cards, have had much to do in creating and perpetuating this error, so also would that of the page in book illustration, if it were rigidly adhered to. The wiser plan is to make the artistic most out of each subject, no matter whether it fills the page, or leaves a wide, or even an unequal margin.

One noticeable fact in the comparison between the photographs and the drawn pictures is that in the latter there are none of those obtrusive lopsided branches and similar monstrosities projecting into the field of view from trees which have no existence in or connexion with the subject, and which are there because they were there, and so result in spoiling otherwise fairly good compositions. Where these occur—and they do frequently—surely the slightest artistic knowledge might have dictated their removal from the negative before printing.

Many of the pictures, both portrait and landscape, were mounted on the ordinary photographic mounts, and had to be removed from them; for this purpose warm water had to be resorted to, as the principal mountant used was evidently starch. In two cases the photographer had—and in this it is well that the name should be noted (A Lothian photographer, Duns), in order that he and others may cease the objectionable practice—stamped name and designation on the back of a plain card with an indiarubber stamp and purple aniline ink instead of the ordinary method of printing, with the result that two of the prints which were being removed from their mounts along with and in occasional contact with them have been spoiled by the dye, which must apparently be partially soluble in warm water. It may have been an overlook not to have noticed this and put those particular prints into a separate bath, but it is a worse fault to make use of so objectionable and dangerous an ingredient. On the same cards, the bookseller who sold the pictures had also stamped his name and address, but in this case it seems to have been done with ordinary black printing ink, so that no evil result has followed.

On the backs of several of the unmounted prints the titles had been written in blacklead pencil, but, warned by former experience, these were most carefully removed, it having occurred in previous practice that a pencil line, however faint, has shown through on the surface of the mounted print. In several others, presumably from sheer inadvertancy, the titles had been written on the backs with indelible pencil marks, either the purplish blue which is sometimes used for transferring, or a red of the same kind; and these marks were found impossible to remove with ordinary rubber, although every effort was made. The result turned out that where these had been made on the back of the sky or other light part of the picture, the marks, although not showing before mounting, have come quite through after they were mounted, just as if the prints had been on transparent paper, and so far spoiled the pictures that they had to be dismounted and reduced in size as to remove the objectionable marks which shone through the albumenised surface. Had this been anticipated, most certainly a method would have been adopted which has been found useful under similar circumstances, viz., careful grinding down of the objectionable markings with very fine glass paper until perfect erasure had been effected without in any way injuring that surface of the paper on which the print is visible. This thinning down of the paper, if carefully done, leaves no effect whatever on the finished result.

Every available method has been tried to remove the aniline dye from those prints which have suffered from this cause, but the albumen seems to act as a mordant, and has fixed the irregular patches of colour very perfectly, and so far the experiments have been a failure.

One other imperfection must be adverted to, and that is the practice of the dealer placing his embossed stamp generally on the corner of a presumably ready-sensitised paper, for we know that it does not exist on

the ordinary Saxe or Rives paper. Now, advertising is all very well in its way, but it does not improve the effect of a picture to see an oval stamp with a vendor's name and address staring one in the face, even though it be in the corner of a cabinet or panel-sized view. The lesson to be learned here is, refuse to purchase such, whatever the quality may be, and the practice will soon be altered.

The desirability of using only permanent processes for such work has made itself painfully apparent in several of the unmounted prints, which have already begun to fade, although only dating since 1882, this commencing generally at the edges, and so indicating atmospheric action, as the yellowing has begun there only and penetrated but a slight distance inwards, thus showing the action to have begun at the cut edge of the paper. Those edges, of course, had to be removed, and from the method of mounting adopted it is not likely to occur again from the same cause, or show in the same way. Several, also, by careless keeping, had been folded and creased, the mode of removal of which will be pointed out further on. One other fault, easily avoidable, and evidently made by an amateur, is the numbering of the negatives on the sky, or where there should be a sky, but encroaching on the distant mountains, and so causing a white mark on the print; a trivial thing enough in itself, but one to be noted for avoidance.

While on the subject of permanency for book illustration, I have before me at this moment a copy of Gordon Cumming's *Wild Men and Wild Beasts*, 1871, the prints for the first edition of which were made with my aid by the late Mr. Dallas, of Edinburgh, by the then little known single transfer carbon process with reversed negatives, and they are as perfect to-day as when first issued. An effect similar to that shown by printing on India paper is well given in these illustrations by using a sheet slightly larger than the subject, and keeping careful registration during the printing, extending as that does a little beyond the subject matter of the sketches.

The method of mounting, while well known in the trade, may not be so to many readers, so a detailed description may not be out of place here. A toned, smooth-surfaced, hard, and tough paper is made use of, and the full-sized imperial sheet is strained on a smooth, clean, drawing board by the underside being thoroughly damped and about half an inch all round the outer edge coated with glue. This is attached to the board, and strained by outward pressure with the hands. The sheet should, previous to this, have been lined off to the size required, but leaving a good margin larger than the page required to allow for the trimming and binding.

The prints, cut to the proper size, are now thoroughly damped, and, if albumenised, damp that side first and afterwards on the back; if they are on plain paper, damp the backs of the prints only. It may be said that any mountant will do, but for this purpose, as they are not usually rolled (nor, indeed, is it needed as a rule), I have found gelatine to be the best, and of the different kinds Cox's has preference. To prepare it, allow any quantity needful to absorb as much water as it will, and pour off almost all the surplus. Melt in a water bath, such as a clean new gluepot or one kept for that purpose only, and when melted add, with stirring, about one-third of its quantity of methylated spirits of wine, and before using it strain through a fine cloth.

The prints being trimmed, damped, and laid face down, coat with a flat camel-hair brush, quite smooth, and be very careful to go over all the edges a second or third time; the reason for this is that the freshly cut edges being more porous they absorb the mountant more freely, and if this is not attended to, edges are apt to curl up in places when the prints become dry. After the first is coated, place it anywhere handy, coated side up, while a second and third, or even a fourth, is similarly treated; by the time this is done the gelatine of the first will have sufficiently set to be put down in its place, which do at once with one movement, without slipping or changing, and although it may not be truly placed, if margin enough is allowed it will come right in the end. The print should be lightly pressed with a squeegee or bookfolder, with stout blotting paper between, and when all are laid down on one sheet, allow to become quite dry without forcing heat, when they will be found to be all strained quite flat and taut, without showing any uprising of the edges. The one thing to be avoided is dust or little picks of solid matter, which will occasionally appear with the most careful. In this case a very useful tool is the polished flat handle of a slightly curved tooth brush, which by a gentle pressure will effectually get rid of them.

In the case of a fold or crease in the print, it is well, when it is laid down, to gently tretch it with the hands, and by a judicious outward straining both ways it will usually, when dry, be found that the fold or crease is effaced, or will need but a very slight touch of the ivory burnisher on a piece of plate glass.

Sometimes among a lot of prints one or two will be found with blisters, which are always an eyesore and a nuisance. In this case the best palliative I have found is to prick them with a fine needle and rub the mountant in vigorously with the finger until it has thoroughly penetrated and saturated, after which remove the superfluous mountant with a sponge passed all over the print, but avoid, if possible, touching the mounting paper.

Any good paper will do for mounting upon, but it should be stout and smoothly calendered. The best I have come across is called in the trade a manilla paper, being a very tough, fibrous quality which seems without any of those additions of kaolin, chalk, or other adulterants in the body of the paper.

When quite dry and finished, the pencil lines which were at first drawn on the sheet will guide the straightedge and cutting knife, and allow them to be made neatly to size without bother. W. H. Davies.

THE LONDON PRESS ON THE PHOTOGRAPHIC EXHIBITION.

[*The Graphic.*]

If there is nothing very new, there is much that is interesting to be seen in the Photographic Society's Exhibition in Pall Mall. Matters photographic have now reached such a pitch of perfection that, unless some great and startling discovery is made, such as a method of photographing in colours, it is impossible to hope for anything absolutely new. The walls of the room in which the exhibition is held are hung with some six hundred photographs, many of which show high artistic perception and a profound mastery of processes. In the catalogue there is a very significant announcement, "Pictures not otherwise specified are by the platinum process," and indeed it is curious to note how completely the platinum process is ousting, not only the once popular silver print, but also all other methods of printing. Platinum has its limitations as well as silver, but some of the landscapes printed by the former process are in the highest degree artistic, and prove that photography has thoroughly lived down the sneer that its pictures are merely mechanical. Mr. R. W. Robinson exhibits his collection of portraits of Royal Academicians, in which he has successfully aimed at producing a characteristic study of the sitter as well as a faithful portrait. Mr. Lyddell Sawyer's humorous photographs show that rigidity of pose is not an absolute necessity in groups, and for his *Two's Company* this photographer gets a medal. Another excellent group, *The Love Letter*, by Mr. John E. Austin, also obtains the Society's medal. Studies of yacht-racing are always very popular, and therefore it is not surprising to see a good number of them at the exhibition. Perhaps the frame of yacht-racing scenes, printed by the silver process, and sent by Harry Symonds, is the best collection of this style of work. Mr. Shapoor N. Bhedwar sends a most excellent series, and Mr. W. J. Byrne's "At Home" portraits, which are taken at the sitters' own residences, are really wonderfully successful. The portraits are, as a rule, extremely good—those of M. and Madame de Falbe, Mr. Gladstone, and Dr. Selle, being, perhaps, those which attract most attention. But all the portraits, whether of children or of grown-up people, show a marvellous advance, both in manipulation and in artistic taste, over the work which passed current not so very many years ago. The table in the centre of the room is occupied with the apparatus sent by various makers. Improvements and modifications in the detective or hand cameras attract a good deal of attention, for these cameras are getting more popular every day, and are rapidly taking the place of sketch-books. Some of the new improvements are very ingenious and useful, and, as all unnecessary space and mechanism is being done away with, these cameras are largely reduced in size and weight. Mr. Slingsby exhibits a specimen of his flash-light apparatus and stands, which he advocates for instantaneous views of groups in interiors of houses. Some specimens of photographs taken by a flash light may be seen on the walls, and they are fairly successful. There are some excellent specimens of Mr. J. Desiré England's celluloid film negatives taken on films prepared by himself, and a process called diazotype printing, which is a photographic application of "Primuline," a new coal-tar dye, should also be noticed. Altogether the exhibition is a very interesting one, and will well repay the amateur photographer the trouble of a visit.

Foreign Notes and News.

The following method of toning bromide prints is recommended by M. Hermann Frendenthal. He suggests the process on account of the difficulty experienced in giving the same degree of tone to chloride of silver gelatine paper. Ordinary bromide paper is employed, developed, fixed, and washed. It is then immersed in a chloride of copper bath, composed as follows:—

Distilled water	10 parts.
Chloride of sodium	3 „
Cupric chloride	1 part.

In which it is left until the surface begins to get white. It is then thoroughly washed for some minutes and dried. It is then introduced, in

full daylight, which is essential, into a suitable gold bath, and after toning washed for half an hour and dried. Dr. Stolze, however, states that he has not found this method successful.

For drying plates by means of alcohol, methyl-alcohol, according to Herr Alfred Stieglitz, is much preferable on account of its low boiling point and the rapidity with which it consequently evaporates. Only absolute alcohol should be employed, as when it contains water it leaves fatty marks which show up in the prints. The plates are dried in the dark and placed in the alcohol in a tightly stoppered vessel. When the alcohol has taken up a dangerous amount of water, it may again be rendered absolute by pouring it on ignited anhydrous sulphate of copper, which gradually becomes blue as it absorbs the water, and must then be re ignited. The drying powers of alcohol appears to intensify the plates slightly.

Our Editorial Table.

Dictionary of Photography.

By E. J. Wall. (Second Edition.) London: Hazell, Watson, & Viney, Limited.

During the interval—by no means a long one—that has elapsed since the publication of the first edition of this work Mr. Wall has added considerably to it. Photography is one of those sciences which, being "all alive," is growing rapidly, hence at frequent intervals there is always to be found something new to record. In the new edition several pre-existing articles have been modified and added to, while altogether new topics have been introduced. There is one improvement which must appeal to every one—it is this: not only are the various formulæ given in the time-honoured grains and ounces, but each one is duplicated according to the decimal system in grammes and cubic centimetres. There is much useful information to be found in its 296 pages, and as a book the dictionary is handsomely got up.

The Feast of Roses.

By Sharpod N. Bhedwar.

There is in India a season known as the Feast of Roses. The poet Moore gives a vivid account of it in *The Light of the Harem* (*Lalla Rookh*) when writing of the Vale of Cashmere, with its roses, the brightest that earth ever gave, he describes how—

> "A happier smile illumes each brow,
> With quicker spread each heart uncloses,
> And all is ecstacy—for now
> The valley holds its Feast of Roses;
> The joyous time, when pleasures pour
> Profusely round, and in their shower
> Hearts open, like the season's rose—
> The flow'ret of a hundred leaves,
> Expanding while the dew-fall flows,
> And every leaf its balm receives."

This Feast continues the whole time of the roses remaining in bloom.

Mr. Bhedwar's six pictures represent an imaginary, yet probable scene enacted in that happy country. These photographs are 15 x 12, and are platinum-toned. The fact that the series were awarded a medal at the Photographic Exhibition attests their artistic merits. Mr Bhedwar has supplied us with some useful information concerning these compositions:—

"It is a set of imaginary pictures. There is a season in Cashmere, in India, called the Feast of Roses, of which you will find a vivid description in Moore's *Lalla Rookh*—*The Light of the Harem*. The Feast of Roses continues the whole time of these remaining in bloom.

"The architecture of the room, so far as my knowledge goes, is Saracen, carried into India by Mahomedans. The dresses are based on modern Indian costume. The inner thin muslin garment is called '*Sudra*.' It is a religious costume, which no follower of Zoroaster, male or female, can be without. The outer flowing garment, which forms the drapery, is called '*Sari*' in Gujarati language. It is the dress in general use by Indian ladies, but the way in which it is put on in these pictures is peculiar to the Parsee ladies. An artistic license has been taken with the dress. The Parsee ladies never move about as dressed in this series. They always wear over the '*Sudra*,' and under the '*Sari*' a kind of bodice called '*Polkas*,' the cutting of which is nowadays getting more European-ised as the Western civilisations and European customs advance.

"The tale of the set:—

"1. Roses from a flower girl are bought by two ladies of higher order. (*Feast of Roses—The Flower Girl.*)

"2. The sisters are seen in this weaving a garland to decorate their saloon. (*Feast of Roses—Weaving the Garland.*)

"3. In which the three sisters are hanging the garland. (*Feast of Roses—Hanging the Garland.*)

"4. The two sisters, being left alone, are talking over their love affairs. This picture is styled *Confidences*.

"5. 'L'Inamorata' is supposed to be anxiously waiting, dreaming of *Love's Young Dream*, for a message from her lover.

"6. Here her hope is realised by the love messenger."

Recent Patents.

Applications for Patents.

No. 15,783.—"Improvements in Photographic Cameras." J. D. Mucklow.—*Dated October 6, 1890.*

No. 15,839.—"Improvements in Photographic Detective Cameras." A. J. Buncher.—*Dated October 7, 1890.*

No. 15,842.—"Improvements in Appliances for the Mounting of Photographic and other Pictures or Configurations." R. H. L. Talcott.—*Dated October 7, 1890.*

No. 15,933.—"Actuating Photographic Camera Shutters by Electro-magnetic and Electro-voltaic Means." S. E. Kelp and E. Heuner.—*Dated October 8, 1890.*

No. 15,961.—"Improved Photographic Camera." Communicated by W. Tobias. J. P. Bayly.—*Dated October 8, 1890.*

No. 16,038.—"Improvements in Photographic Shutters." G. Dickinson.—*Dated October 9, 1890.*

No. 16,045.—"Apparatus for Producing and Delivering Silhouette and other Photographs." R. W. Page and M. Justin.—*Dated October 9, 1890.*

No. 16,054.—"Improvements in Cameras." W. Griffiths.—*Dated October 10, 1890.*

Meetings of Societies.

Meetings of Societies for Next Week.

Date of Meeting.	Name of Society.	Place of Meeting.
October 21	North London	Wellington Hall, Islington, N.
,, 21	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 21	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 22	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 23	Burton-on-Trent	The Institute, Union-street.
,, 23	London and Provincial	Masons Hall Tavern, Basinghall-st.

The London and Provincial Photographic Association.

October 9.—Mr. A. L. Henderson in the chair.

Mr. F. A. Bridge showed prints from two of the negatives that had been taken of the members by Mr. Robert at the last meeting.

There was a full attendance of members to witness the first monthly lantern display of the season, and to hear a paper by Mr. T. E. Freshwater on the question, *Is there any Advantage in Using a Large Objective with the Lantern?*

Mr Freshwater said: Time has not allowed me to put my remarks down in the form of a paper, but I hope I shall be able to show that all this talk about large objectives for the lantern is not what it represents, except, perhaps, in appearance and outward show, which, by-the-bye, goes a very long way with some people. I was once in a hall getting ready for the show, when a lady came up; she looked at the lantern very studiously, as if she knew all about it, and turning to me, said, "What a beautiful lantern!" It seems quite a pity to use such an instrument." On another occasion I had a small tin lantern on the table, when some noble swell remarked, "You are not going to show that thing?" I said indeed I was. After the exhibition I did not see him. But enough of this. First, perhaps, I should show you the cone of light as it passes from the condenser to the front lens. Now, if you are using a short-focus condenser, one that is usually supplied with a lantern for limelight, you will find the cone comes down to such a point, that is, about nine inches before it crosses, now, if you place a six-inch lens in this cone at its right place, that is, at its focus with the picture in the lantern, you will see that the diameter of the spot of light is about one and a half inches in diameter, so you see a two-inch lens is quite large enough to pick up all the rays from a four-inch condenser and carry them to the front combination; but if you place an eight-inch lens, this same cone of light has come down very much, and is almost on the cross, so that there is not enough light to fill the lens so as to illuminate the whole of the disc, as I shall presently show. I intend to put on lenses of different forms—the old meniscus pair, single achromatic, using in front of both of these a stop about one-third of the diameter of the lens. This stop is necessary to cut off the outer pencils of light and give a flatter field and better definition. The other lens is a combination of the portrait form, but altered in the curves to give a flatter image on the screen. Now, if you use a large lens of this form of about eight inches in focus with the same condenser, you will undoubtedly gain some considerable advantage; it will pick up the rays better than the small lens and cover the disc much better, but you so increase the size of all your fittings and the weight of your lantern you have to carry. Some will say that is of no consequence; you must have a cab; a pound or two is of little moment. That is all very well, but a set of such lenses is rather a serious matter. Now, if you alter the condenser in such a way that the cone of light is longer, you will then illuminate the smaller lens, as I will show, and get as good a picture as with the large objective. Then comes the question of definition. It does not matter for long-focus lenses what form is used; a single lens will give just as flat a field as a compound lens, and pass more light. This will apply to lenses of above ten inches in focus.

Mr. G. R. Baker said that there was bound to be a falling off in definition at the edge of the picture. As to the size of condenser, with a four-inch one

there was want of complete illumination if the slide were cushion-shaped. For the objective, he used to think lenses of two-inch diameter sufficient for all purposes, but had been converted to a preference for large lenses for long distances. For a lens of six-inch focus, two inches diameter was sufficient. For paraffin, plano-convex condensers of the usual form act very well; but for limelight it was certainly better to use the Herschel form, meniscus and double convex.

Mr. FRESHWATER did not think the form of condenser had much to do with it. He had tried many forms, and found nothing much better than the usual form of two plano-convex lenses.

Mr. J. TRAILL TAYLOR said that he proposed to show on the blackboard when and how any advantage would arise in the use of large objectives. He then showed by diagrams that in the case of a perfect optical system there was no advantage in a large objective, provided that the object in the slide was clear black and white. With photographic slides, however, on account of their semi-translucency, there was a good deal of light passing that was dispersed so far as to be out of the area included by a small objective, whilst with a large objective this light would be received and utilised in the formation of the image. A form of objective which he had constructed, and which worked very successfully, was a slight modification of the ordinary Petzval portrait lens. In order to obtain greater flatness of field he had used a double convex of about equal radii for the positive lens of the back combination. This, with a suitable concave lens and a small front lens, gave very satisfactory results. The general form of this lens was shown on the blackboard.

Mr. W. E. DREENHAM inquired whether Mr. Taylor would not include as arguments in favour of a large objective the fact that condensers were, generally speaking, far from bringing the rays of light to a point, and that with any flame illumination, such as paraffin, the light must be spread over a considerable area at the place of the objective.

Mr. TAYLOR certainly agreed that with a paraffin illuminant there was an advantage in a large objective, as well as to catch the light spread about by imperfection in the condensing system. As an example of what could be done, the late Mr. Thomas Grubb had constructed an achromatic condenser of six inches diameter, capable of passing the whole of the light through a quarter-inch microscopic objective. It was impossible to make a perfect condenser with less than three glasses.

Mr. F. P. CEMBRANO thought that there should always be the power of altering the distance between the slide and the condenser, so as to get a more concentrated cone of rays on the slide when the opening was of small size.

Mr. TAYLOR said that there were many inch condensers that would not illuminate a three-inch slide, especially if of cushion shape. He had overcome the difficulty on one occasion by unscrewing the condenser till it only just hung in its place, and so brought it close enough to the slide to illuminate it all over.

A number of slides were then shown, including many subjects photographed by the Chairman during his late visit to the West India Islands, and others by Messrs. Cembrano, Chang, Medland, and Wollaston.

CAMERA CLUB.

OCTOBER 9,—Mr. Francis Cobb in the chair.

The Camera Club opened its winter session of technical meetings, a paper on *Density of Negatives* being read by Captain Abney.

Captain ABNEY, in his lecture, examined critically the grease-spot method of measuring density of negatives, as employed by Messrs. Hurter & Driffield, and showed that for measuring the transparency of a negative that method introduced important error. He then described and exhibited in working his own photometer, and contended for its theoretical and practical accuracy. In conclusion, he conducted an interesting inquiry as to the interchangeability of time and intensity for both long and short exposures.

On Thursday, October 23, Mr. E. J. Humphery will read a paper on *The Reproduction of Positives and Negatives*. Meeting at half-past eight p.m.

WEST LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 10.—Annual general meeting.—Mr. C. Bilton (President) in the chair.

The annual report, having been read, was adopted.

Mr. C. WHITING moved that Rule 5 be amended by striking out the clause that provided that the President be not eligible for re-election. He thought it undesirable, speaking generally, if a Society possessed a good President, not to give the members an opportunity of re-electing him. They could not do better than follow the example of the Parent Society, which had not changed its President for many years.

Mr. L. C. BENNETT seconded the motion and spoke in its support.

Dr. F. H. LOW, while admitting that there was something in favour of Mr. Whiting's argument, pointed out that the converse was equally applicable; an unsuitable President might be elected, and, if the motion was carried, the opportunity for selecting a substitute would to some extent be lost. The alteration was made in order that every member should, like the French soldier, have the Marshal's *bâton* in his knapsack, or, in other words, stand an equal chance of occupying the Presidential chair.

Mr. C. WINTER thought, putting both arguments in the scale, that the unpleasantness which might arise if the rule were rescinded would quite counteract any possible benefit from the change, and therefore hoped the meeting would allow the rule to stand.

Mr. J. A. HODGES had always looked upon the rule as being contrary to the interests of the Society, and he reminded members of the circumstances which led to its being proposed. It was, moreover, contrary to the original constitution, and he should like to see its recession. He hoped that his remarks would not be construed in a personal sense, as they were intended to be general and without reference to individuals.

Mr. WHITING (in reply) thought that in the election of officers it should not be supposed that the person voting entertained an unfriendly feeling for the person for whom he did not vote. They would not be doing justice to the Society if they did not act independently, and if feelings of jealousy occurred it was their duty to smother them.

The PRESIDENT said, as proposer of the resolution last year, he should be very sorry to see it rescinded, he having suggested it mainly upon the ground that an annual change in leadership would be beneficial to the Society, and would give every member the opportunity of so studying the interests of the Society that he might be elected to the chair.

The motion having been put to the meeting was negatived by a majority of one.

A discussion on the financial statement and the balance-sheet ensued, in which Messrs. Lynn, Leslie Selby, Whiting, and others took part.

A discussion followed upon the question of the advisability of making the financial year conterminous with the annual general meeting, which ended by the following resolution, moved by Dr. LOW, seconded by Mr. HAZEON: "That all subscriptions become payable on the 1st October, old members whose subscriptions are paid to the 1st January, to pay three-fourths of the full amount," being carried.

Further revisions in the rules having been made, the election of officers was proceeded with.

The PRESIDENT stated that he was glad to inform the meeting that Mr. G. F. Blackmore had been nominated for the office of President, whereupon Mr. Blackmore replied that though quite sensible of the honour conferred upon him, yet, owing to the many demands upon his time, he felt it quite impossible to accept the office, feeling that it was the duty of a President to devote all possible time and energy to the affairs of the Society. The hour being late, it was decided to adjourn the meeting to Friday, October 17, when, bearing in mind the importance of the business, it is earnestly hoped that *all* members will make a special effort to attend.

HOLBORN CAMERA CLUB.

OCTOBER 11,—Mr. E. Bayston in the chair.

Messrs. T. O. Phillips and H. T. Culliford were proposed as new members.

Mr. EDWARD DUNMORE read a paper on *A Few Odds and Ends of Photographic Practice*, in the course of which he said he thought he would commence by finding fault with some of the practices to which photographers young in the practice of the art were addicted. It was a curious fact that a great proportion of those who took up photography as an amusement knew all about it, and were perfectly uninstructable in about a week or ten days. In fact, it was not until they had pursued it for some considerable time that they began to find out there was something to learn. Then difficulties came, not singly, but in battalions; contradictory results were obtained, developers and plates were changed, and in the end the whole thing was in a muddle, and photography was thrown over. He was inclined to think that the giving up of photography was an advantage to the rest of the brotherhood. It was certainly no loss. There would always be a considerable percentage of press-the-button amateurs, but as time went on they would gradually become less, and the real earnest workers would be in the majority. On the other hand, there were workers who entered into the work with great energy, never disheartened by failures, and whose efforts were crowned with success. There were certain qualifications essential to success: patience, perseverance, and carefulness, dominated by an acute perception of the artistic and beautiful. Given these qualifications, the photographic aspirant was almost certain to succeed. The most important part of the photographic process, and which required all their artistic qualifications, was the judgment that decided what form and composition the picture, whether portrait, group, or landscape, should possess. The most technically perfect negative was scarcely worth looking at if it failed in composition and lighting. He urged all amateurs to cultivate their artistic knowledge as much or more than anything else. The reckless exposure of plates not only did no good, but induced habits of carelessness. He advised them to make it a rule never to expose a plate without a purpose. No matter what the object might be, let there be some definite intention in the mind. In choosing a subject it must be remembered pictorial effect depended very much on the direction of the light. A dominant side light was nearly always an advantage. A light behind the camera was not, as a rule, conducive to good effect, the shadows being reduced to the least possible quantity and high lights inordinately increased. With regard to the burning question of exposure, he looked upon actinometers, tables, &c., as hindrances rather than aids. If the light was uniform in quality, which it never or seldom was, some reliance might be placed upon them; but as the luminosity of the light to the eye was not equal to its actinism on the plate, any exposure metre based on the apparent strength of the light to the eye must give fallacious results. The colour of the light was the most important factor in the matter. Actinometers on the principle of having a sensitive surface to be coloured to match a certain painted tint were more reliable as far as they went, but, owing to the rapid changes that took place in the qualities of the light and the rapid exposures that were given, they might indicate a certain exposure at the time they were being examined that would be quite misleading for an exposure to be given shortly afterwards. He advised all photographers to accustom themselves to judge the proper exposure by the appearance of the image on the ground glass, and to train themselves to estimate the actinism of the light by its colour and by the unaided eyesight. The only mechanism regarding exposure that he thought was of practical utility was uniformity of stops. The greatest step to correct exposure would be made if a standard size of stops was adopted. If they knew the average exposure by any one stop of a standard size they would know it for all their lenses. When a variety of lenses by different makers and of various foci were in the kit, the value of this uniformity could not be overrated. With regard to shutters, he thought an easily working drop shutter would do most of the work required, even when the exposure was very quick. In taking instantaneous pictures, if they were expected to turn out good, the light and the subject must be taken into consideration and suited for the exposure. The objects must not be too near, and the contrasts of light and shade not too great; and the greatest possible amount of light in the right direction was a *sine quâ non*. With respect to apparatus, weight was a decided consideration, but in reducing it they must avoid any sacrifice of rigidity. He

particularly disliked the heavy, solid leather cases, with brass locks and straps. He himself made his focussing cloth do for the case, folded round the camera and secured with a strap. It answered every purpose and did away with some extra weight. The camera stand, whatever form it might take, must be rigid when set up. If a stand was unsteady, it might be improved by a cord fastened to the tripod head with a loop at the lower end, in which the foot should be placed and considerable strain put on the cord by pressing it to the ground. In windy weather this was a good plan with any stand. The legs tied together by a cord from one to the other, after extension to the proper distance, was very useful when the stand was on a slippery surface. As to lenses, he would say little. Whatever they were, they should have good depth of focus with a flat field, and work with a fairly large aperture, giving an image sharp to the edges. A good principle to adopt was to always work with the largest-sized aperture that would give the necessary definition. By working with a lens stopped down there was danger of lack of atmospheric perspective—the most beautiful quality in a landscape. About developing, whatever form they might adopt, providing it was a good one, he should advise them to stick to it, and make themselves thoroughly masters of it. He preferred their old friend pyro-ammonia, not that other developers would not give as good results, but the pyro-ammonia development was more amenable to after treatment in the matter of intensification, and particularly reduction. The yellow tint of washing-soda developed negatives, which in some cases was an advantage, was in others just the contrary. For instance, it was impossible to print on carbon from a yellow negative. Some would not stand ammonia without green fog, and in such cases we should have to fall back upon soda. To intensify a negative nothing was better than Monckhoven's process of bichloride of mercury and bromide of potassium followed by cyanide of silver, or iodide of mercury in solution followed by a weak solution of hypo, as recommended by Edwards. To reduce the density of a negative, a weak solution of perchloride of iron followed by hypo, or Howard Farmer's method of ferricyanide of potassium and hypo. A slight reduction might be made with a weak solution of hydrochloric acid, or alum and nitric acid. These solutions should be kept at hand in the dark room. Printing, to those who were unaccustomed to it, was not such an easy straightforward operation as it seemed. A good deal of judgment was required as to the depth of colour necessary, and this depended in some degree on the toning bath to be used afterwards. The toning bath should not be too cold nor too hot. If the toning bath was above seventy degrees it tended to produce flatness in the tones. It also caused a rapid decomposition of the toning solution. The fixing of the prints was never safely performed with a weak hypo bath, as it took a strong solution of hypo to dissolve the hyposulphate of silver formed. One part of hypo to five or six of water was a good average strength with an immersion of twenty minutes. If the paper blisters, the most effectual remedy is to put the prints, before they have been moistened by water, for a few minutes in methylated spirits, then wash, tone, and fix in the usual manner. Few, if any, papers would blister after this treatment. With respect to mounting prints, nothing could be better than fresh starch paste, with or without the addition of gelatine. The cleanliness of this mountant was a great recommendation. He said that mucilage of white gum was also an excellent mountant.

A short discussion ensued on the matter of supplementary exposure, Mr. Dunmore, one of the opinions, that there was a slight advantage gained in the same way as an under-exposed plate might, just after development had begun, be exposed to actinic light to gain density and detail.

In answer to the Chairman, Mr. Dunmore said he did not think there was much to be gained by printing under green glass, except in the case of very thin negatives. More harm than good would be done by printing a good negative under green glass. It tended to make the picture harsh. It was an old dodge.

A member asked what developer Mr. Dunmore would recommend for instantaneous work.

Mr. Dunmore. The pyro-ammonia developer is the best for any sort of work, whether instantaneous or time.

In answer to another member Mr. Dunmore said, for cloud pictures use f 32 stop and give half second exposure. The best cloud negative would be obtained on a cloudy day.

The Chairman asked if destroying the latent image by bichromate of potash, so as to use a plate which had been exposed again, was worth the trouble.

Mr. Dunmore said it was not. After a plate had been treated in this way it required about twenty times the usual exposure. It was all very well as a matter of experiment, and no doubt very good fun to the amateur.

To-day (Friday) Mr. Thorpe on *Photographic Chemistry*.

Saturday (the 11th, we are afraid) outing. A number of members met at the Temple, and permission having been obtained to photograph within the precincts, a number of photos were obtained in and around the learned spot. Then, after adjourning to the headquarters of the Club, where an excellent tea had been provided, they finished up the evening with a smoking concert.

Prizes are to be given for the best set of lime pictures taken at the Club official outings. They will be divided into two classes, half-plate and over, and under half-plate. Prints mounted, but not framed, to be sent in by October 31.

HACKNEY PHOTOGRAPHIC SOCIETY.

A PRIVATE auction was held on Thursday, October 2, under the directorship of Mr. Henry J. Reader (a member). The idea was that many amateurs brought apparatus added, was found useless to them, but might be of use to others, little, if any, reserve being placed on them. The evening was most amusing, Mr. Reader giving a humorous description of the various articles.

Mr. Wratten exhibited a new magnesium flash lamp, which was handed round. The magnesium was brought about by a spring which caused a lever full of powder to discharge a given quantity into a small chamber, and on releasing the spring the lever went back. The flash was caused by magnesium being blown upwards through a small stone.

The Dry Mounting Tissue Company sent samples of their various specialities, which were duly distributed, the members being requested to report the result of the trial.

Messrs. Mawson & Swan also sent copies of "Home, 1B make, lantern slides," also enlargements.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

THE annual meeting of the above Society was held at the Masonic Hall, Surrey-street, on October 7,—Mr. B. J. Taylor in the chair.

The TREASURER presented his statement of accounts for the year, showing a good balance in hand, which was considered very satisfactory and duly passed.

The SECRETARY read his general report of the proceedings for the year, showing that thirteen meetings had been held, including one special meeting; numerous papers and demonstrations have been rendered, and have in no small degree tended to pleasant and profitable meetings; some good work had been done by the members, several having gained prizes at the photographic exhibitions in different parts of the country, notably Mr. Ernest Beck; and altogether the Society was in a flourishing condition. He urged upon each individual member, by exercising a little in personal influence and a word in season, to induce their amateur friends to join the Society for mutual benefit. He also announced that the annual dinner would be held on the 30th inst., and trusted all the members would make a special effort to be present.

They then proceeded to elect officers for the ensuing year, which, on the votes being taken, were as follows:—Mr. B. J. Taylor was unanimously elected as President for the second time. *Vice-Presidents*: Messrs. A. Davy and G. Bromley.—*Council*: Messrs. A. Reynolds, A. J. Brown, T. Furniss, Thomas Firth, and — Spencer.—*Reporter*: Mr. E. H. Pearce.—*Treasurer*: Mr. Bradley Nowill.—*Secretary*: Mr. Ernest Beck.

The President's prizes are again offered for competition; the subject is left open to the taste of each individual competitor, so that prints of any subject or size may be entered.

After votes of thanks to the retiring officers the meeting terminated.

MANCHESTER PHOTOGRAPHIC SOCIETY.

OCTOBER 9.—Mr. Alan Garnett presided over the annual business meeting, at which the subjoined report of the Council and the Treasurer's statement were read and accepted.

The following gentlemen were elected to form the Council for the ensuing twelve months:—*President*: Mr. Alan Garnett.—*Vice-Presidents*: Messrs. T. R. Cawley, A. Coventry, Abel Heywood, jun., J. Schofield, and H. M. Whitefield.—*Librarian*: Mr. J. Schofield.—*Curator*: Mr. F. Edwards.—*Hon. Treasurer*: Mr. W. G. Coote.—*Hon. Secretary*: Mr. W. H. Farrow.—*Lantern Committee*: Messrs. D. E. Benson, W. Broughton, M. W. Thompstone, and H. M. Whitefield, the remaining members being Messrs. W. Blakeley, F. W. Burt, T. Chilton, H. Smith, F. Spencer, and J. Whitham.

Mr. John Hedding, who has been a much respected member of the Society for many years, was unanimously elected an honorary member.

A remarkable correspondence was read that had passed between the Council and a former member of the Society, who had written that his solicitor would defend any action the Secretary of an unregistered Society might take to recover the amount of subscriptions claimed, one guinea of which he tacitly admitted had been due to the Society for three years. The Council struck the individual's name off the roll of members, and the new Council was requested to take the necessary steps to register the Society, in order to prevent a recurrence of an incident which is happily extremely rare amongst literary, scientific, and other institutions where gentlemen are wont to rely upon their mutual honour and good faith.

A cordial vote of thanks was passed to the retiring Secretary, who had acted during the previous six months.

Some interesting photographs of the new main sewer in Manchester, taken by magnesium light, were handed round by Mr. Benson.

REPORT.

The past year has been unusually eventful, and changes have marked its progress throughout. The death of some of its oldest and most valuable members has been a distinct loss to the Society, and the members of the Council at the close of their tenure of office record with much regret the absence of their esteemed colleagues, Messrs. Pollitt and Atherton, who have passed away from us.

In the year now ended, Mr. Chadwick, who has acted as Hon. Secretary for twelve years, has felt it necessary to resign; no doubt his able services for so long a time are duly appreciated by the entire Society.

The Council has held sixteen meetings, but, from the causes alluded to, also the illness at some of the members and the total absence of our President, the management of the Society has devolved upon a small number only; yet, although small Committees are generally credited with greater activity than large Committees, it is extremely desirable that the numbers of the Council of such a Society as this should be fully maintained, so that all sections may be represented, and the work to be done may not press too heavily on any individuals; the Society is therefore asked to-night to modify the rules, to enable any seats at the Council table to be filled up as vacancies arise.

In the earlier part of the year there was a decided lack of enthusiasm, the Society having participated in the fate of all others in the ebb and flow of the tide of interest in its proceedings.

The Council gladly observes that of late the meetings have been better attended, even during the summer months, and considerable interest has been manifested generally.

The summer meetings may be pronounced a success, notwithstanding the temptation of fine weather, coupled with the fact that numerous members were away for the customary holidays with their cameras, and the attendance has been, on the whole, better than at some of the earlier meetings. The Council anticipates a revived interest during the coming winter session, and that growth of photographic friendship that surely results from the regular meeting of congenial spirits all intent on pursuing the same hobby and giving mutual assistance to each other.

With regard to the twelve general meetings of this Society, it is sufficient to say of three at the earlier dates that they were filled up with conversation and discussion.

At one meeting the members' sets of lantern slides which had been sent in for competition were shown on the screen. The adjudication was made by Mr. Paul Lange, President of the Liverpool Photographic Society, assisted by two of its members, whose services are cordially acknowledged. The result was that our esteemed member, Mr. Coote, was awarded the first position and the Society's prize.

At another meeting a competition of prints attracted notice, the prizes being awarded to Mr. Tomlinson, for the best print "over half-plate," and to Mr. Whitefield, for the best print "half-plate or under," by the votes of the members then present.

Two meetings have been devoted to the consideration of the constitution of the Society and the amendment of the rules.

The four recent gatherings have been occupied by very successful demonstrations of the development of dry plates and the printing and toning of albumenised, kallitype, Eastman's platinotype, Blanchard's, Obernetter's, and aristotype papers. These were all ably conducted by members of our Society.

In December last the annual exhibition and *soirée* took place, when there was exhibited a good collection of our newest and best work, also specimens and apparatus from various manufacturers, which attracted close attention, and have doubtless proved profitable to the firms who exhibited.

The Members' work, consisting of both prints and transparencies, was shown in the Lecture Room to an appreciative gathering of members and friends.

The Lantern Section provided two exhibitions in the large hall of the Athenæum last session, and others in our Lecture Room. These were considered excellent, but it must be admitted that in these days of improved optical lanterns, and the almost perfect lantern plates now obtainable, many more results should be forthcoming from our lanternists. The Council hopes they will give a better response this winter.

The outdoor meetings have not been numerously attended, but those who have joined the excursions have been well pleased, for, while there has been no complaint of several dozen tripods being in everybody's way, there has been a sufficient attendance to yield friendly intercourse, piquant humour, and many good pictures.

With respect to the future, the Council has prepared work for its successors in arranging for an exhibition in December next, which it is earnestly hoped the Society will take up in a hearty manner, and produce on the walls that variety and high quality of work which it is certain many of its members habitually accomplish.

The Treasurer will present his financial statement, which, of course, shows the balance on the right side. The expenditure has been made with a great regard to economy, but it must not be forgotten that if members are to have the entire benefit of their subscriptions they should pay them at once when due, for it has been found impossible to purchase apparatus that would have been most useful in consequence of several members relying on the kindness of others and deferring the payment of their contributions to the general weal.

In the past year many gentlemen whose names are on the roll of membership have not come to the meetings, but as the increased satisfaction of those who have attended becomes better known to the absentees, the Council expects the forthcoming session will prove more enjoyable to all, and promote the advancement of both taste and skill in the photographic art.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

October 9.—General meeting.

Mr. Andrew Stewart, Editor of *The People's Friend*, gave a lecture on *How Our Morning Paper is Laid on Our Breakfast Table.* The lecturer minutely described the various details in connexion with the production of a daily paper, from the receiving of "copy" to the despatching of the papers to the railway station. A capital series of lantern slides illustrating the different processes carried on in a newspaper office was thrown upon the screen, which gave the members a realistic view of the working of a newspaper establishment.

Mr. V. C. Baird exhibited a number of prints on Fallowfield's aristotype toned in the ordinary borax toning bath.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

The annual meeting of the above was held on Tuesday evening, October 7. In the absence of the President (Mr. W. S. Adamson), Dr. J. Anderson (Vice-President) occupied the chair.

The Secretary read the President's address to the members, in which Mr. Adamson offered five prizes for landscape, instantaneous work, portraiture, enlargements, and transparencies, all the work to be given in by October 31. It was also arranged, on his suggestion, that a public lantern exhibition should be held early next month.

The reports of the Secretary, Treasurer, and Curator were read and adopted. The Treasurer's was very satisfactory, showing a considerable balance in favour of the Association.

Office-bearers for the ensuing year were elected as follows:—*President:* Mr. W. Shaw Adamson, Careston Castle.—*Vice-Presidents:* Messrs. G. Mackie and Bailie Lawrence.—*Committee:* Messrs. H. Braid, A. Brown, and William Dakers.—*Curator:* Mr. J. C. Middleton.—*Treasurer:* Mr. William Stewart, jun.—*Secretary:* Mr. J. D. Ross, 6, High-street.

It was agreed to hold the meetings on Tuesdays instead of Wednesdays.

BERLIN ASSOCIATION FOR THE PROMOTION OF PHOTOGRAPHY

September 19.—Professor Vogel in the chair.

This was the first meeting since the vacation, and the Chairman consequently embraced the opportunity thus afforded of congratulating the Association on its reassembly. He then laid before the meeting the first volume of his new *Lehrbuch der Photographie*, and presented it to the Association. The elaborate illustration of the new work renders it a highly valuable contribution to photographic literature, and the meeting expressed sincere thanks for the presentation.

Herr Schultz-Henke exhibited a number of photographs of himself and family, taken by an automatic apparatus by Ramspeck on the occasion of his last visit to Hamburg. The portraits had the appearance of ferrotypes, which they also resemble in their method of preparation. The statement that only three minutes elapsed from the insertion of the coin to the delivery of the photograph occasioned general surprise.

Dr. Hezekiel then showed a number of views which he had taken of the recent naval manœuvres, and also a number of prints on his so-called silver-platinum paper. The advantage of this paper appears to be that it gives great detail and deep blacks without it being necessary, as hitherto, that the negative should be very hard. The printing is carried out in the same way as with albumen and gelatine paper, except that the proof is printed rather darker than it is desired that it ultimately should be, whereupon it is washed and toned in a platinum bath, instead of a gold bath, after which it is fixed with ordinary fixing soda. The tone can be made brown-black or blue-black, according as desired. The receipt for the toning bath is supplied together with the paper manufactured by Dr. Hezekiel. The toning salt employed consists mainly of potassium-platinous-chloride. Dr. Hezekiel exhibited a number of prints on this paper which fully justified the claims made. The new paper costs 1.50 m. per sheet, as against 2.50 m., the cost of the old paper since the rise in price of platinum. The new paper prints quicker than the old printing-out platinum paper, though slower than developing platinum paper.

Herr Rau stated that he had employed this paper, and found it excellent in all respects, and quite independent of whether the negatives were hard or not.

Herr Diskan gave an explanation of the recent gradual rise in the price of platinum, which, he said, was due to the daily increasing consumption of that metal for the manufacture of incandescent lamps, the firm of Siemens alone using about 30,000 m. (1500*l.*) worth every month.

The Chairman then proceeded to report on the steps which had been taken to obtain Government support for the technical school founded by the Association. He had, he said, applied to the Ministers in whose province the matter fell, and received a friendly response. It was proposed, however, that both the students and the Association should contribute to the support of the institution by paying fees for the instruction they received.

After some discussion on this subject, and on the photographic institute for ladies founded by the Lette-Association, the proceedings terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

SPECTACLES AND DEFECTIVE VISION.

To the Editor.

Sir,—Your comments on this subject in a recent number tempt me to the egoism of placing my own difficulties before you in this matter. My eyes are very unequal in power, the left being very short-sighted, and the right being all but normal. Many years ago I was fitted with spectacles at the Charing Cross Eye Hospital, the glass for the normal eye being all but plain glass, and the left being only sufficiently strong to bring up its short sight to enable me to write or read comfortably at table with it—not strong enough to enable me to see clearly any further distance than that. Consequently I never use my two eyes in combined vision: it is either the right for all looking about, or the left for reading or other close work. This leads to a perpetual "dislocation" of vision, if I may so term it, there being a conscious change over of vision from one eye to the other, leading to perpetual discomfort, feeling of strain, &c. Some time back Mr. Chapman Jones in your columns adverted to the subject, and, stating his case to be similar, said he had experienced perfect relief by having glasses made to bring the sight of both eyes quite level in power—I presume for all ordinary looking about. As mine were certainly not so, —my short-sighted eye being provided for reading distance only—I at once had a glass fitted for that eye to bring its sight equal to the right eye for distance work, ordinary looking about. The change was curious: while I certainly could see equally well with each eye, there was a most perplexing feeling going on within, for the images, though equally clear, were *not equal in size*, that of the left eye being very greatly smaller than the other. The attempt at combined vision was thus most peculiar and speedily most painful, for in an hour or so I was compelled to revert to my usual glasses, both eyes having become bloodshot and greatly inflamed all round, while the internal distress was very great.

Now, how can my eyes differ from Mr. Jones's so much as to lead to so different a result? Is it possible to obtain glasses that should render the sight of such widely divergent vision as mine equal in power each to the other, and at the same time give an image from each eye equal in size? In no other way can I see that I can get relief from the perpetual feeling of strain, but it seems to me that such glasses are optically impossible of manufacture. Does your experience led you to know of such another case being dealt with successfully? I shall be grateful for any comments you can help me with, or that any of your experienced oculist readers can afford.—I am, yours, &c., Fred. H. Evans.

158, *Osbaldeston-road, N., October* 11, 1890.

HARTNACK'S NEW LENS.

To the EDITOR.

SIR,—I see you have an article on *Dr. Hartnack's New Photographic Aplanats and Pantoscopes*. Through the kindness of Dr. Hartnack and Dr. Miethe, of Potsdam, I am able to exhibit one at the Society's Exhibition in Pall Mall. It is of 18 c.m. (7¼ inches) focus, and has a ratio aperture of *f*·8. The iris diaphragm is very neat, but the mounting is, I think, unnecessarily large. The lenses are symmetrical combinations, worked to special curves to suit the Jena Borosilicate glass. The workmanship leaves nothing to be desired, but I am still doubtful whether its optical properties will show a superiority over the "symmetricals" and "rectilinears" of our leading English opticians.

To suit the requirements of English photographers who might wish to try these lenses, I persuaded Dr. Hartnack to construct the aplanats with a ratio aperture of *f*·8 instead of *f*·10·2, as being more useful for portraiture and instantaneous work, and also to mark the scale with numbers indicating the ratio apertures instead of merely the diameter of the diaphragm aperture as hitherto done, thus obviating all necessity of calculation.

—I am, yours, &c.,
G. LINDSAY JOHNSON.

14, *Stratford place, Oxford-street.*

P.S.—I shall leave the lens in its case at your office for a few days.

WORK FOR THE WINTER SEASON.

To the EDITOR.

SIR,—In your article of the above title you refer to the use of electricity for photographic purposes, in which you make an erroneous statement as to the cost of same, when obtained from a public supply company.

You state, "Not only is the current available, but most of the electric lighting companies will instal the light and provide the necessary lamps, or lamps, free of expense, and charge only a moderate rate for the electricity supplied." This is not the case. The electric supply companies, or most of them in London, only undertake the supply of current, while the consumer provides all his lamps, fittings, &c., and the wiring of his premises at his own expense.—I am, yours, &c.,
H. L. LEACH.

London.

THE VAN DER WEYDE MEDAL PHOTOGRAPH.

To the EDITOR.

SIR,—I was somewhat surprised, on visiting the Pall Mall Exhibition to-day, to see the above photograph still hanging on the screen with the word "Medal" attached, and this in spite of the protests of exhibitors and the photographic press.

I now learn that there will be no Council meeting until November, when the exhibition is closed or closing; and that, unless the judges take action at once, the frame will continue to defy the rules of the British Photographic Society by hanging on its screen.

I am informed that if Mr. H. P. Robinson (as Chairman of the judges) will get a resolution signed by the rest of the judges, and forward it to the Hanging Committee, with a suggestion that it be acted upon immediately, *they* have the power to order the removal of the frame; and for the sake of the Society (in common with many others) I hope that this step may be taken, and an example made of the exhibit as a warning to others.

October 15, 1890.
SCRUTATOR.

THE (VERY) NEW TRADES' UNIONISM.

To the EDITOR.

SIR,—Will you allow me a few lines in your JOURNAL in order that I may make a "personal explanation," as the Parliamentary jargon has it?

Ever since we failed to find any one sufficiently independent of the anger of employers to take the organizing post in London of a Photographers' Union, the photo-zincographers have been attempting to form a sectional organization. On September 3 a meeting of the "profession" (*i.e.* trades) was called at the "Blackan," Fleet Street, where about twenty photo-etchers assembled, who elected a Committee, empowering it to call another meeting and get the workmen engaged in the trade together. This Committee—Messrs. Bagley, Collier, Miller, Garnett, and Anning—proceeded to try and find a chairman for the forthcoming meeting. At the first meeting of this Committee it was decided that it was necessary to have as chairman some one who had experience of organization. My friend, A. Anning, proposed my name altogether without my knowledge, connivance, or acquiescence in any way. The whole of the Committee agreed in asking Anning to write to me and ask me to come to the next meeting, and to fix a date previously to suit my own convenience. The letter lies before me as I write. I am told that the Committee is of opinion that I am a suitable person to take the chair, and that with me therein the Union will go on well, &c. I replied accepting the offer, and fixing as the date of meeting either September 24 or October 1. A post card was returned adopting as date October 1.

A few days later came a letter from Anning informing me that when he showed my letter to the Committee they took offence at my writing on the note paper of the "Dock, Wharf, Riverside, and General Labourers' Union," and decided that so vulgar an individual as the Branch Secretary of a Union of dirty unskilled labourers could not—ah—be accepted—ah—as chayahman—ah! And an informal letter from Anning, as between friends, was the only intimation vouchsafed to me that the Committee had with gross discourtesy elected another chairman after I had accepted the invitation!

And this is one of the new Unions! Perpetuating the discords among the working class; trying to make itself believe that its members are not members of the great army of worker bees, by refusing to touch with the hem of its garment the bees that work the hardest; wallowing in exclusiveness and "professional" privilege (though where the "profession" comes in I, as a worker in it, fail to see); and altogether reproducing all the faults which made the old Unions stink in the nostrils of the working order. At the meeting where Anning protested for me against this absurd conduct, I read that the evening was devoted to "shutting up" malcontents.—I am, yours, &c.,
ARTHUR FIELD.

Maidstone, October 15, 1890.

A CORRECTION.

To the EDITOR.

SIR,—Would you oblige me by permitting me to correct two obvious mistakes in the report of the North London Photographic Society published in your issue of October 3rd, referring to a developer for instantaneous work used by me? The quantity of carbonate of soda in ten per cent. solution should be "up to two hundred and forty minims to the ounce of developer," not, as stated, twenty-four minims. The five minims of a saturated solution of bromide of potassium should be read as "five minims of a ten per cent. solution," &c.

It is needless to remark that both of these alterations would make, to say the least, a marked difference in the resulting effect obtained. Thanking you in anticipation,—I am, yours, &c.,
EDWARD W. PARFITT.

18, *Gatcombe-road, Tufnell Park, N., October* 9, 1890.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Rees' 15×12 actinic doublet (No. 12,234) in exchange for 12×10 portable symmetrical or offers.—Address, TEAR & SON, 12, Clapham-road, London, S.W.

Stereoscopic camera, bellows body, and two slides, in exchange for quarter-plate camera or rectilinear lens.—Address, K., 189, Southampton-street, Reading.

A set such lathe (property of the late Sir Charles Bright), with heavy fly-wheel, &c.; wanted, good camera and lens in exchange.—Address, F. HUDDLESTON, 21, Upham Park-road, Chiswick, W.

Wanted, half-plate camera set fitted with rapid rectilinear lens; will exchange Stirn's detective nickel-plated camera and rapid rectilinear lens, takes plates for six exposures.—Address, J. PAWSAT, 8, Catherine-terrace, Tottenham.

Wanted, magic lantern for exhibiting slides and enlarging, with a five-inch or six-inch condenser, will give in exchange a LOCKS single-view lens and a half-plate wide-angle by Robinson & Son, Dublin.—Address, G. J. ELPHICK, 57, Stonefield-road, Hove, Sussex.

Will exchange the following:—Half-plate burnisher with spirit lamp (12×10), ditto Marion's gas, two view-finders, Eclipse folding developing tent, two backgrounds (interior and exterior), one combination set of lenses (Spicer Bros.), quarter-plate to 12×10, and a quantity of light-tight boxes; wanted, studio accessories and show cases.—Address, A. WHETTON, Deddington, Oxford.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

A. Squibbs, Bridgewater.—*Photograph of Dennis James Heron, one of the Six Hundred in the Charge of the Light Brigade, Balaclava. Photograph of Balaclava soldier.*

Pollard Graham, Derby.—*Photograph of Derby County Football Team*, 1890-1.

Taylor & Hayden, Bishop Auckland.—*Photograph of Rev. G. R. Eden, Archdeacon of Canterbury and Bishop Designate of Dover.*

J. T. (Co. Galway).—So far as we can judge from the portion of print enclosed, the stain is owing to imperfect fixation.

ARCADY.—The use of the saving bank has been explained over and over again in former numbers, but not very recently.

J. SMALE.—The formula for Beach's developing solution is given on page 650 of the ALMANAC for the current year. It is the No. 2 formula.

A. C. R.—Copper plates suitable for etching upon may be obtained from Hughes & Kimber, West Harding-street, W.C., or from most dealers in printing materials.

PLODDER.—Study the articles on retouching, by Mr. Redmond Barrett, which have appeared in the current volume of the JOURNAL. These are the best articles that have appeared on the subject.

P. M.—From the data given it is impossible to form the slightest idea of the cause of failure. If the directions were closely followed, there should be no difficulty. Try again, and if you still fail, write again.

W. A.—The yellow patches are due to imperfect fixation, and it is very doubtful if they can now be removed. Try the effect of a fresh immersion in a strong solution of hyposulphite of soda, and give plenty of time.

P. MILLER (Birmingham).—The failure in making the relief is that too hard a kind of gelatine has been employed. The "X opaque" is not suitable for the work. Nelson's amber gelatine is what is generally employed for the purpose.

J. W. HATTON.—The ordinary *carte* and cabinet lenses are rapid enough for children's portraits in the studio. There is a quicker series of lenses than these, familiarly known as "baby lenses," but they are seldom used in these days of quick gelatine plates.

W. C. B.—If you can prove the agreement was made, although it was only verbal, we imagine it could be enforced in the County Court. An order could there be obtained for the production of the books. Perhaps you had better consult a respectable solicitor before taking action.

E. F. S. & Co.—We have received the specimens, which you ought to have returned to the aggrieved party, to whom we have forwarded them. You had no right to retain them, even though you did not consider them up to your requirement, especially after having been written to for their return.

W. SEARLE sends us some silver prints with the surface of the albumen full of cracks, caused by the pictures curling up so tightly while drying. He wants to know a remedy.—If the prints are allowed to dry between sheets of blotting paper, or blotting boards, they will then be kept flat whilst they dry, and cracking of the albumen will be avoided.

DADO inquires:—"1. If gelatine reliefs are covered by patent?—2. Is the Stannotype patent run out?—3. How are they made? Can I get a work on the subject, and where, and the price?"—In reply: 1. Gelatine reliefs are not covered by patent.—2. We are not sure.—3. The Stannotype process is described in Burton's work on *Photographic Printing Processes*, published by Marion & Co. We do not remember the price.

C. R. C. says: "I have had brought to me a number of lantern slides (plain and coloured) to make two more slides from each one. Not having done any before, what will be my way to get about it, without damaging the originals?"—First make negatives of the slides by copying them in the camera, by transmitted light, and then from them reproduce the slides. This may be done either in the camera or by printing by superposition.

PRINTER writes: "I have enclosed a carbon print, developed on collodionised glass, which has a number of cracks across the print like scratches. They show when they are put into water previous to mounting. If you could assist me as to what is the cause of the marks I shall feel greatly obliged."—The marks are due to cracks in the tissue. It appears to have been over-dried, which has caused it to curl up. Then, in uncurling it, the cracks were produced.

INQUIRER writes: "I am using a syrup barrel for holding the silver washings, and have used salt for precipitating the silver, but the fine precipitation has not taken place, owing, I think, to there being so much syrup in the water. I shall be much obliged if you can prescribe any remedy."—It is very doubtful if the syrup is the cause of the non-subsidence of the chloride, unless the cask contained a considerable quantity when it was taken into use. If a few ounces of nitric acid be poured in, and the contents of the barrel be stirred vigorously for a few minutes, the silver will probably settle to the bottom in the course of a few hours.

T. E. WOODHOUSE asks: "Will you kindly say where information may be obtained on the subject of pinhole photography, and whether any really good work can be done without a lens? I want some practical information as to distance between pinhole and plate, and average length of exposure. Any references to authorities on the subject will greatly oblige.—There are no authorities on the subject. Whether good pictures can or cannot be taken with pinhole in place of a lens depends upon one's idea of what constitutes a good picture. But one thing is evident, the sharpness obtained by a lens cannot be obtained with a pinhole. The plate may be *any* distance from the pinhole, and the exposure will be dependent upon that distance.

W. A. W.—Try the effect of again treating the negatives with the mercury solution. This will very likely bring them to the proper density. If, however, they are then too thin, apply a very dilute solution of ammonia. It is a very difficult matter to print a number of negatives, as a panorama, on a continuous slip of paper without showing the junctures. The best method of obtaining satisfactory prints will be to strip the negatives from the glass on to gelatine, and so obtain them in film form. They can then be joined in the manner directed in the article. Another plan, by which there is no risk run with the originals, is to reproduce the negatives on films. This, we believe, was the plan adopted with the panoramas to which you make reference.

B. W. puts the following queries: "1. In sensitising my own paper I often get the surface marbled like the enclosed piece. Sometimes the next sheet floated will be nearly or quite free from the marking. What is the reason?—2. Is the argentometer a reliable instrument for testing the strength of the solution? I am told it is not.—3. Is there any advantage in fuming the paper with ammonia before printing?"—Replies: 1. The marbled appearance is due to scum on the surface of the sensitising solution. This always forms if the solution is allowed to remain long in the dish after paper has been floated. The scum should be removed with a strip of blotting-paper before more paper is sensitised.—2. Theoretically, it is not, but it answers every purpose in practice.—3. Opinions are divided on the subject. In America it is very general to fume the paper. But in England the majority of printers do not consider the advantage gained (if any) worth the trouble involved.

T. H. T. writes as follows: "I am just making a new dark room, and should like your advice. The room is fourteen feet long. Would it also do for daylight enlarging? It has one window, facing west, about a yard square. What material would be best for glazing? Would yellow glass be more pleasant to work by than ruby, and would it be as non-actinic? If the room is not suitable for enlarging, I shall divide it, as I should not want so much space for development, &c."—The room will answer very well for both purposes. The best plan will be to get a wooden shutter made to block out the whole of the light. Then cut a hole in this—say, eighteen inches square—and fit to it a sliding sash, glazed with non-actinic glass. The sash can then be slid back to admit white light when the room is used for enlarging. yellow glass will do if it be of the right kind; but if orthochromatic plates be used, then the ruby will be the best.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, October 22, *Photographic Copyright*. October 29, First lantern night of the season; slide competition. November 5, Annual general meeting.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—October 23, *Preparation of Dry Plates*, by Mr. W. H. Prestwich. October 30, *Pictorial Definition*; adjourned discussion. Paper by Mr. W. E. Debenham.

WE have received from the Fry Manufacturing Company a sample developing dish they are bringing out. It consists of a wooden frame with a glass bottom centred in a rebate. A small pin at each side of the centre prevents the negative from adhering to the bottom of the dish.

"A MANIA FOR PHOTOGRAPHY."—In our issue of last week we recorded the theft of a lens. We now record the sequel. At the Highgate Police Court, Albert Edward Ewin, a City clerk, residing at Chiswick, was charged on Monday last with stealing a photographic lens, of the value of 85s., the property of Mr. Wray, of Laurel House, Highgate. The evidence showed that on the afternoon of the 30th ult., the prisoner went to the prosecutor's place of business at Highgate and purchased something of him. There was a lens upon the counter, and when the prisoner left it was gone. In consequence of an advertisement in a photographic journal, Detective-sergeant Masey went to the prisoner's home at Chiswick, and there saw the lens. He told him he should charge him with stealing it, and he then admitted the offence. "He had a mania for photography," his solicitor assured the Highgate magistrate, "and, being seized with a sudden temptation, was unable to resist it." The learned gentleman's appeal to the Bench to treat the young man leniently was strongly supported by Mr. Wray. It was of no avail. His worship, with the remark that enthusiasm did not justify a theft, sent him to jail for a month.

MODERN MECHANICAL PHOTOGRAPHIC PROCESSES.—Nothing in the wonderful history of photographic progress, which has been so strikingly rapid during the past few years, has been of greater importance than the development of what may be called, for want of a better term, the photo-mechanical processes, which are so largely superseding wood engraving, steel engraving, and other pictorial methods. This subject is of great interest to the whole public, but particularly to all persons in any way interested in the production or use of pictorial illustrations, such as artists, authors, publishers of books, magazines and newspapers, printers, and manufacturers whose products require illustration. For the past few years these processes have multiplied in number, have improved greatly in their results, and are every day assuming greater importance in both artistic and economical directions; yet it is a remarkable fact that in no exhibition have they been brought together for comparison and study. During the week beginning November 3, 1890, the New York Camera Club is to give an exhibition in its rooms, 314, Fifth-avenue, of the work of the various establishments producing all classes of photogravure, photo-engraving, photo-lithographic, and other mechanical photographic illustrations. Admission will be by cards of invitation, which will be sent as generally as possible to photographers, artists, authors, publishers, printers, manufacturers using illustrations, and in general to all persons likely to be interested in the subject. A pamphlet will be distributed at the exhibition containing an essay giving a sketch, historical and descriptive, of the different methods. A space, probably a page, will be set apart for each exhibitor, in which, on his own responsibility, he will be allowed to describe or recommend his process in his own way. No charge will be made for such insertion, and the pamphlets will be distributed free. Exhibits suitably framed and of proper character, subject to the approval of the Committee in charge of the exhibition, will be hung upon the walls. Other exhibits, whether in books, albums, or on cards, will be displayed upon tables for the examination of visitors. All frames must bear a neat label, which will be furnished by the Club, giving the name of the exhibitor, the process by which made, and the title or explanation of the pictures. All other exhibits must be properly marked for identification. There will be no charge whatever to exhibitors.

[We commend this for imitation to our home societies and clubs.—ED.]

OUR FORTHCOMING ALMANAC.—*The Editor will feel obliged if those friends who purpose contributing of their practical experience, research, or experiment to the* ALMANAC, *and, through it, to their brethren all over the world, would kindly send their articles or hints—no matter how brief—as early as possible, as it is the intention of the publishers to go to press early next month.*

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POSITIVES DIRECT IN THE CAMERA.

Colonel Waterhouse's recent investigations, which have resulted in the discovery of a simple means for producing a positive image on an ordinary gelatino-bromide film—whether on paper or glass—and by the usual exposure in the camera, seems not unlikely to be the first step towards something like a revolution in photography. Indeed, when we consider the remarkable results obtained by adding extremely small quantities of certain derivatives of carbamide (urea) to the developer, it is difficult to suppose that the tourist—and perhaps even the professional photographer—will long fail to take advantage of so ready a means of securing reversed action, especially as the positive first produced can obviously be used for making subsequent copies by the same method, just as a negative is now used. Indeed, there are at present several instances in which the photographer only requires one copy, and that copy a positive on paper, as, for example, when an original is wanted for the use of the engraver or phototype block maker; this latter generally preferring to receive from his customer rather a paper print than a negative. It must not be forgotten that a direct camera positive on paper or other opaque base will always be reversed unless some reflecting surface intervenes between the object and the sensitive film. In the old Daguerreotype days a right-angled prism was placed in front of the lens, an arrangement still occasionally employed by the ferrotype operator, while another reflecting arrangement for reversal—used mainly by those copyists who make reversed negatives for collotype and kindred processes—is a glass flat silvered on the face and set in front of the lens at an angle of forty-five degrees with its axis. Perhaps, however, the most convenient arrangement of all for general use is a lens in which one element of the combination virtually forms a right-angled prism—a sort of reversing objective which is now occasionally made by opticians—and we have no doubt that the general manufacture of instruments of this kind would soon follow any widespread use of a direct positive camera process. We may refer to a prismatic lens in our possession, as similar in general construction and dimensions to an eleven-inch rapid cemented combination, only the back glass of the front combination is really a right-angled prism, the two faces at right angles being worked to the required curves.

The prism or prismatic lens is not, however, an absolute essential to the working of a direct positive process in the camera, as the *transparent* celluloid film may be used (not the celluloid roughened or ground on one face), and the originals thus obtained will show like enamelled prints if the celluloid original is held or fastened face downwards on a card or on the stiff leaf of an album; at the same time, this original will always be available for the production of copies, not only by the gelatino-bromide reversal process, but also by such positive methods as the aniline method, the common blue process, or the primuline method to which we referred last week.

It is quite needless to recapitulate the older plans which have been proposed for securing the reversal of the gelatino-bromide image, and we think we are safe in saying that such of these as insure complete reversal involve long exposures or such complications and uncertainties in working as to put them outside the category of practical working methods—at any rate, for ordinary work in the camera. Waterhouse's method, on the other hand, involves no other variation from the usual routine than a simple addition to the developer, so that the final decision as to whether a negative or a positive shall be produced, may be left to the last. It is true that in some cases Colonel Waterhouse recommends a certain preliminary treatment of the plate, but this is not by any means essential. In the Photographic Society's Exhibition are two illustrations of Colonel Waterhouse's method, Nos. 527 and 528, being prints of intaglio plates from direct camera positives, and these are quite sufficient to show what results the method can give.

Just two years ago Professor Emerson Reynolds, F.R.S., of Dublin, a former associate-editor of The British Journal of Photography, communicated to the Chemical Society the result of some investigations regarding the action of thio-carbamide derivatives on silver haloids, experiments which throw so essential a light on Colonel Waterhouse's work that some mention of them is necessary. Carbamide or urea is a compound ammonia formed by replacing H_2 in two molecules of ammonia by the divalent radical carbonyl, CO. Thus, two molecules of ammonia may be represented for our present purpose as $N_2H_6H_2H_2$ and carbamide or urea will be represented as $N_2H_6H_2CO$, or more simply as N_2H_4CO. The corresponding body containing sulphur instead of oxygen, thio-carbamide or sulph-urea, N_2H_4CS, was long sought for by chemists as a missing link, and was discovered by Professor Reynolds many years since. In the paper communicated to the Chemical Society two years ago (*Journal of the Chemical Society*, November, 1888), Professor Reynolds describes a remarkable series of thio-carbamide derivatives, a typical example of which is tetra-thio-carbamide ammonium bromide, a body which has the composition of four molecules of thio-carbamide united to one molecule of ammonium bromide. Thus:—

$$(N_2H_4CS)_4H_4NBr.$$

An alcoholic solution of this body reacts in a remarkable way when an alcoholic solution of silver nitrate is gradually added

to its alcoholic solution, silver bromide being first thrown down, but afterwards this redissolves, and then a granular white precipitate is formed, this afterwards blackening from the formation of silver sulphide. Professor Reynolds next undertook a general examination of the relations of silver haloids to thio-carbamide, and it was found that thio-carbamide in solution directly unites with silver bromide, chloride, iodide, or cyanide, forming the following compounds :—

$(N_2H_4CS)_2AgBr.$
$(N_2H_4CS)AgBr.$
$(N_2H_4CS)_2AgCl.$
$(N_2H_4CS)AgI.$
$(N_2H_4CS)_2AgCN.$

The full paper on these bodies is, we are informed by Professor Reynolds, nearly ready, and will shortly be communicated to the Chemical Society; and he now informs us that the darkening action of thio-carbamides on silver compounds—due to the formation of silver sulphide—takes place most easily in alkaline solutions. With simple oxide of silver the following reaction takes place immediately :—

$$\underbrace{N_2H_4CS}_{\text{Thio-carbamide.}} + Ag_2O = Ag_2S + \underbrace{NHH(CN)}_{\text{Cyan-amide.}} + H_2O.$$

We now come to Colonel Waterhouse's experiments, as published in an article, the first part of which appears in our issue of September 19 last (page 601); and although in reference to the method Colonel Waterhouse's latest statement is that at present it "seems too uncertain to be considered thoroughly practical," our own experiments lead us to the hope that comparatively little experimental work may suffice to make the results as certain as is the case with most other photographic methods.

Of the two derivatives of thio-carbamide recommended by Colonel Waterhouse, our own experiments were made with a sample of allyl thio-carbamide prepared by Mr. T. W. Kirby, and which he has been good enough to send to us, this preparation being sold, as we understand, by Messrs M'Guffie & Co., chemists, of 24, Castle-street, Liverpool.

Having prepared a saturated solution in water of the crystals of thio-sinamine—to use the shortest of the several names by which allyl thio-carbamide is known—to each ounce of ordinary pyrogallic or eikonogen developers, we added from two to eight minims of the solution. Under these circumstances varying degrees of reversal resulted, ammonia appearing to be rather favourable to the reversal, and any considerable amount of bromide being evidently unfavourable. We failed to notice any advantage in giving more than a normal exposure; indeed, less than the normal exposure appears to be rather favourable than otherwise. This result is specially interesting, as to secure the best reversal by adding hyposulphite to the oxalate developer a long exposure is required—an exposure which may perhaps be estimated at over a hundred times the normal.

In Colonel Waterhouse's paper he recommends that in some cases the plates should be subjected to a bath of five per cent. nitric acid, or three per cent. bichromate of potash before exposure, followed by thorough rinsing; but in our hands the former treatment simply removed the film, and the latter appeared to have no effect, except to make the plates far less sensitive, and the results were better only to the extent that they could be made better, by reducing the exposure. There are, however, plates which will stand much stronger nitric acid than a five per cent. mixture.

There is a wide field for experiment in connexion with the method now touched upon, and although the best course for the present will probably be to thoroughly study the conditions under which the two agents described by Waterhouse will cause reversal with absolute certainty, it must not be forgotten that many analogous derivatives of thio-carbamide are known to chemists, and in turning to the third supplement of Watt's *Dictionary of Chemistry* (p. 396), we find described thio-carbamides containing ethyl, amyl, phenyl, benzyl, tolyl, naphthyl, tolylene, acetyl, benzoyl, and glycolyl.

WINTER WORK FOR AMATEURS.

In a recent article it was pointed out how professional photographers might materially increase their returns during the winter months in directions now frequently neglected. The present article is to indicate how the amateur may pursue his favourite pastime during the short and dark days of winter. By the term amateur is meant the *bonâ fide* amateur, who derives real enjoyment in the practice of the art in contradistinction to those who follow it simply because it is a fashion.

Amateur photographers can find plenty of work during the winter, much of which can be executed by artificial light quite as well as by daylight. Outdoor work, of course, will not be entirely suspended. Frost and snow effects will receive due attention. Many subjects that would not be worth a plate in summer will often make an excellent picture when covered with snow or hoar frost. Photographs of hoar frost form charming slides for the lantern. Flash-light photography will also give employment for the camera, as really very good portraits and group subjects can be taken by this source of illumination.

Lantern-slide making can as well be practised in winter as in summer, either by contact printing, or by reducing in the camera from larger negatives. In the latter case the negatives may be illuminated by a paraffin lamp, a gas flame, or by the combustion of a few inches of magnesium ribbon. With either source of light, two or three sheets of ground glass, placed an inch or so apart, should be interposed between the light and the negative, so as to secure equal illumination. Transparencies for window decoration will also receive attention. By making them in the camera they can be produced of any size, either enlarged or reduced, so as to fit any desired space or frame. Transparencies might well be utilised, wholely or in part, in place of stained-glass designs in leaden frames for suspending in windows.

Enlarging on bromide paper will also give employment for the long evenings. Most amateurs now possess lanterns, and this, of course, will be used by them for the purpose. But those who do not own one may produce enlargements with an ordinary camera that will be quite as good as any made with a lantern and condenser. The illumination in this case should be similar to that just referred to for camera printing, except that the light must be enclosed so that none reaches the paper during the exposure. A suitable arrangment can easily be extemporised with any old box or packing case, or, better still, with a large biscuit tin.

Contact printing on bromide or on chloride paper by development can always be carried on by artificial light. The exposure may be to a paraffin light, or to gas. The latter is preferable as being more constant. When it is used, the burner should be what is known as a "governor" burner. With this the light is maintained constant when the tap is full on, however much the pressure on the main may vary, and this it does considerably at different times of the day or evening. These burners cost a

shilling or eighteenpence each, and that outlay is soon saved in time and material from ill-timed exposures. In contact printing the exposure should always be made at a given and fixed distance from the light. When this system is regularly adopted, the correct exposure can be the better estimated, and more uniform results obtained. With very hard negatives it may, however, sometimes be an advantage to make the exposure pretty close to the light, but as a rule it is better to adhere to a fixed distance, and that not too near the light.

At the end of the season amateurs frequently find themselves in the possession of negatives that, in their then condition, will not produce satisfactory prints, although they may yet have some good qualities. For instance, they may be too thin or too dense, and, as is often the case, they will not yield sufficiently to the ordinary methods of intensification or reduction. Such plates need not be cast away, for good printing negatives may generally be obtained by reproducing them. This is profitable work for the winter season. Supposing the negative be too thin, a transparency is made, giving the minimum of exposure, and conducting the development so as to obtain the maximum of density. It is afterwards intensified. From this transparency the negative is reproduced under similar conditions. By this means a vigorous negative can be obtained from the most phantom-like image. If, on the contrary, the negative be too dense, then the proceeding in its reproduction must be just the reverse of the above. A full exposure must be given, and the density kept back in the development.

Here is another instance where an imperfection in a negative may be remedied by reproducing it. A negative is sometimes taken of a building with the camera tilted, and the swing-back not brought sufficiently into use, hence converging perpendiculars. This defect can, however, be perfectly cured by reproducing the negative. This must be done in the camera. The original is placed in the holder, and the back swung so that the top of the subject is brought nearer the lens than the bottom, a small stop being used to get all portions of the image into focus. A transparency is then made, and from it a negative. In regulating the amount of slope to obtain a correct result, it should be divided equally in making the transparency and the negative from it. That is, the correction should be divided between the two operations instead of being made all at once.

In consequence of the continually increasing price of platinum, suggestions have been made as to the possibility of utilising others of the rare metals for photographic purposes, iridium being most generally fixed upon. Mr Willis has spoken of the suitability of this metal; but as, even at the present high price of platinum, economy would lie with the latter, the suggested alteration would not be advantageous, and it is little likely to be employed. Taking the October list price of a firm of manufacturers of photographic chemicals, we note that the price of the oxide of iridium is about twice that of the oxide of gold; and there is every probability that if a sudden demand arose for it, iridium also would advance in price, after the alarming fashion of platinum. It is worthy of note that the metric standards recently distributed by the International Congress absorbed two-thirds of all the iridium in the world.

Before the Brussels Academy of Sciences, M. Emile Laurent read a paper, in which he stated that nitrate of potash was decomposed by the action of sunlight, a certain amount being reduced to nitrite. If nitrate of ammonia were similarly acted upon, it is possible that the reaction would have to be taken account of in explaining the action of light upon sensitised paper, as, of course, a perceptible amount of that salt must impregnate the paper from the decomposition of the chloride of ammonium, which forms the main ingredient in the salting of all popular commercial albumenised paper.

We have on previous occasions pointed out a probable cause of the want of success in treating waste hypo fixing solutions by sulphide of potassium to obtain the silver, in which it is quite as rich as are the "print washings" of silvered paper. This cause is the use of a decomposed sample of the salt in question, which unless very well secured from atmospheric contact quickly becomes useless. The rapidity with which sulphides absorb oxygen is so great that a process has recently been devised for absorbing oxygen from the air, for certain chemical purposes, by shaking it up with a solution of an alkaline sulphide. We may again, however, point out that it is quite easy to ascertain the precipitating power of any given specimen by breaking a piece and examining the fracture. The unchanged sulphide is a dark substance almost like pitch in appearance, but with a rich, dark, transparent, brown colour. If the colour always seen on the outside of lumps of sulphide of potassium—a pale, dirty, yellowish, opaque tint—penetrates to the centre of the piece, it is useless, and should be thrown away.

Should there be any difficulty in obtaining the sulphide at all, or in perfect condition, a solution may be advantageously extemporised by boiling together sulphur and caustic potash, in the proportion of three parts of the former to four of the latter, till the sulphur has disappeared.

An interesting paper on the constitution of the flue gases from gas stoves and gas burners was read at the last British Association meeting, and the facts stated conclusively show the need for causing the products of combustion to be conveyed away so as not to impregnate the atmosphere of close rooms, such as "dark rooms," which are often occupied for many hours together. In no gas flames whatever did the writer, Mr. Wm. Thompson, find complete combustion to take place; in fact, it was only in the flame of a paraffin oil lamp not turned to its highest point that perfect combustion was observed. An Argand burner came first in the list of gas burners, a little hydrogen only escaping unburnt in one experiment, while with an ordinary Bray flat-flame burner 11·12 per 1000 of carbon escaped unburnt, the Welsbach burner giving so much as 15·4 per 1000 of unburnt carbon. Several heating stoves were examined, and here from ten to twelve per cent. of carbon escaped unconsumed. The products of perfect combustion themselves are injurious, and when to them is added the unburnt gas thus described, it is evident that to use a gas stove and allow the products of combustion to spread and mingle in the atmosphere of an inhabited close room is most dangerous to health.

Some remarkable experiments upon the behaviour of liquid chlorine have been made, and the results published in the current number of *Liebig's Annalen*, from which we extract the following point of interest. The sensibility to light of chemical mixtures of chlorine and silver does not need to be more than adverted to, and it is curious to note that the liquid chlorine is perfectly opaque to those rays most active in the decomposition, the blue and violet portions of spectrum; it absorbs them completely. (We may here interpolate the fact, recently published, that pure aldehyd undiluted absorbs nearly the whole of the ultra-violet rays.) Liquid chlorine is now employed for manufacturing purposes, and can be purchased like carbonic oxide and sulphurous anhydride, and it follows the action of other liquefied gases in the enormous expansion it suffers by heat. At certain temperatures it expands more even than do uncondensed gases; its volume would be doubled, while such liquids as water would not increase more than a few units per cent.

PHOTOGRAPHIC SOCIETY'S EXHIBITION.—III.

Alex. Keighley (No. 6), *A Thorn in the Foot*.—The photographs by this exhibitor are slightly disappointing, the subject matter not being quite what we expected; when compared with those of last year, this study is very good, as far as it can be, but there are some realisms in photography which do not repay the thought spent upon

them. Here we have a boy sitting down in a well-chosen spot looking for the thorn—a subject painful both to the sufferer and to the looker-on, but all the detail very carefully considered and well executed. We turn to No. 214, *Springtime*.—An exceedingly well-chosen bit of picturesque foreground with distance, with three children gathering something out of the hedge. This is a good subject, and well selected for the purpose; the dark dresses of the children have been well placed to assist in the strongest position of the picture, which, with the gradation of the extreme distant hills, show an artistic perception of a high order.

W. R. Cassels (No. 13), *Studies*.—Three studies of heads, very carefully treated, being about five inches in height, the centre head being the best. There is none of that persistent introduction of dark shades and shadows, which in too many modern portraits assume an affectation of something very good. In No. 280 are three studies of an actress, where the white draperies are very soft, and the faces equally so. Again, we have in No. 340 a composition where two girls are indulging in the pleasures of a *Sad Story*. The picture is full of detail, but in the composition the models have been placed a little too much towards the lower part of the picture, otherwise the picture is very good and nicely photographed.

F. Beasley (No. 13), *A Cottage at Pangbourne*.—This is the only picture shown by this exhibitor, and is a very good example of correctness in everything; no departure from any one formula, the result being, as far as the subject would permit, a most careful rendering of that which is always pleasing to look at; but there is just one little matter which has been overlooked—we allude to the very white sky. Now if this had been reduced in vivacity this picture would have been made more valuable.

Ralph W. Robinson, No. 44, and twenty-four consecutive studies of Royal Academy painters.—These photographs form a continuation of those shown last year, and are exceedingly interesting, as so many can now become acquainted with the *personnel* of the modern successful painters, sculptors, and others. Many difficulties must have been encountered in these interesting portraits, which reflect great credit upon the photographer, who shows a capacity for the right treatment of the different phases of artistic talent which these studies so clearly evince. Then we have a quantity of other subjects, all showing the industry and perseverance which aims at the study of all kinds of pictorial photography, from ordinary portrait work to figure studies. This is an outcome which many might well follow. Possibly some of these exhibits might have been kept back; but they all show a very promising capacity for studying picture-making by photographic means.

G. Davison (No. 54 and 56).—Two large views about 19 × 12 inches, where the same mystic character pervades the results as alluded to in the medal picture by the same exhibitor. The subject matter has been well chosen, the points of view well considered, and then chaos has come. There is also a smaller series, Nos. 289 to 298, consisting of some really well-selected points of view, the subjects being sea-coast and inland studies. Many of these years ago would have been considered far from complimentary to the scientific side of photography. Where will it end? As it is comparatively easy to arrange the lenses so as to produce like results, it is to be hoped, therefore, that this treatment will not become universal. These particular exhibits possess the glamour of well-selected points of view, and, if treated in the orthodox way, might have afforded a very large amount of pleasure.

Lyddell Sawyer (No. 107), *Crewel* (cruel) *Work*.—This prolific exhibitor, whose productions arrest our attention everywhere in the Gallery, and who seems to be able to get something out of comparatively nothing, exercises his artistic faculty upon all kinds of subjects. His bits of old dwellings, his views of moving vessels, and his studies of figure subjects, all show a very versatile capacity for picture-making on an extensive scale. One photograph, No. 107, we select for notice, as it looks like a scene from a comedy. One lady is sitting down engaged in crewel work, another is leaning on the back of her chair, whilst at a little distance sits a gentleman visitor, who probably has just come in for five-o'clock tea. The desolation of his position, with the awkwardness of his feet, have been very well designed, and, in fact, assumes the acting of a domestic comedy. The girl at the back of the chair seems to be enjoying the poor fellow's bashfulness. Objection might be taken to some of the background arrangements; for instance, the line of a curtain: still, on the whole, the subject has been well considered, and a very successful picture has been the result. There is another picture, No. 324, *The Smoky Tyne*, which is very picturesque, although made up from materials which are commonplace—a number of waterside factories, with a steamboat coming right on ahead. Now the point to be noticed in this picture is the selection of the right moment when the smoke from the various sources had assumed a picturesque arrangement, and then science does the rest. There are a few more very good studies, but sufficient have been noticed to show that good results can be obtained from unpromising materials when artistic perception has been brought into action.

Francis Cobb (Nos. 112, 113)—Two sea-coast views at St. Margaret's Bay, both very nicely chosen for realistic production, where the clouds, which evidently have been kept very subdued in the printing, possess one valuable quality. They retire just a little too much, but this is a small matter, which can be condoned when we consider the very nice way in which both distant and near objects have been so carefully attended to.

Paul Lange (Nos. 132, 133), *Hoar-Frost Scenes*.—Two very pretty pictures, where the points of view have been well chosen, each having in front effective bits of detail, where the hoar frost is more pronounced, whilst the background consists of very carefully chosen picturesque trees, also clearly well rendered. These studies constitute exceedingly good specimens of photographic loyalty, the result being most effective and pleasing. No. 645, by the same exhibitor, consists of twelve small views taken whilst on a *Tour in Norway*; possibly there may have been difficulties in choosing points of view, the result being somewhat disappointing in pictorial result.

A. R. Dresser (Nos. 143, 144), *Corbière Rocks*.—These photographs are bromide enlargements from the exhibitor's negatives, and very successful they are, both in the chosen points of view, and in the treatment of the same. The possibly small originals must have contained a large amount of carefully manipulated detail to have furnished such good results, which are so suggestive from their vivid reality of the incessant roar and turmoil of the restless waters.

T. M. Brownrigg (No 147), *An Arab and his Daughter*.—This is by far the best study which this prolific amateur has yet produced. The arrangement of the two figures, and the treatment of the white draperies, are alike deserving of much praise. We picture to ourselves what the Arab is like when at home; here we have the reality pictorially before us, and very instructive is the study. There are other photographs on the walls. No. 249, *Corridor, Alhambra*.—This is a picture of a totally different character, where a number of receding archways, full of the elaborate details of the Moorish palace, have been most carefully photographed, and the beautiful, although somewhat faded, colouring very nicely rendered. Some of the other studies are also carefully done, but need not be further alluded to.

Miss W. P. Arnot (No. 169), *Irene*.—This is a carefu study of model in white drapery, which has been exceedingly we rendered, the photograph being about 24 × 12 inches taken direct, whilst the attitude—that of sitting with both hands clasped on one knee, which is resting on the other—is suggestive of deep thought. This is a bold attempt at a classical study, which is rather successful; albeit, the attitude, or rather the particular view of the same, might have been benefited by a slight change from the too upright outlines of the drapery. No. 209, *The Eastern Cupbearer*, is another good study, where again white drapery has been carefully arranged, but in thi photograph the face is too deep in tone; however, the whole picture, which is the same size as the previous one alluded to, shows much study and great care in a successful attempt to idealise photographic studies of existing models for antique personalities.

John E. Austin (No. 178), *Chaff*.—We have already noticed the medal picture of this exhibitor, who has several other studies all nearly equal in merit. These pictures show an artistic capacity which is most pleasing to see in connexion with photographic rendering. *Chaff* consists in two fisher-girls poking their fun at a fisherman who is passing; the pose of the girls is excellent, and the story is understood at once. The three figures have been carefully assisted in the pictorial composition by an arrangement of the fisherman's tackle, as also by the position of a basket on the shoulders of one of the girls. The

background retires, giving force to the figures. Although a small photograph, it is large in thought and treatment. Many others show equal thought, especially No. 220, *Entangled*. A sailor and a girl, posed very nicely, are sitting on some rising ground on the seaside. He is clearing some rope which has got entangled, at the same time becoming entangled himself by the charms of the lass reposing by his side. All these photographs are exceedingly good, and promise well for the future.

S. Bourne (No. 191), *Gems of the Lake*.—This is one picture of a series, all taken in the same locality, all very carefully manipulated, and almost all similar, in having the lake line running straight through each view. This causes each picture to be somewhat like the others; a certain monotony of effect is the result, which slackens the attention to the rest. There are some departures from this treatment which show much more taste in the selection, and, as a result, assume at once a more pictorial value. These photographs are carefully executed, and if the points of view had been different, would have formed a good series of the lake gems.

Lionel E. Westropp (No. 265), *Elmley Castle Church*.—This photograph is taken direct, about 15 × 12 inches, and is a very good study of the interior. All the detail has been very carefully attended to, and no apparent halation from the distant stained-glass window. No. 267, an exterior view of the church. This forms a picturesque bit, where trees (without foliage) assist the same. These photographs, with two others, have been printed in silver, and are amongst the very few specimens in this year's exhibition of a nearly extinct process. They show the salient points of the old process, where a larger scale of tones was the prevailing outcome.

Arthur Burchett (No. 279), *La Belle Bretonne*.—This is a very good photograph, where the manipulation has been carefully attended to, the subject being a three-quarter figure of a young girl, with hands gently touching each other, and with a closed "bascuit" nicely arranged on the arm. This is a very good specimen of careful attention to all that which makes a good photograph, where the balance of light and dark portions have also been well cared for, the result being a simple but very good study.

Matthew Whiting (No. 313), *Country Rambles*.—Six small pictures of very pretty country cottages, containing the same amount of careful work which we look for from this exhibitor. Nos. 314, 315, *Lowestoft*, are also by the same hand, also very carefully done. But year after year, what with the same rather small size, and the same style of frame, we become somewhat restless, and could wish to see the same good work bestowed upon some different sizes, and a bolder method of treatment; but as this year the prevailing size leans towards small work, possibly a change in that respect all through the lines will follow.

W. J. Byrne (No. 424), *At Home Portraits*.—This frame of fifteen portraits, taken at the residences of the sitters, contain some of the best work which this exhibition has done. There is the absence of heavy shadows on many of the faces, which is very pleasant to see, and the delicate manipulation of the white draperies of the ladies is very tender and refined. There is a vast amount of naturalness about these exhibits which conveys a sense of truthfulness not always connected with work done in the studio. No. 660, by the same exhibitor, contains also "at home" portraits of gentlemen, but in many of these the shadows and half tones of the faces are too powerful, and must suggest another source of lighting, as it is hardly possible that we should ever see the originals at their own residences under conditions of light which produced such violent and inharmonious contrasts of effect. No. 317 is a frame with portraits of children, where, probably from the shortness of the exposure, the white portions are not so delicate in detail as in the "at home" series, these children having been photographed in the studio. Here, again, are some dark portions which cannot be true records of the half tones seen in the studio. This tendency for exaggerated effects in black and white will never raise photographic portraiture to its highest standard; the aim should be to make the face prominent by its being that part upon which the eyes must be compelled to look, and not upon far-away objects.

We have been somewhat startled by the discovery of an error in our review in last week's issue which requires correction. By some cerebral process of mental development, we find that the word "zebra" has wrongly been attached to the notice of No. 347, which in the catalogue has no title. The *Zebra* is really by another exhibitor.

STEREOSCOPIC PHOTOGRAPHY.

[Read at a meeting of the London and Provincial Photographic Association.]

When your Hon. Secretary wrote me a few days ago asking me to fill up this evening with the subject of stereoscopic photography, I began seriously to consider how far it was in my power to add anything to the existing knowledge of the members, seeing that so many might be present who, as old workers would know far more than I, have comparatively recently taken up the branch and worked it entirely upon my own ideas. At the same time, I reflected that a very considerable number, whatever they may have read or otherwise learned about stereoscopic photography, had never produced a slide. It is those to whom I would more particularly address myself to-night, and endeavour to show that there is nothing mysterious in the process, and that it is in the power of all (with a suitable camera) to make these twin pictures with but a trifling, and in some cases *no* addition to their ordinary outfit.

I will not detain you long with the optics of the stereoscope, but I would like to explain its general construction. It is an instrument by means of which the pictures are presented to the eyes under practically the same conditions as those which obtain when we look upon the natural scene with binocular vision. That the instrument itself is not necessary to enable many to combine the views is a well-known fact, the conditions being that the optic axes shall be so directed that the right eye sees the right-hand picture (on the mount), and the left eye the left picture.

It is an unfortunate fact that the stereoscope has fallen away so much in popular estimation. Many attempts have been made to resuscitate it, but so far I do not see anything like a permanent revival; and it is very rarely indeed that one sees a pair of lenses in use by an amateur. This leads me to ask how it is that with all the advantages which the gelatine plate offers, this beautiful department of photography is so neglected? The subject has been written upon considerably of late years, and a series of articles is at the present moment appearing in The British Journal of Photography. To the modern form of camera with its tapering bellows must be attributed a share of the blame, inasmuch as a pair of lenses cannot be mounted upon the front board of such a one. To the possessor of a camera of square form of half-plate or larger size, the only addition necessary is a central division to prevent the fields of the two lenses interfering with each other. I have mentioned a "pair of lenses" above as being the usual method of working, and show such a pair of the single meniscus form of four and a quarter inches focus which I generally use; but when I started to take stereoscopic views I employed the one-lens arrangement, which I will now describe, as it is quite as efficient as the first-mentioned plan. The sliding cross front carrying the lens is first pushed to one of its extreme positions, the view focussed, &c., going through the usual routine. After exposure and recapping the lens, all that you have to do is to pass the lens over to the other extreme position and again expose. This system of working has the advantage over the special pair of lenses, inasmuch as any lens already in your possession from, say, four inches to seven or eight inches focus may be used. Of course, there is the drawback that objects may have moved during the time between the exposures, but many subjects may be taken by this method when other means are not available; indeed, the movement of small objects, such as persons walking about in a street scene, is not of the importance that might be supposed, many of the older slides being taken by the one-lens arrangement as above, examples of which I produce.

Premising that a half-plate camera will be the size most used at the present time to produce stereoscopes, it becomes a matter of importance to determine the best separation of the lenses (and consequent distance, centre to centre, of the pictures on the negative), because a very small margin exists in the length of 6½ inches (that of a half-plate) from which to cut two pictures, each 2¾ inches wide, after making allowance for the rebate of the slide at each end and the division in the middle. I find that 3¼ inches is about right; with any material departure from this distance there will be a difficulty in getting the same subject on each side, and still keeping the right width of picture.

As to the matter of exposure, it goes without saying that it must be equal for each lens, and the diaphragms rigidly exact in size. The older stereoscopic pairs were frequently furnished with a double flap-shutter, opened and closed by hand, and this, no doubt, was efficient. Personally, I prefer the double cap for time exposures (and I have attempted none others), and experience no difficulty in removing and replacing it without shaking the camera.

Those possessing a 5 × 4 or quarter-plate camera and outfit can practise stereoscopy without any addition at all to their ordinary appliances, the only departure in working being to take one view as usual, then to move the camera legs, one at a time, to the new

position of three inches, or more to the right or left, and make the other exposure, taking care that the camera is maintained fairly level and pointed to the object. The development of both plates should take place on the same dish.

My remark, as above, concerning the lateral movement of three inches *or more* reminds me that in a class of views in which there is no immediate foreground, such as one finds in mountainous localities, and where the main objects are at a considerable distance, the points of sight for the two halves may be at a distance many multiples of three inches without producing exaggerated effects, which would certainly result if the same distance was used when objects are close at hand. If this were attempted in the latter case, everything in front would appear more or less drawn out in depth; that is, a tree stem, instead of being round, would assume an oval form with the longer axis pointing towards the spectator.

I now wish to draw your attention to the reason why it is necessary to have the two halves as they appear on the negative reversed in mounting the prints. This point has often been explained, but many do not seem to master the cause for it. It is found to be necessary on account of the inverted projection of the lens upon the focussing screen, and consequently upon the plate; the lenses invert their images in each half of the camera, *i.e.*, each picture makes a half revolution *around its own centre*; consequently, when the print comes from the negative, and is then held right way up, the half which was exposed in the right side of the camera will be found upon the left side of the print, and *vice versâ*, thus necessitating either the cutting of the negative or the print, the latter being usually the more convenient. There is an old method of printing by which neither negative nor print need be divided. The cause which originally obliges us to reverse the prints when printing by contact is ingeniously taken advantage of when copying with lenses in the camera in making transparencies, when by a second optical inversion the original positions come back again correctly without further manipulation.

In order to show distinctly the difference between a reversed and a non-reversed print, I have made (for the purpose of this paper) a wire model of a pentagonal prism, photographed it as usual, and mounted the prints, one reversed, the other not, when the different appearance in the stereoscope is most marked, the unchanged one appearing as if turned inside out as it were—an effect which has received the name "pseudoscopic," or false sight. The same thing takes place in an uncut print, but the eye is deceived by the physical impossibility of certain objects in the view which we know to be behind, something else appearing in front of them.

In the early days of the stereoscope, before the advent of practical photography, the objects principally in use were figures, such as can be projected in the ordinary way from two views of an object in geometrical drawing, a difference being made in the two figures by slightly altering the angle of projection, their appearance being somewhat similar to the slide of the prism already shown you; but you will understand they were not photographs, but printed as white lines on a black ground. It is possible that some one may have specimens here to-night.

When photography came to the front, it was very soon seen that pictures for the stereoscope were now possible, which before could not be produced, or at least only done in a very imperfect manner, owing to the minute difference existing in the two halves, and which it was well-nigh impossible to imitate by hand engraving. The result of this popularity was that the stereoscope was rapidly vulgarised, all sorts of objectionable slides were introduced, and this, coupled with bad mounting, either through carelessness or ignorance—the two halves in some cases possibly having been printed from the same negatives when, of course, no proper effect could be obtained—all these combined to bring into discredit a most charming optical instrument.

I will conclude my paper by saying a few words upon the subject of mounting the prints. Although not absolutely necessary, still it is advisable to so cut them that a trifling amount more of the subject appears on the two middle margins than on the outermost ones, as mounted on the cards—about one-sixteenth of an inch is sufficient. The reason for so doing is that the picture will seem, when viewed stereoscopically, to recede behind the mount in much the same manner as if it were looked at through a window or similar aperture. The height of the prints may be left without limit when using the open instrument, but must be of such height for the old box form as will pass through it.

Levelling the camera in the cross direction when focussing will be found of great advantage when cutting the prints (before separation), because if the base and sky lines are made to pass through the same object in each of the prints, we then know that they are each in a vertical position.

I have by no means exhausted my subject, but trust that what I have said may induce some of our members to join the ranks of stereoscopic photography. Thanking you for your attention, I beg to leave the subject in the hands of the meeting for discussion.

G. W. Atkins.

THE PREPARATION AND USE OF PLAIN PAPER.

To me this paper is the most artistic of silver prints. It is not only artistic, but costs little to prepare it, both of time and money, and gives the most satisfactory results. By following closely the method given below, no one need go astray in its preparation. I have had such good results in my experiments that I recommend every amateur to try it, as it can be prepared in a very short space of time and with little expense. It is far from the lost art, as some are wont to claim, as some prints that are now before me show that brilliancy and softness in a high degree can be obtained.

One of the advantages of plain paper is its tendency to reproduce the finest detail, and to retain it during the subsequent toning and fixing. There have been many different formulæ given for its preparation, and after exhausting a number of them, I have finally settled on the method given below, which has given me the best results. Let us first consider the things necessary for its preparation.

1st. *The Paper.*—While any kind of good strong white paper can be used, each giving a result peculiar to itself, I claim that it is economy to use the Saxe paper, which is easily procured at any photographic supply house.

2nd. *The Sizing.* — Almost all formulæ advise gelatine, and while that will give excellent results, I have so much better success with albumen that I give it preference, as it gives clearer lights, and is much easier to coat.

My formula and manipulations are as follows:—

The Salting Bath.

Albumen	1 ounce.
Water	16 ounces.

Place in a bottle with some broken glass and shake vigorously until all the flocculent matter is thoroughly cut up, then add ten grains of chloride of ammonia to every ounce of solution, and after shaking well, strain through two thicknesses of fine muslin. This salting bath, although simple, will yield the best results. It will tone quickly and easily with but very little gold. With this bath a beautiful neutral tone can easily be obtained; or, in fact, any tone from a dark sepia to a positive black.

After filtering, pour your solution in a tray large enough for the sheets that you intend to coat, being careful to remove all air bubbles. Now immerse the sheet in the solution for one minute, then draw out quickly by two corners and hang up by means of a clip to dry. After it has thoroughly dried, float the right side of the paper on the solution for two minutes.

The paper has a "right" and a "wrong" side, which can easily be distinguished after the first bath by the grain of the paper, the smooth side being the right one to float the second time. Now hang up to dry again in the same manner as before. You can salt any quantity of the paper, as it keeps indefinitely if kept in a dry place.

The Sensitising Bath

should be an ordinary neutral bath, fifty grains to the ounce, and kept neutral by the addition of silver carbonate; it is prepared as follows: Take the amount of water that you wish for the bath (I use about ten ounces) and add silver nitrate until an "actinometer" shows it to be fifty grains to the ounce. Neutralise by adding enough of a saturated solution of carbonate of soda to form a slight precipitate (about ten or fifteen drops). The precipitate which is produced should be left in the bottle. Shake well, and after the bath has settled it is ready for use. You can either filter or decant the clear solution into your silvering tray.

Float the paper three minutes on this solution, using the same precautions as when floating albumen paper, being careful not to get any of the solution on the back of the paper.

It is a good plan to place one end of the paper on the bath first, then lower carefully until the entire sheet is in perfect contact with the bath, this will force any bubbles, should there be any, from under the sheet. While the sheet is in contact, raise the corners separately to see if there are any; if so, they should be broken with the finger or a glass rod.

The sensitising bath should be tested from time to time and kept up to the required strength by the addition of fresh nitrate of silver. It will be neutral as long as there is any excess of carbonate of silver in the bath.

After sensitising, dry the paper thoroughly and keep in a dark, dry place. If kept in a perfectly dry state it will keep for several days, but when it can be, it should be used at once to insure the best results. The sensitising operations may be safely carried on by lamp light.

Printing.

The best results are obtained by fuming the paper for twenty minutes over ammonia, after which expose the same as albumen paper. After fuming, the paper is extremely sensitive, and had better be exposed in diffused light, unless the negative is very dense. It is better to print somewhat deeper than you care to have the finished print, as it loses density during the toning and fixing.

The Toning Bath.

Make up a stock solution as follows:—

Water	7½ ounces.
Chloride of gold and sodium	15 grains.

Take one half ounce of this solution and immerse a piece of litmus paper in it, which will turn red; now add, gradually, enough of a saturated solution of bi-carbonate of soda to restore the litmus to its original colour; now to twenty-four ounces of filtered water add the neutralised gold, and a very small pinch of chloride of sodium (common table salt), stir thoroughly, and your bath is ready. For simplicity and excellence this cannot be surpassed.

The quantity given is ample to tone one dozen 5×8 prints. It can be strengthened from time to time by adding gold from the stock solution, being careful to neutralise it each time.

After washing the prints in two changes of water, they are immersed one at a time in the toning bath: a dozen or more can be toned at the same time if you are careful to keep them in motion by changing them during the process of toning. Leave them in this bath until they assume a deep purple; if fixed at this stage the result will be a warm sepia, which will dry out a neutral tone; do not carry the toning until the prints lose their brilliancy. Generally about fifteen minutes is ample, but will vary according to the temperature and amount of gold in the bath.

Prints fixed without toning give a very artistic and pretty effect, producing a result not unlike a photogravure in tone and general effect.

The Fixing Bath.

The prints are fixed in—

Hyposulphite of soda	1 ounce,
Water	8 ounces,

for fifteen minutes. They should then be washed in running water for two hours.

After drying, trim, then lay them one on the other, and place a heavy weight on them overnight, the next morning the prints will be perfectly flat. Now procure some heavy, stiff, white paper, about the same as that used for the illustrations of the *Times*, and have it cut large enough to allow a good margin when mounted; for example, a 9×11 mount for a 5×8 print. Mount by simply sticking the corners.

I have tried in as clear and concise a manner as possible to describe my process, and am confident that if the foregoing is carefully followed out, success will attend the effort.

—*Photographic Times.* W. S. Waterbury.

ALPHA LANTERN PLATES.

The instructions given for working these plates are decidedly concise and simple, and as in addition the latitude of exposure is very considerable, it is not difficult to see how they came so readily to the front on their introduction last season. This very latitude of exposure, however, carries with it what may be considered by some people a slight drawback. Thus, under any given negative any exposure varying from one to three minutes will give perfect slides, all of the same depth, but of varying colours. It is evident, therefore, as colour is so purely a matter of taste, that many slides will run the risk of rejection at the hands of their maker, owing to that person's predilection for some special tint. Again, the colour of a slide needs adaptation to the subject, or at least that picture is best shown where painted in a colour that is somewhat in harmony with the original of the picture.

With these two points in view, I have thought that the record of some experiments I have made in regard to the colours resulting from different exposures, and their subsequent modification by toning, would be of more than ordinary interest to many, and would specially help those who, wanting variety, had little or nothing in the Ilford Company's instructions to guide them.

My experiments were directed to find—

1st. The limits of exposure.
2nd. The colours resulting from the several exposures within those limits.
3rd. How those colours were severally modified by fixing or combined toning and fixing.

The negative used was of average density and quality, and from experiments made at other times, I may say that though the character of the negative used might to some slight extent influence results, it would not in any degree nullify the general principles shown.

With the negative in question, it was found that the 75 seconds and the 180 seconds were the utmost limits of exposure, but I need scarcely point out that this shows a very wide latitude. This is a natural result of the low degree of rapidity of the emulsion, and must tend to reduce the waste usually arising from errors in exposure.

My mode of procedure was as follows:—Five plates were exposed under the same negative and conditions of light for the time shown. These plates, after development, which was done in one dish, were each cut in six pieces. No. 1 piece of each was fixed only, and the remaining pieces were put into the Alpha combined bath and withdrawn at regular intervals. The colours obtained are given in the following tabulated form, and speak for themselves:—

How Treated, and Resulting Colours.

No. of Plate.	Exposure given.	Image appeared in	Image completed in	Fixed in hypo only.	Time in Combined Bath. 7 min.	15 min.	25 min.	30–35 m.	35–40 m.	Remarks.
1	sec. 75	min. 2	min. 6	Olive green.	Cold brown.	Cold purple brown.	Purple black.	Black.	Blue.	The blacks and blues are of slightly varying shades, and appear somewhat irregularly as to time.
2	90	11	5	Do.	Warm brown.	Cold purple.	Do.	Do.	Do.	
3	110	1	3	Cold brown.	Do.	Photographic purple.	Do.	Do.	Do.	
4	130	1	2½	Brown.	Reddish brown.	Warm do.	Dark purple.	Do.	Do.	
5	180	8	8	Yellowish Red.	Red.	Do.	Do.	Do.	Do.	

A few obvious deductions may be made from this table. 110 to 130 seconds may be called the normal exposure. With this exposure the image begins to appear in about one minute from time developer is poured on. With this exposure a most satisfactory coloured image is obtained by simply fixing in the hypo bath.

The greatest latitude of exposure lies in the warm tones, there being only 35 seconds between the shortest exposure and the cold brown, against 70 seconds between this and the longest exposure; therefore, it is well in cases of doubt to err on the side of over-exposure, as there is less risk in so doing. The Ilford formula says, "Warm tones are the result of long exposures." The table shows that the actual order of colour in proportion to length of exposure is as follows:—

Greenish black.
Olive green.
Cold brown.
Brown.
Reddish brown.
Red.
Yellowish red.

Knowing this, it is evident that it can at once be seen on looking at any slide whether it is over or under-exposed, or whether, to obtain any desired colour in the next exposure, it is necessary to prolong or shorten it.

I have written of shortest and longest exposures, and wish to define these as the shortest and longest that can be given *with safety*. Beyond a certain limit general fog will result, whether it be green fog from under, or yellow from over-exposure.

Further, one or two general remarks, not to be gleaned from the table, but which were at once suggested by observation during the course of the experiments.

An under-exposed slide gives a vigorous image with difficulty and only after long development; and if this is carried too far, fog results.

With normal exposures the image comes up steadily and boldly, and, after the correct density is obtained, the colour of the image begins to grow more green, as if it were somewhat under-exposed.

Over-exposures flash up and are thin, and must be stopped before they reach the full density required, as the image grows considerably for a minute or so after it is put in the washing water. This continuing action is present in all cases, but is not, of course, so appreciable in the lower range of exposures.

The developer can be used for two or three plates, but it must be remembered that its action becomes weaker each time it is used, and this will make the second or third plates seem as if they had had shorter exposures. If after developing one or more plates the solution should be at all discoloured, discard it at once or stains will occur. It will be scarcely necessary to say that this slower action of a once-used developer may be utilised to save what would otherwise be a fatally over-exposed plate.

Dishes which have had in them pyro, hypo, or anything other than the developer used, should be avoided absolutely, and speaking generally the utmost care as to cleanliness must be used. A stained negative may, and often does, produce a good print, but a stained slide is a dismal failure, which even that favourite title, "A Misty Morning," cannot save from condemnation. It is somewhat difficult to tell which is the coated side of an Alpha plate, as the emulsion is so transparent, but if you remember that the plates are packed film to film, in pairs, the slide wanted is readily known; if not, a very slight scratch with a pin at the extreme corner reveals the film at once. A piece of opal used as a reflector behind the flame will shorten the exposure by twenty-five per cent.

If a slide has been much over-developed, it can be reduced by immersion in the following bath before fixing:—

Alum	1	ounce (avoirdupois).
Citric acid	¼	„ „
Warm water	2	ounces.

Use when cold, then well wash and treat as usual.

It has been thought that Alpha plates are too slow for reduction in the camera, but I have found that with good diffused daylight, reflected by a sheet of white paper, a whole-plate negative can be reduced to the regulation 3¼ square inches in a few minutes.

Toning.—The formula used, and the one best suited to the plates, is the combined fixing and toning bath recommended for use with the Alpha paper:—

Water	10	ounces.
Hypo	2½	„ (avoirdupois.)
Acetate of soda	½	ounce „
Sulphocyanide of ammonium	¼	„ „
Chloride of gold	4	grains.

This is used instead of a plain hypo solution, and therefore toning does not entail the use of an extra bath as in the case of albumenised paper. This bath can also be used, if desired, after the slide has been fixed in the ordinary way, if the colour is not an acceptable one, or a slide can be retoned in this bath at any time, either whilst still wet, or weeks or months afterwards.

Practically, there is little or no loss of depth of image in the toning bath, unless in the case of considerable over-exposure, and in this case the loss is due to the longer time taken in reaching the purple stage; but whilst the image is not quite so brilliant, owing to the original over-exposure, the purple tone is more intense. Toning proceeds more regularly and more promptly in the medium exposures.

The greens are slow to move in the toning bath, browns give the greatest range of colours most readily, and blacks are only to be had by carefully watching the toning, withdrawing the slides just as they pass out of the photographic purple into the blue stage. The truest black is obtained from the cold browns.

One more point, and then I have put on record all the lessons I have learnt from my recent working with Alpha plates. Slides always dry colder in tone and a little denser in image than they appear when wet, and this must be allowed for in stopping the toning, when any special colour is aimed at. To obtain a correct idea of this difference in colour between a dry and wet slide, it is instructive to look carefully at a plate whilst it is half dry.

Of the methods of printing by contact or reduction, of mounting, of the requisites of a good slide, and of the utility, benefit, and pleasure to be derived from lantern work I will not write, as these things are beyond my purpose. I wished to give some assistance in the actual manipulations to those (and they are many) who, like myself, admire the warmth, range of tone, and clear brilliancy which Alpha plates give.

In conclusion, I lament that so many workers rest content with the lantern-sized plate when doing transparency work, for, to my taste, no other process yields such beautiful results, and a large transparency mounted in the leaded frames now obtainable is the perfection of any picture we can produce by photographic means. JOHN HOWSON.

A LARGE PHOTOGRAPHIC CONCERN.

THE fraternity will read with some interest the following account given by the *Rochester* (N.Y.) *Morning Herald* of the 1st inst. of the Eastman Company's new buildings in that busy manufacturing city. There are already large factories in the United States devoted to the photographic industry, but none approaching the magnitude of this one.

"Ground will be broken this morning for three new buildings to be erected by the Eastman Company on the tract recently purchased by it on the west side of the boulevard, just outside the city limits. These buildings will cost, when finished and completely fitted up with the necessary machinery and equipment, the sum of $125,000. The whole contract was yesterday let to Thomas W. Finucane, who has sub-let the mason work to H. H. Edgerton. The contract calls for the inclosure of the buildings within seventy working days. After making allowance for stormy weather, it seems probable that this part of the work will be done about Janurary 1, and that the three buildings will be ready for occupancy by March 1.

"The property of the Eastman Company fronts on the boulevard, and extends north to the Handford's landing road. The three new buildings, which form but a part of the extensive plant to be located there, will be set in the back part of the lot; the one nearest the boulevard, known as No. 2, being located 450 feet from the street. All this broad expanse of ground will be graded, turfed, and adorned with ornamental trees, adding much to the beauty of the property.

"The material used will be brick, and all of the buildings will have a cut stone foundation, rising five and a half feet from the ground. They will also have cut stone copings. The exteriors will all be plain, although the cut stone trimmings and the general design will relieve them from the bare appearance which characterises so many factory buildings. The middle building, or the power house, will be designated as No. 1, the film factory as No. 2, and the laboratory as No. 3. These will be principally one storey in height, although a second floor will be added over portions of Nos. 1 and 2. All three will be of slow-burning mill construction. By designing them according to this system, air spaces which permit the quick spread of flames are avoided. Oak posts will be used, and the floors will be double, a maple floor one inch in thickness being placed above a two-inch one of pine. The ground floors will be covered with concrete, together with a layer of asphalt. The ceilings will be from fourteen to eighteen feet in height. The roofs of Nos. 2 and 3 will be flat.

"The power house, or building No. 1, will extend 50 by 180 feet on the ground, inside measurement. It will be divided into a boiler house, an engine room, a machine shop, and a carpenter's shop. The last-named will form the Company's construction department. There will be space in the boiler house for boilers to the extent of 400 horse-power, but for the present 150 horse-power will be sufficient. One engine of about 100 horse-power will be placed in the engine room. The buildings will be heated by steam and lighted with incandescent electric lights. The machinery is to be run by electric motors driven by a large motor in the engine room, so that the Company will have a complete electric plant of its own. One motor will be used to furnish the power for the machinery, and another to supply illumination, each one being a 250-light machine.

"The film factory, or building No. 2, will stand north of the power house. It will have a frontage of 100 feet with a depth of 286 feet. It will take the place of the present Court-street factory, which is to be discontinued when the new one is completed. The third building is to be used as a laboratory for the manufacture of the materials used in building No. 2. In ground dimensions it will be seventy-five by ninety feet. The special machinery for all the departments will be made in the Company's own

construction department. For four months past the shops forming this branch of the Company's establishment have been busy turning out the machinery for the English factory, now nearly finished.

"The plans for these buildings, as well as for those of the English branch just mentioned, were prepared by Otis and Crandall, and seem to cover every possible need of the Eastman Company. More buildings will be erected next year to take the place of the State-street factory. It is probable that it will be in the neighbourhood of two years before the great Eastman plant on the boulevard is completed, and the removal of the business office from State-street shall be effected. In time, the Kodak camera works will follow the other departments down to the boulevard.

"George Eastman told a *Herald* reporter yesterday afternoon that the Company now employs 350 people, and that when all the changes are made the number will be increased to 500. The business of the Eastman Company has grown so rapidly that the average Rochester citizen has failed to realise the importance of the establishment as one of the principal industrial concerns of the city. The improvements contemplated will add very considerably to the appearance of the section where it is located."

WAVES OF LIGHT.

Before a large and appreciative audience, Professor Silvanus P. Thompson on Sunday last delivered a lecture at St. George's Hall, entitled "Waves of Light—a Lay Sermon," and illustrated it by some interesting and beautiful experiments with the electric light projection polariscope and spectroscope. A portion only of a large linen screen was employed, that had previously been wetted, and the apparatus was placed on the stage behind. Nothing at all ambitious in the way of size was attempted, but the projected beams and designs were very satisfactory if somewhat less brilliant at times than one would have anticipated, knowing an electric arc lamp was employed as the source of light.

After illustrating Newton's rings and the colours produced by a soap-bubble, to show that a ray of light by interference (with a film) was converted into spectra, he went on to define a *surface*. This, he said, generally was supposed to mean the top of the lens, fluid or medium, through which a ray passes, or the object from which it was reflected, such, say, as the top of a polished table; it, however, was not really so, but the *interval* between air and the top of the table, lens, or medium, was the surface.

Two Lights to produce Darkness.—As the different rays, according to their colour, travelled at different speed, it was possible for two rays of light when they were, as he aptly termed it, "out of step" to the length of half a wave to produce darkness also at any number of half-wave lengths, such as three, five, and seven half-waves behind the other ray. A film of quarter-wave in thickness would produce a half-wave. The thickness of this would be eleven millionths of an inch. A red ray, which travelled quickest, would be twenty-seven millionths of an inch long, while the violet ray would only be sixteen millionths of an inch, hence its slower travel. A *red* glass possesses no colour of its own, for it is only illuminated by the red rays of the spectrum, all others being stopped, and therefore shows no other colour; while a green only allows the green rays to pass. By placing two different coloured liquids in a bottle and showing each separately this was demonstrated, while on mixing the two and interposing the mixed fluid in the ray no light at all passed.

Diffraction Gratings.—By ruling with a diamond fine lines on a glass of 1000 to the inch, spectra could be produced by interference of the ray, and other substances, such as muslin, would also produce it. Some idea of the vastness of the movement of light rays may be gathered from the fact that rays travel at the *speed* of 100 millions of feet per second, their *length* is 1000 millions of feet long, and it is possible for the **eye** to see rays of 400 million millionths of a second, while the *photographic* image will detect rays of 750 million millionths of a second, while by aid of instruments in the laboratory light vibration of 40,000 million millionths of a second can be detected. When this is compared with the vibrations of sound, which the ear can detect thirty vibrations to a second, or by instrumental or laboratory aid to 35,000 or 36,000 vibrations a second, it will be seen how vastly the light waves differ from sound waves.

Polarisation.—This was described as the "motion of wave," either up or down—that is, in the vertical plane—or sideways (horizontal plane). After passing the polarising and analysing prisms of the polariscope so that they were both in the same plane, the beam of light was shown on the screen as a clear disc, then on turning the analyser at right angles a dark field was shown. A crystal of amethyst was inserted, which had the effect of moving the waves out of their path, and so allowed them to be visible on the screen in the colours representing the particular ray of the spectrum that was intercepted and moved. These colours, when the analyser was rotated, showed their complement, viz., red turned to green, and blue to orange. Other crystals and objects were shown, and particularly pretty and interesting was a section of a stalactite, also moonstone, and many designs made of various thicknesses of selenite, which the lecturer explained was a kind of moonstone. The crystals that did not show changes in the polariscope were stated to be the diamond, spinel, and garnet. According to the thickness of the selenite so the colour was produced, and a section 2¾ millionths of an inch, that the professor succeeded in cutting himself, showed a slight orange colour, while it should have been, he said, 5½ millionths of an inch for yellow, and for blue 6½ millionths of an inch. By adding various thicknesses of selenite they were shown to give more or less interference with the same substance according to the plane of their surfaces. For instance, with two plates of 9½ and 6½ millionths of an inch thick used together in the same plane, making 16 millionths of an inch thick, *red* light in third order was produced, whereas 9½ - 6½ (that is, placed at right angles) gave 3 millionths of an inch. By using a *sectional plate* and a concave plate of selenite, a very beautiful effect of the rolling in and out of the concentric coloured rays was produced, after the manner of a cushion-shaped chromatrope in the ordinary optical lantern, and various other phenomena were shown with wedges of quartz and annular quarter-wave plates.

Senses.—As regards the senses of man as far as we understand the five or six senses, there are certain limits beyond which the average cannot go, but it may be that some one may in future time be possessed of greater intelligence of sight or sound that should enable him to surpass the recorded work of previous experts. As an illustration of what was considered by a great authority possible, the professor stated the following:—"If a rod was revolving in the centre of a dark room, and at the rate of thirty or forty vibrations a second, it would not be noticeable except to the touch, while 40 thousand to the second would produce sound, and 50 to 2000 thousand to the second would produce shriller and shriller notes. At 100 million million vibrations to the second, *heat* rays would be felt, and at 400 million million, heat rays would be seen."

Progress.—What Maxwell advanced fifteen years ago as the electro-magnetic theory of light had become a proven fact, and Professor Oliver Lodge had projected electric waves across space at the rate of 1000 millions per second, but these have not been detected by the naked eye, but by instruments, as light. If the interval between this and the 40,000 millions and infinity can be bridged, who can say what new scientific fact will be discovered; but whatever it may be, the lecturer was in no doubt it would be a development of what had been proved, for there is no *contradiction in nature;* there may be illusions, and these, until our knowledge was sufficient to detect them, may appear paradoxical, but like hypnotism and second sight (which should not be left in the hands of those who practised on the credulity of the public) have a future which shall be marked by steps leading nearer and nearer to the truth. For as insects and animals were endowed with greater intelligence in certain of their senses or a higher development, so we might hope some day to have revelationary sense that should enable us to advance nearer to the truth.

ARISTOTYPE, OR PRINTING IN THE CHLORIDE OF SILVER EMULSION.

This process is not new, and yet it is new to many photographers of this country. Photo paper is coated with an emulsion of chloride of silver in gelatine or collodion, in the presence of a certain proportion of an organic silver salt. Gelatine and collodion papers differ essentially in several points. The latter curls more or less during the operation of washing, thus causing the film to crack and come off the paper. The finished prints are also very easily injured by rubbing. Gelatine chloride paper may be worked same as albumen paper without any trouble. The most objection to it is the softening of the gelatine film in warm weather. This, however, is easily overcome and the film rendered insoluble by the application of alum. The paper should be printed and toned same as albumen paper, in a neutral gold bath, but not quick or strong as for albumen, and then be fixed in an alum hypo bath. Recently I have tried a formula, given by Mr. G. Cramer, of St. Louis. The results were surprising: one pound of hypo, one pound of alum, and a quarter of a pound of bicarbonate of soda are dissolved in one gallon of water, and left a few days to clear.

In this bath the gelatine film becomes as hard as leather, and appears to be almost indestructible, without showing any tendency to crack when bent sharply. It is also not injured by water after being dry. Such prints are mounted same as silver prints and dried between blotters. Hot burnishing gives *glacé* finish. This is also obtained by enamelling the wet print on a ferrotype plate or on chalked glass, which is very convenient for amateurs. The prints remain perfectly flat after glazing, and require no mounting. Gelatine chloride paper may also be toned and fixed in a combined bath, such as recommended by Dr. Liesegang. This bath should not act too quick. If the prints tone in less time than ten or fifteen minutes they should have a subsequent fitting in a weak hypo bath, otherwise they may be placed in above-mentioned alum-hypo bath for about five minutes—just as coming from the printing frame; if desired, they may be previously marked in two changes of water. After rinsing in water

they are placed in the combined bath, and toned. This last method is one of the best according to my own experience to work aristotype paper. There is no fear of stains caused by hypo or uneven toning. The film is hardened on the first immersion, and the high lights are perfectly clear, the shadows rich and brilliant; furthermore, tri-coloured prints are not obtained, the highest and deepest shadows have exactly equal colour.

The general advantages of aristotype paper are the brilliancy and depth of tone and the preservation of all the fine details and half tones, which are in general lost by albumen. The paper will also not stretch and cause destruction.

One drawback has prevented me sooner to be able to place a perfect gelatine chloride paper on the market, not having been able to obtain the paper for the process. The requirements for such paper are to be pure and free from the least trace of form, and to be coated with a very fine substratum, neutral to the above-mentioned silver salts. I am pleased to say that this paper is now in my possession, which enables me to place a fully reliable aristotype paper on the market, which any one may work with ease and entire satisfaction.

—*St. Louis and Canadian Photographer.* LOUIS BRADFISCH.

ON THE NATURE OF THE INVISIBLE IMAGE.*

IODIDE, bromide, and chloride of silver, when absolutely pure, may or may not be reducible by light; but with this we have nothing whatever to do, as we never saw such haloids, never prepared them, and never used them in photography.

What does concern us, and will concern us for some time to come, is the nature of the salts as we employ them day after day; and when examining into their characteristic actions, there is nothing more likely to throw us off the true scent and lead our wits on a wild goose chase than to give ready credence to an oft-repeated assertion irresponsibly advanced.

Of all the apparent difficulties in the way of a fair and broad seizure of the situation, there is one standing out pre-eminent, preventing simplicity, insisting on complexity, asserting its insurmountability, and this is the acceptance—as a *bonâ fide* statement of a simple matter of fact—of the dictum that nitric acid does not dissolve the darkened product. The adoption of this position by such men, say, as Meldola, is not only likely to strengthen the influence of those who put forward plausible hypotheses of but limited application, but of necessity must act as a deterrent to unbiased research, seeing that experiment is productive of the most valuable results when based on the most crucial and reliable of postulates. Discussing *ex cathedrâ* the relative claims of the "molecular," "subsalt," "oxyhaloid," and "metallic" theories, it is nowadays the custom for those who discourse on the question from some particular standpoint to dismiss the others with scant courtesy, as untenable for this, that, or the other reason; and in the case of the last-named, it is usually "scratched" or put out of the running by some such statement as the following, although it is seldom so accurately expressed:—"The free metal theory is disposed of by the fact that silver chloride darkens under nitric acid of sufficient strength to dissolve the metal freely." This is identically the objection of Hardwich, expressed almost in identical phrase. Combating Davanne's contention that metallic silver forms the developable nucleus, or urging a chemical change as against Hill Norris's suggestion that the cause is physical or electrical, Sutton iterates and reiterates.

"Such appears to be the action of light upon chloride of silver. When exposed under water, the water is found to contain hydrochloric acid (not chlorine); and when exposed under nitric acid, the acid neither retards the action of light nor attacks the sub-chloride produced, as might have been expected, *à priori*. It appears that sub-chloride of silver is with great difficulty reduced by light to the metallic state. It is even doubtful whether it is reduced at all."

"A mixture of chloride and nitrate of silver in the test tube, *without* organic matter, is never bronzed by light. Bronzing always indicates the presence of organic matter. When organate of silver is exposed to light it first becomes red, then bronzed. Wherever light acts, a chemical change takes place in the material exposed to its influence, and this produces a visible picture. I conceive that everywhere the change is chemical, and not molecular. In the lighter parts of the picture, where no *visible* impression is made, there is, nevertheless, a chemical change produced, only feebler in degree, and we cannot *see* it simply because our eyes are not good enough." (*Photo. Notes*, 1858, pp. 74-75.) This is exactly Abney's position. "MM. Davanne and Girard affirm, on the contrary, that chloride of silver exposed to light loses chlorine and becomes reduced to metallic silver, so that AgCl becomes Ag + Cl. No one denies that chlorine is liberated when chloride of silver is exposed to light *in presence of hydrogen* (not otherwise, for the chloride does not darken under exposure to light when surrounded with Nordhausen oil of vitrol, in a closely stoppered bottle, completely filled, so as to exclude atmospheric moisture), and the only question is, What is the nature of the residue left when the chlorine has been driven off? MM. Davanne and Girard assert that it is soluble in nitric acid, which sub-chloride of silver is not; on the other hand we, and those who hold the sub-chloride theory, assert that it is *not* soluble in nitric acid, because chloride of silver exposed to light under nitric acid darkens just as readily as under water, and the nitric acid does not attack the dark-coloured reduced material, whatever it may be; to this objection, however, it has been advanced that the dark substance under the nitric acid may be metallic silver in a passive state, which, however, may be considered as a wild and improbable hypothesis. A piece of sensitive paper before exposure is inodorous, but on removing it from the pressure frame it smells strongly of nitric acid, which nitric acid, be it observed, does not attack the shadows of the proof." (*Photo. Notes*, 1859, p. 127). HUGH BREBNER.

* Continued from page 650.

(*To be continued.*)

NOTES FROM NEWCASTLE.

IN spite of frequent and uncomfortable changes of weather, dull skies, fog, and the like, business keeps fairly brisk. I note two or three changes hereabouts—Messrs. Lorraine have left Collingwood-street, and this studio, which has seen many different owners, is once more "to let." Miss Sands has given up her studio in Grainger-street, and the premises formerly occupied by Brown, Barnes, & Bell, and more recently by the late Richard Brown, are now owned by Mr. James Dickinson.

The Society's first indoor meeting of the session was extremely well attended; a long discussion as to the desirability of securing new premises with dark-room accommodation occupied the first part of the evening. I should advise the Executive to take "the bull by the horns," and go in for premises suitable for club purposes; such a place is ready for them at 54, Collingwood-street (referred to above). Studio, dark room, reading room, &c., all complete, and I believe the whole at a reasonable rate; and I don't think the expenses of fitting would amount to a serious sum; but members must not forget that if they select the time they must be prepared to pay the piper.

The discussion on halation revealed the fact that the members, with two or three exceptions, knew very little about it, and not one mentioned what is, in interior work, a remedy of the utmost importance, viz., *prolonged exposures*. To get the best results, my experience points to three cardinal *desiderata*—dull days, backed plates, and prolonged exposures, and of course must be added to these careful and intelligent development. For backing, I never used a better preparation than one I made and introduced some years ago, viz., equal parts of matt varnish and enamel collodion, deeply stained with roseaniline; the back of the plate is cleaned and coated with this, and allowed to dry, which it does quickly. Mr. Auty uses red, gummed paper; the same paper brushed over with thin starch or tragacanth paste answers even better, as it peels off more readily.

Mr. Pike's name has been added to the list of teachers of photography, in connexion with the City and Guilds of London Institute. I understand it is Mr. Pike's intention to form a class at the Science and Art Schools, in Bath-lane.

Mr. Sawyer's success in London is very gratifying to his friends and *confrères* here, and he has been the recipient of much favourable notice and criticism in the local press.

Mr. J. E. Goold fully deserved his success at the Edinburgh Exhibition; this gentleman has taken part in the recent gun trials at Armstrong's, and his photographs of shot in the act of striking the target should be interesting, to say the least of them. D. D.

Foreign Notes and News.

THE story of Baron Rothschild's adventures as a photographer, which we published in a recent issue, requires a slight correction. A whole month elapsed before the good people received their proof. When it arrived, however, it was not an ordinary *carte*, but a fine enlargement, characterised by very artistic execution.

FROM a recent communication to the *Deutsche Photographen Zeitung* by Herr. C. Hinckelmann, it would appear that eikonogen is by no means as inexpensive as it is represented. Both Herr Hinckelmann and his

assistant have had their hands considerably eaten into by frequently handling the reagent in question. Zinc ointment diminished the pain, but had no other effect. The application of soft soap healed the sores, but as soon as the skin was again brought into contact with eikonogen they reappeared, showing that the result of one attack is to make the skin in future much more sensitive than it was originally.

The universally esteemed name of Du Bois Reymond appears in this week's *Wochenblatt*, heading an article on experiments dealing with the causes tending to prevent developers from keeping. These he attributes solely to the oxidising action of the atmosphere, and in no wise to the effect of light, which is often regarded as being the destructive principle in such cases. Dr. Du Bois Reymond has designed a vessel in which contact with the air is completely prevented, the result being that large quantities of developer can be kept perfectly good for an indefinite period.

A cynic once suggested that if London were to be destroyed by an earthquake, the survivors would meet and hold a dinner among the ruins to commemorate the event. Whether or not such an inordinate love of the table is characteristic of the Englishman, it certainly seems to be so of the German—wherever he goes his first anxiety appears to be to secure a good "braten," and to wash it down with small beer. Photographers in the "Fatherland" are no exception to this rule, and the result is that the accounts of the excursions of the "German Photographic Club" to Eisenach, contain a great deal about "braten" and beer, but practically nothing about photography; whether the meeting *had* any connexion with photography will perhaps some day be revealed. Until this revelation is vouchsafed we remain in a condition of respectful wonder.

The excursion of the Berlin "Free Photographic Union" to the Muggelberg on the Upper Spree, seems to have been quite exceptional for a German Society, as there is hardly any mention of "braten," and there is some allusion to photography—a regular camera competition being carried on for some time from a coign of vantage above the lake.

The Vienna Club of Amateur Photographers intends holding an international exhibition from April 30 to the end of May next. Like most photographic enterprises in Vienna, the exhibition will be under the patronage of the Archduchess Maria Theresa, and will be confined to works of express artistic value only. Intending exhibitors should communicate with Herr Carl Sma, No. 30, Stiftgasse, Vienna vii., not later than Jan. 13, 1891. Exhibitors will not be charged for the space occupied.

Liesegang has recommended a mixture of eikonogen and hydroquinone in the developer, which produces a solution, according to him, combining the advantages of both these bodies. This is his receipt:—

Boiling distilled water	1000	parts.
Sulphite of soda	100	,,
Eikonogen	15	,,
Hydroquinone	5	,,

On cooling, fifty parts of carbonate of potash are added. This developer acts, according to Liesegang, as energetically as eikonogen, and gives the intensity and clearness of hydroquinone. The temperature at which the development takes place exerts considerable influence. At 20 C., six seconds suffice; at 30 C., three seconds; while at 10 C., twelve to twenty-four seconds are required.

La Nature gives a new method of temporarily fixing negatives while on tour. Dip them five minutes in the following bath:—

Water	150	parts.
Bromide of potash	5	,,
Glacial acetic acid	5	,,
Alum	5	,,

Then wash and dry. The negative can then be kept, even in the light, without injury for several days. On arriving at home it should, of course be fixed permanently.

Our Editorial Table.

Beziehung zwischen Absorption und Empfindlichkeit Sensibilisirten Platten.

Von J. J. Acworth, Ph.D., F.I.C., F.C.S.

In this work Dr. Acworth treats of the relation of spectral sensitiveness of plates (mostly orthochromatised) to the spectral absorption of the same. From a perusal of its pages we glean that its author's views are at variance with those generally accepted as correct. He maintains that absorption maxima and sensitiveness maxima of the same light-sensitive plate do not agree, but that the latter are always displaced towards the less refrangible end of the spectrum in comparison with the former. A full description of apparatus employed, how exposures in the spectroscope were made, and the *modus operandi* of colour-sensitising the plates or emulsions with the various dyes are fully gone into. The work consists of thirty-eight pages and two tables, and is published in Wiedeman's *Annalen der Chemie und Physik*.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,238.—"The Treatment of Negatives in the Art of Photography by means of a Liquid to be called 'Nonactinine.'" Complete specification. H. H. Beale. *Dated October* 13, 1890.

No. 16,339.—"Improvements in or connected with Photographic Cameras." C. Beck. *Dated October* 14, 1890.

No. 16,421.—"Improvements in or connected with Cameras, and in Focussing Screens therefor." H. Ransom. *Dated October* 15, 1890.

No. 16,620.—"Improvements in Photographic Apparatus." S. D. Williams and W. A. Edwards.—*Dated October* 18, 1890.

PATENT COMPLETED.

An Improved Trough for Use in Washing Photographic Prints, Photographic Negatives, and the Like.

No. 16,492. Percy Ellis, The Manor House, Wallington, Surrey.—*September* 27, 1890.

This invention has for its object the construction of a trough for washing photographic prints, photographic negatives, and the like, which shall be simple in construction and shall automatically empty itself when filled or nearly filled with water or liquid.

The trough is shaped or formed as follows:—

Three of its sides and the bottom are rectangularly disposed with respect to each other. The fourth side is jointed to and inclined upwards from the bottom of the trough, and outwards or away from the side to which it is opposite, thus leaving an angular space between the inclined or fourth side and the surface on which the bottom of the trough rests. Two of the three sides of the trough, which, as already mentioned, are rectangularly disposed with respect to each other, are prolonged so as to join the inclined or fourth side. Thus it will be seen that a side elevation of the trough would be a figure formed of a rectangle joined to a right-angled triangle, the hypothenuse of the latter forming the fourth side of the trough, and one of the sides of the right angle being continuous with the top of the trough.

The trough is weighted at that side or part opposite to the inclined or fourth side in such manner as to cause it to stand upright or on its bottom when empty or partly filled, and also to allow it to automatically turn over and empty itself when the trough is nearly or entirely filled, or the height of the water has exceeded a certain limit. When the water has been emptied to the requisite amount the weight will cause the trough to return to its normal position, with its bottom on the surface on which the trough rests.

I provide the trough with a false bottom, which may be removeable if desired, upon which I place the photographic prints to be washed when the trough is to be utilised for this purpose, and I fix a wire or other reticulated partition to the trough at the middle or other part of the fourth side to prevent the photographic prints from being washed away when the trough empties itself.

When the trough is to be utilised for washing photographic negatives the negatives are inserted in a holder and the holder placed in the trough. The latter may be provided with supports for bearing the said holder.

By the construction of trough above described, which automatically empties itself, I am enabled to dispense with the siphon arrangements used for that purpose.

Photographic Club.—October 29, Lantern slide competition. First lantern night of the season. November 5, Annual general meeting.

The *Pall Mall Gazette* says: "Mr. Byrne, of Richmond—who invited Lord George Hamilton to sit, and then sent him in a bill—is not the only photographer whose treatment of public men is peculiar. Mr. Barraud, of Oxford-street, appears to be another, although in a different way—as will be seen from the following note prefixed to the *Scottish Leader* Special on Mr. Gladstone in Scotland:—'The combined portrait of Mr. and Mrs. Gladstone by Barraud, which, with his' (*i.e.*, Mr. Gladstone's) 'wonted courtesy, Mr. Gladstone chose for reproduction here, has been withheld at the last moment in consequence of the objections of the photographer, although Mr. Gladstone's consent was made known to him.' It seems hard that a member of Parliament should not be able to present his photograph to his constituents 'in consequence of the objections of the photographer.' Now that the 'authors and publishers'' question is 'off' for a time, that of 'sitters and photographers' might advantageously come on.'

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
October 27	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 28	Great Britain (Technical).....	5A, Pall Mall East.
,, 28	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 29	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 29	Burnley	Bank Chambers, Hargreaves-street.
,, 30	Halifax Photographic Club	Mechanics' Hall.
,, 30	Liverpool Amateur.....	St. George's-crescent North.
,, 30	Oldham	The Lyceum, Union-st., Oldham.
,, 30	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 16,—Mr. W. E. Debenham in the chair.

Mr. G. W. ATKINS read a paper on *Stereoscopic Photography* [see page 677], in the course of which, aided by illustrations on the blackboard, he explained the cause of stereoscopic vision, dealt with methods for producing stereoscopic negatives involving little or no additional apparatus, and advocated the taking up again of an application of photography giving such realistic and beautiful results.

Mr. T. E. Freshwater showed a collection of stereoscopic slides, including those early representations of models in white lines on a black ground that preceded photographic slides as articles of commerce.

A letter was read from Mr. A. L. Henderson, accompanying a large collection of stereoscopic slides of caverns at Tenolan or Fish River, including some to which he called particular attention as having been photographed by magnesium flash, some having taken as much as two ounces of the metal for a single exposure.

The CHAIRMAN gave some further explanations of the union to the appreciation of the observer of the two images, illustrated by diagrams of the eyes and the optical system used for the purpose. The effect of greater separation of the lenses than the natural distance between the human eyes when taking stereoscopic pictures was to produce a result such as would be seen by a being whose eyes were at the distance of the lenses. To the human eyes the effect was to represent the scene as in a model made to so much a smaller scale as was proportionate to the distances of lenses and eyes respectively. This effect was perfectly legitimate if recognised as what it really was. The telescope was an instrument for seeing things not as we do see them, but as we should if we were so much the nearer; and the telestereoscope (which was illustrated by a sketch on the blackboard) was an instrument for seeing distant objects not only enlarged in apparent size, but with the same relief that is seen when such objects are photographed stereoscopically with lenses widely apart. In general use he thought the two-lens camera best, as enabling scenes to be taken, including moving objects. Even in landscapes it was desirable to be able to do this, so as to show, when practicable, the clouds accompanying the scene. A pair of stereoscopic lenses that would serve very well might be improvised by taking out the front lenses of an opera glass and mounting them as single lenses, convex side to the plate, with a stop of moderate or small size in front.

In acknowledging the vote of thanks which was accorded to Mr. ATKINS, he mentioned that the first lens he used photographically was taken from an opera glass, as described by the Chairman.

Mr. W. A. Casson was elected a member.

It was announced that on October 30 Mr. W. E. Debenham will read a paper on *The Unnaturalism of "Naturalistic" Focussing.*

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION

AT a meeting held on the 17th inst. (Mr. W. Benham, Chairman) two applications for assistance were granted.

Messrs. Lott, H. Chapman, H. G. Parry, H. Francis, W. I. Tabrum, A. E. Dean, G. W. Pember, and F. Dudman were elected members of the Association.

CAMERA CLUB.

OCTOBER 16,—Mr. Wilson Noble, M.P., in the chair.

Mr. LYONEL CLARK read a paper on *Toning Rough-surface Silver Paper.*

Previous to the lecture Mr. MASKELL exhibited and described the use of a Claude Lorraine mirror, and also a simple pinhole apparatus sent out by a French house.

Mr. CLARK, in his lecture, proceeded to give some particulars of treatment in sizing and sensitising rough and smooth-surfaced papers, showing where his later experience had varied from or improved upon the instructions given in his paper last year. He also described toning with palladium, and gave a demonstration of this process, in which the print was subsequently intensified with silver. A print exposed for only seven or eight minutes to daylight was in this way built up to full intensity.

A discussion followed, in which several members took part.

Thursday, October 30, will be a lantern evening. Meeting at half-past eight p.m.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 7.—General meeting.—Mr. J. Traill Taylor in the chair.

The SECRETARY announced that the four negatives kindly provided by Mr. Mackie for the lantern-slide competition early in next year were now ready for circulation among the members. This competition has been taken up with spirit by the members, and promises to be a very interesting one. Each member is to make slides with or without clouds by any process from the negatives provided by Mr. Mackie, and these will be exhibited side by side upon two screens, the body of members themselves being the judges to decide as to the best productions.

At this meeting Mr. Roberts, of Victoria-street, exhibited a new flash lamp, called *Le Tison Eclair*, and explained its construction. It holds several charges of magnesium powder, each of which can be fired in succession by the pressure of a ball. By a simple contrivance two of the lamps can be fired together. Mr. Roberts took two successful groups of the members in the room by means of the lamp, and developed them with his new lavender developer. This appears to be a very powerful developer, giving clear negatives without the slightest stain or fog, and can be used over and over again. These lamps, though so powerful, can be carried in the waistcoat pocket, and each lamp will illuminate a space of ten or twelve yards round.

The lantern of the Society was then brought into requisition under the management of Mr. Parfitt, and a large number of beautiful slides were passed through and exhibited upon the new patent screen presented to the Society by Mr. Hart, of Kingsland. There can be no doubt about the portability, stability, and usefulness of this screen. It has every arrangement for fixing it in any position to the floor, can be made of any size, and can be inclined at any angle to suit the position of the lantern, and when done with can be taken down in a few moments and packed away in a very small compass. The Society has been greatly benefited by Mr. Hart's kindly gift.

Slides were exhibited by Messrs. Dando, Tavener, Grover, Tanner, Walker, Collins, Medland, Powell, and the Secretary.

Mr. Dando exhibited a set of views of Paris made upon collodio-bromide emulsion, upon which he is experimenting. These slides were very beautiful, and were greatly admired by the members. It is well known that Mr. Dando spares no pains upon the production of the stereoscopic negatives from which these slides were made, and he has promised to contribute a paper upon their manufacture to the forthcoming BRITISH JOURNAL PHOTOGRAPHIC ALMANAC. Mr. Tavener exhibited a large number of very beautiful slides, many of the views from Wanstead Park. Mr. Grover's slides were made from hand-camera negatives, and were very successful, many of them showing the ease with which high buildings, &c., can be taken with a detective if proper care is taken. Mr. Tanner's slides were made from views taken in a hand camera of his own construction, and one view especially, taken from a railway bridge of a locomotive at full speed, showed that his hand camera must be a most useful one. Mr. Walker showed some beautiful views of Scotch scenery taken with his hand camera whilst on a visit to the Scotch lakes, &c. These slides were most successful. Mr. Medland exhibited some wonderful pictures of horses and their riders in a steeplechase, amongst them his gold medal picture. The shutter with which these were taken was made specially for Mr. Medland by Newman's, and he has been gradually increasing its speed, so that we may expect still more wonderful pictures from him. The position of the legs of some of the horses in full gallop is one certainly never seen by the human eye, and only shows how very much quicker the eye of the camera must be. All the slides shown were of excellent quality, and it was agreed that this was one of the most interesting and successful evenings which the Society has had.

At the next meeting on the 21st inst., Mr. Friese Greene will give a demonstration of printing on its opal cards, and specimens of Fry's lantern plates and papers will be distributed to the members.

A hearty vote of thanks was accorded to Mr. Roberts for his demonstration, and to Mr. Parfitt for presiding at the lantern.

WEST LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 17.—At the adjourned annual meeting, the President (Mr. C. Bilton) in the chair, the following officers were elected for the ensuing year:—*President:* Mr. Walter Adam Brown.—*Vice-Presidents* · Messrs. C. Bilton, G. F. Blackmore, Walter L. Colls, and Dr. F. H. Low.—*Council:* Messrs. England, Horton, Richardson, Scalan, and Whiting.—*Hon. Librarian:* Mr. J. Wilson.—*Hon. Lanternist:* Mr. R. Horton.—*Hon. Auditors:* Messrs. H. and L. Selby.—*Hon. Treasurer:* Mr. W. H. Whitear.—*Hon. Secretary:* Mr. J. A. Hodges.—*Assistant Hon. Secretary:* Mr. L. C. Bennett.

Mr. BROWN, in returning thanks for the honour conferred upon him, said he could not help feeling that there were other gentlemen present better qualified for the post than himself. His aim during his year of office would be to endeavour by every means in his power to forward the best interests of the Society.

A general discussion then took place relative to the drawing up of the syllabus, in the course of which Mr. C. WHITING expressed the opinion that it would be advantageous to hold technical meetings more frequently than hitherto.

Mr. MILLER, speaking as a beginner, looked forward when he joined the Society to obtaining guidance and information, and he thought instead of negatives and prints being handed round promiscuously it would be better if some qualified gentleman took the exhibits and demonstrated their merits or faults, whereby they would all receive instruction in composition, development, and in other ways; in that manner knowledge might be collected and placed in a suitable manner before beginners.

Mr. WHITING thought that a technical meeting would effect the objects aimed at by the last speaker, because at such meetings members could bring forward novelties, or avail themselves of having the opportunity of having their difficulties solved. He considered that more was to be learned at a technical meeting than by listening to the reading of papers.

Mr. HODGES concurred in the view expressed by Mr. Whiting, but considered that the success of a technical meeting depended very much upon the members themselves. If the objects in view were supported by a larger number of exhibits being brought, a good practical result would be assured.

Mr. LAMLEY, in a letter, suggested that in order to avoid prints becoming damaged, and to give every one an opportunity of inspecting them, a drawing

board covered with grey cloth should be provided, to which the prints might be attached with drawing pins, which met the approval of the meeting.

Messrs. Rogers, J. C. Adams, and F. Adams, were elected members.

The next meeting, on Friday, October 24, will be a lantern night.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

October 17.—Mr. F. W. Edwards gave a demonstration on *Printing on Alpha Paper*.

Mr. L. Warnerke showed a print which he had executed six years ago, and which had not faded in the slightest, and was a strong testimony of the permanence of the process.

Mr. Howson (Britannia Works Company) expressed his thanks to Mr. Warnerke for showing the print, as permanency was a most important point in any printing process.

Three members were elected and eight names proposed. Mr. Leon Warnerke was elected an honorary member.

HOLBORN CAMERA CLUB.

October 17,—Mr. T. O. Dear (Vice-President) in the chair.

Mr. E. Thorpe, who has just returned from a holiday in Scotland, passed round a number of half-plate platinotype prints, together with some 10 × 8 bromide enlargements from the negatives taken during his stay in the North.

Two new members were elected.

Mr. Thorpe then read a paper on *Photographic Chemicals, their Uses, Tests, &c.* He had thought it would not be out of the way if he brought together a few hints on the chemicals used by photographers. He deemed it necessary for every photographer, both amateur and professional, to know something about the chemicals which passed through their hands. For example, supposing they had acids a bottle or a packet which in a hurry they had omitted to label, by applying a few ready tests they could at once discover what the substances were. He then described the mode of preparation, the various tests and uses of ammonia, bromide and chloride of ammonium, the different acids, alum, alcohol, borax, calcium, chloride of gold, hydrochinone, hydrogen, iron, magnesium, mercury, the various potassium salts, pyrogallol, nitrate of silver, and the numerous kinds of soda. He specially referred to the intensification of thin negatives by mercury, and said that he thought the chief cause of failures was due to insufficient washing before and after treatment in the various baths, and to insufficient time allowed in the intensifying bath. In speaking of hydrochinone, he said he thought a substance lately introduced, called guanol, would, in all probability, supersede hydrochinone as a reducing agent. He believed it could be produced much cheaper than hydrochinone.

In the discussion that followed the paper, Mr. Thorpe, in answer to Mr. Bayton, said alum itself did not act as a hearing solution, unless it was acid. It simply hardened the film and prevented frilling.

Mr. E. H. Bayton asked if sulphocyanide of ammonium was very deliquescent. He said he had had some in a stoppered bottle, but on opening the bottle the other day he found about a quarter of it had turned to water.

Mr. H. Thompson said he had found it very deliquescent. In fact, he had found it almost impossible to weigh the salt, water being absorbed so rapidly.

In answer to Mr. Smith, Mr. Thorpe said the presence of hypo in prints might be roughly determined by dropping a weak solution of iodine on the print, when, if hypo were present, the colour of the iodine solution would be discharged.

After some discussion on this matter, a vote of thanks was passed to Mr. Thorpe for his instructive paper, and the meeting closed.

To-day (Friday), lantern night.

NORTH MIDDLESEX PHOTOGRAPHIC CLUB.

October 13.—Mr. Rogers gave a lecture on *Pictures of Egyptian Life*, and illustrated the same by the optical lantern. He first said that he thought it would interest his audience if he showed the apparatus by which the pictures afterwards exhibited upon the screen were taken, this was a Shaw's camera, quarter plate, fitted with Eastman's roll holder and celluloid film. He then proceeded to give a very interesting account of the places visited by him, also of the manners, dress, customs, and methods of living of the people. The whole of the pictures exhibited in illustration were calculated to give those who had not visited the country a thoroughly good idea of what it was like, as, instead of confining himself to fully finished views in which a comparatively large district was included as a background.

On Monday next, October 27, Mr. Bishop will give a lecture on *Stereoscopic Photography*.

CHELTENHAM PHOTOGRAPHIC SOCIETY.

October 16.—The President (Mr. Clifford E. F. Nash) in the chair.

This being the annual general meeting the election of officers was the first business.

Mr. L. Winterbotham proposed, and Mr. Jeffrey seconded, that the officers of the past year be re-elected, which was carried, with the addition of Captain Harrison.

The treasurer, Mr. J. Ball, presented his accounts, showing a small balance in favour of the Society.

Four candidates for election were nominated and elected as members.

A proposal which stood in the name of Mr. E. Wethered for the establishment of a gentlemen's section in connexion with the Society was postponed, owing to the unavoidable absence of Mr. Wethered.

The President then addressed the meeting, reminding the members that the Society had now been in existence for twenty-five years, and stood as regards age among the first seven or eight of all the numerous societies now in existence. He expressed his regret that so many of the amateur photographers residing in Cheltenham had not yet joined the Society, but expressed a hope that some of them might yet do so. It was also a matter of regret that so few bestirred themselves to bring matters of interest before the Society. Nearly all that had of late been done in that way having been done by the Hon. Sec., Mr. Beetham. It was to be hoped that more of the members would help in making the meetings of greater interest.

A considerable number of pictures were on view, notably some fine 15 × 12 direct pictures by Mr. Beetham, printed in platinum. These were chiefly yacht pictures, taken at Torquay and Dartmouth regattas.

Mr. L. Winterbotham had a large collection of prints on bromide paper, toned with potassium iodide and gold.

Some good lantern transparencies were shown by Mr. Jeffrey.

A letter was read from the Eastman Film Company, offering a demonstration by their representative of the working of their films and papers. The offer was accepted, the exact date to be left to the company to fix.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

October 14,—Mr. J. P. Gibson in the chair. There was a large muster of members, and the meeting was of an animated and interesting description.

The subject of *Halation and Backing Plates* was opened by the Chairman, who said that he had not seen reason to change the opinion he expressed two years ago, that black paper smeared over with glycerine and squeegeed into contact with the plate was the easiest, and at the same time a practical method of avoiding halation in nine cases out of ten. In extreme cases he would pin his faith to the method of Mr. J. Hedley Robinson, viz., drop black mixed in gum water and alcohol.

Mr. M. Auty recommended black paper ready gummed, which only required to be damped with a sponge and then put on the plate.

Messrs. J. Brown and Edgar G. Lee both expressed their preference for a solution of bitumen in benzole, on account of its immediately drying, and they usually postponed its removal until after fixation of the plate, a scratch of a finger across the back being sufficient to show how the negative is as to density.

The *Amateur Photographer* travelling studentship competition photographs were on view, and the superiority of the work to anything previously sent out from the same office was commented upon on all sides.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

The President (Mr. Andrew Pringle) in the chair.

Mr. A. R. Dresser then exhibited in the lantern some very fine instantaneous work taken in one-three-hundredth part of a second, including his wave studies, followed by slides by Messrs. Court, Fry, jun., Clare, Jones, and Hawkins. Mr. Court's eclipse of the sun was very clear and distinct, and quite a success, considering the difficulties it was taken under.

The next meeting will be held at the Board Room, Bexley, on Wednesday, October 29, at eight p.m. Mr. A. R. Dresser on *Lantern Slide Making*, with demonstrations.

DERBY PHOTOGRAPHIC SOCIETY.

October 14,—Dr. Green in the chair. The election of officers for the year 1891 was proceeded with, and resulted as follows:—*President:* Captain Abney, R.E., &c.—*Vice-Presidents:* Dr. Green and Messrs. Richard Keene and Thomas Scotton.—*Committee:* Messrs. C. B. Keene, C. Bourdin, W. Hart, A. H. Bennett, R. Woods, and R. L. Warham.—*Treasurer:* Mr. A. B. Hamilton.—*Secretary:* Mr. Charles J. Chadwick.

After the business was transacted a fine collection of lantern slides was exhibited by the maker, Mr. Warham, who was accorded a cordial vote of thanks for the treat he had given.

BRIGHTON PHOTOGRAPHIC SOCIETY.

October 13,—Mr. Douglas E. Caush in the chair.

Mr. George Foxall read a paper on, and demonstrated *The Carbon Process of Printing*.

A fine collection of prints lent by the Autotype Company were on view.

Mr. A. H. C. Corder, the Hon. Secretary, passed round several opals which he had produced by this method.

On October 28 Mr. Caush will read a paper on *Failures*.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

October 20,—Mr. S. Wells (Vice-President) occupying the chair.

The Hon. Secretary presented the annual report, which, after some discussion, was passed unanimously.

Mr. Burrows, in introducing his motion—"That as the usefulness of this Society has been sadly crippled by the want of funds, the subscription in future be one guinea per annum, which will enable the Committee to cater more efficiently for the information and instruction of the members by means of lectures, demonstrations, &c., throughout the session"—explained at great length and very forcibly what the Committee wished to carry out, but for want of funds found it impossible. After an animated discussion the motion was agreed to by a majority of two-thirds.

The officers for the ensuing year were elected as follows :—*President :* Mr. S. Wells. *Vice-Presidents :* Mr. G. E. Williamson and Mr. G. E. Smith.—*Committee :* Messrs. R. S. Armitage, W. Burrows, T. Carnell, J. Hodgson, J. C. Lancaster, J. Furley Lewis, A. Pickard, T. S. Piggin, J. Spray, W. Towers, M. Tuquet, and H. A. A. Wigley.—*Hon. Treasurer :* Mr. B. Sturges Dodd.—*Hon. Secretary :* Mr. P. E. Knight.

VIENNA PHOTOGRAPHIC SOCIETY.

The first autumn meeting of the Vienna Photographic Society took place on October 7, President (O. Volkmer) in the chair.

Dr. Eder gave an account of the optical progress achieved by the use of the new Jena baryta glass for the construction of photographic lenses. Likewise some improved apparatus, especially photometers and flash-light apparatus.

Mr. Einsle spoke about the harmonising the different intensity of light, which often spoils landscape pictures. He explained the remedies he uses. They consist in keeping back, respectively promoting the development of certain parts by painting with certain solutions.

Professor Luckhart showed the audience a magnesium flash-light apparatus by Messrs. Hacke & Albers.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

THE EXHIBITION OF THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

To the Editor.

Sir,—It has been pointed out that a medal has been awarded in error to photograph No. 600 in the exhibition of this Society, *An Invitation to Supper*, by Mr. Van der Weyde.

It was not noticed at first that this picture had already been publicly exhibited within the London postal district, and should therefore have been disqualified.

The medal has been withdrawn.

It is greatly regretted that the mistake occurred. The exhibitor, through some misunderstanding, was led to suppose that the rules of the exhibition did not exclude the photograph in question.—I am, yours, &c.,

A. M. Mantell, Capt. R.E.
Hon. Sec. Photographic Society of Great Britain.

8, *Mansion-row, Chatham, October* 15, 1890.

To the Editor.

Sir,—As I find myself placed in a false position at the Photographic Society's Exhibition, a medal having been awarded me and now withdrawn on account of my having infringed the rules, I trust you will grant me space to make the following statement :—

In the first place, I had no idea of exhibiting at Pall Mall this year, and should not have sent, but that incidentally meeting the Hanging Committee at the restaurant where I lunch, they particularly requested me to do so.

I promised to see if I could find something, and the same day I sent an enlargement (a life-size single figure), which in the hurry I quite forgot had been exhibited at the Drapers Hall last season. This picture on delivery was recognised, refused, and brought back.

For several succeeding days I met the Committee at the same place, and one day I spoke to Mr. Cocking, the secretary, and expressed to him my regret at the mistake, and told him that I had nothing else I cared to send which had not been exhibited at the Crystal Palace or the City, upon which he told me in a friendly aside, that he did think there would be any objection to the Palace, it being so nearly the postal district, but that anything shown in the City was out of the question, and he again urged me to send something that day, as, though the hanging was practically finished, he could yet find room if my pictures were not large. Two small photographs were accordingly sent that evening.

I hope this will show that I acted in perfect good faith. With regard to the medal system I should like to say something, but will leave that for another letter.—I am, yours, &c.,

Henry Van der Weyde.

182, *Regent-street, W., October* 21, 1890.

TRADE MARKS ON PAPER.

To the Editor.

Sir,—Mr. W. H. Davies, in his article *Anent Mounting*, advocates the refusal to buy any paper stamped on the back with the trade mark of the maker. He has evidently not considered that this mark is the only guarantee which identifies a certain make of paper, and that if makers were compelled to send out paper without any mark they would be obliged to refuse all responsibility, as in that case they would be liable to having bad paper (not their make) returned to them without being able to identify it. I myself had last week not less than three parcels of defective paper returned to me as mine which had the mark of other makers on the sheets. How much more frequent would such occurrences be if the paper had no trade mark? After all, the mark is mostly small, and put right in the corner of the sheet, so that it can generally be trimmed away without interfering with the economical cutting up of the sheet. Insist on paper without any mark on the sheet and you will soon have a host of inferior makers mixed up with the better ones now in the market. My experience is that careful buyers insist on the trade mark being on every sheet.—I am, yours, &c.,

Otto Schölzig.

31, *Binfield-road, Clapham-road, S.W., October* 21, 1890.

ENLARGED NEGATIVES.

To the Editor.

Sir,—In your able leader last week on *Enlarged Negatives* you did me the honour of referring to a paper read by me some years ago before the then South London Photographic Society. You mention that I demonstrated the possibility of producing direct positives in the camera by the wet collodion process. This is a slight error. What I demonstrated was a method with wet collodion of obtaining enlarged negatives direct from small ones, and showed some sixteen or eighteen-inch plates taken from *carte-de-visite* negatives. Of course, direct positives could be taken in the camera by the same method, but my object was to obtain enlarged negatives direct from the originals without the necessity of a transparency. The paper, and a leading article thereon, will be found in the Journal for February 21, 1873.—I am, yours, &c.,

E. W. Foxlee.

22, *Goldsmith-road, Acton, W., October* 20, 1890.

SPECTACLES AND DEFECTIVE VISION.

To the Editor.

Sir,—Your correspondent, Mr. Fred. H. Evans, touches in last week's Journal an important and interesting subject to all persons who require to use their eyes critically, and wish to have binocular vision. It is difficult to give him an exact opinion as to the "dislocation of vision" without applying optometric tests; but if he will call on me I shall be happy to thoroughly test his sight and show him the best optical correction I can give him. I should think from what he describes that the two eyes have considerable difference in the amount of *accommodation* or natural adjustment, and consequently the working eye will assert itself, notwithstanding each eye by means of a lens is brought up to normal focus. It is probable by curbing, so to speak, the excessively active eye, he can get harmonious and combined impressions with both eyes open and working. In the same way that men are right or left-handed, so the majority of persons are right or left-eyed, and the master eye will invariably assert itself. Then, again, there may be astigmatism, which will give considerable trouble and oftentimes pain if not fully corrected by suitable cylindrical or spherical cylindrical lenses. Should there be any of your readers in doubt about their eyesight, I shall be pleased to test it by means of my improved optometer free of charge on their calling here.—I am, yours, &c.,

406, *Strand.* J H. Steward.

THE DIAZOTYPE PROCESS.

To the Editor.

Sir,—We shall feel obliged if you will allow us to make a few remarks respecting the article on the diazotype process which appears in your issue of the 17th inst. First, let us congratulate you on its general excellence and accuracy. There are, however, one or two statements which are somewhat misleading, and are, moreover, calculated to injure us and prevent us from reaping the due reward of our labours.

With regard to the "scanty information to be gathered from our paper," we would point out that the paper has not yet been published; only abstracts have hitherto appeared. This, we trust, will be remedied before long.

As to the "new" developers which the writer seems to think he has discovered, we would remark that these developers have been well known to us for some time; in our opinion they possess no special advantages over those that have been more specifically named in the published accounts of the process.

It is surely somewhat premature, and a little unfair, to discount the value of our patents by saying that "it is difficult to suppose that such claims can cover the use of the eikonogen developer." The specification was drawn up after due consideration by a well-known firm of patent agents, and we feel every confidence in its accuracy and comprehensiveness.

For further information we would refer readers to your advertisement columns.

It is only right to point out that, at the time your article appeared, full instructions had been written, and were, in fact, in course of being printed for circulation among those who desire to work the process under our sanction.

Apologising for having taken up so much of your space—We are, yours, &c.,

Green, Cross, & Bevan.

4, *New-court, Lincoln's Inn, W.C.*

TONING.

To the EDITOR.

SIR,—I shall be obliged if you will kindly allow me to correct an error (caused, I am afraid, by my own carelessness in sending a confused description when filling up the form for the Pall Mall catalogue) in your notice of my picture, No. 457, *Under the Mendips*, with respect to its *toning*. This is toned by a new process I have lately been experimenting on, viz., *gold and platinum*, whereas No. 456 is toned with platinum only. I purposely sent only these two exhibits to show the contrast and the improvement which, to my mind, silver prints possess when toned by this combination method over those toned with platinum only, while at the same time they are, I believe, equally benefited in the matter of permanency.

I shall not now take up your space by entering into any details, as I propose that the subject shall form my contribution to the ALMANAC for the ensuing year.—I am, yours, &c., HENRY B. HARE.

Great Elm Rectory, Frome, October 18, 1890.

"FOREIGN NOTES AND NEWS."

To the EDITOR.

SIR,—Reference has been made for months, under the heading "Foreign Notes and News," to the differences between me and Mr. Scolik, of Vienna. The statements made are misleading, and as far from facts as possible. I have said nothing till now respecting these strange communications, though my opinion is that there are better things to tell to the English fraternity than the details (and even wrong details) of quarrels between two Continental gentlemen.

I expected that these reports would cease, but, as that is not the case, allow me to prove that your contributor is not sufficiently informed. For instance, he speaks, in the number for September 10 of your valuable JOURNAL, of the "eternal rivalry between Berlin and Vienna." I do not know anything of this "eternal rivalry." I have been honorary member of the Vienna Photographic Society for twenty years, and correspondent of the *Photographische Notizen*, Vienna, for twenty-five years; I am in intimate connexion with Dr. Eder (who calls me *friend*), and with a great many other honourable and well-known gentlemen working in photography, as M. Luckhard, Volkmer, Angerer and Goessohl, Moll, in Vienna, and others. On the other hand, Professors Hornig and Eder, of Vienna, are honorary members of *two* Berlin photographic societies, and in the last year the Vienna Amateur Society has agitated in the most energetic manner in favour of the exhibition proposed by the Berlin Photographic Society (Stolze), which was given up, whilst the Jubilee Exhibition, prepared by the Berlin Amateur Society, succeeded under the aid of the *Vienna* Photographic Society.

I think these few facts will prove that there is no "eternal rivalry between Berlin and Vienna," perhaps the opposite. There is only a very strong private difference between me and Mr. Scolik. But Scolik is not *Vienna*, and I myself am not *Berlin*. I do not like to annoy the English fraternity with details of the reason of the difference between Mr. Scolik and myself. It may be sufficient to tell that Scolik claimed to be the inventor of *azaline*, though two years before his publication of the analyses of azaline, azaline plates were in commerce with my name, and a great many people have used them. Suppose the constituents of the old gunpowder should not be known, and anybody proceed to analyse it, is he then the inventor of gunpowder?

I beg to remark that I am not the only one who has reason to oppose Mr. Scolik. In the last number of the *Photographische Correspondenz*, Dr. Eder protests against Scolik's assertion that he first demonstrated that erythrosine is a better optical sensitiser than eosine, and Eder proves that he indeed was the first who recommended erythrosine.

On the other hand, your valued contributor confuses Dr. H. *W.* Vogel with H. *E.* Vogel (the astronomer), and honours me, in your number of October 10, for works not done by me, but by the last-mentioned gentleman in Potsdam.—I am, yours, &c., Dr. H. W. VOGEL.

Berlin.

[We thank Dr. Vogel for setting us right in regard to these matters, which we have hitherto imperfectly understood.—ED.]

"FREE LANCE" ON PICTORIAL DEFINITION.

To the EDITOR.

SIR,—May I ask you to kindly insert the following in answer to "Free Lance's" criticism of the paper read by me at the London and Provincial Photographic Association on *Pictorial Definition*? My object in referring to blind spot and other defects of the human eye was to indicate the different conditions under which we see, as compared with those under which the image is formed by the photographic lens. The report of my paper fails to indicate this contrast, hence, perhaps, some misapprehension. Be this as it may, I cannot understand how it might have concerned the great painters of the Middle Ages, unless "Free Lance" believes they produced their pictures by some photographic process. Further on "Free Lance" falls into a curious mistake, which leads me to doubt if he has ever read Dr. Emerson's book on *Naturalistic Photography*. Criticising the rule "that only the principal object should be in focus, and that only as sharp as the eye perceives it in nature," he says, "It is obvious that a photograph never can give more sharpness than actually exists in the original." Here "Free Lance" substitutes the object for the mental image of that object, and then triumphantly pronounces the impossibility of that which is but his own false assertion. In the rule given, Dr. Emerson refers to the image presented to the mind by the eye, not to the external object. Will "Free Lance" affirm it is impossible for a photograph to give more sharpness than we feel when we look at a scene in nature? Let him prove this, and I will then admit you cannot be in error by rendering everything as crisply as the lens will define it.

It is not for me to defend Mr. Debenham against "Free Lance's" criticism *re* planes of focus. The assertion referred to was made by him, not by me. But I do protest against the sneering style indulged in by your anonymous contributor. It ill becomes a man who shields his personality behind a *nom de plume* to refer to others by name and use such expressions as "glib platitudes," "display of pseudo-science," &c. Or, again, to select at his own sweet will single points of an argument and belard them with such expressions as "driven to extremes." If a writer adopts this style, let him take the frank and manly course of signing his name, that we may know who he is and what weight may attach to his utterances. To throw journalistic mud under an assumed name is the reverse of what should be expected from one who adopts the chivalrous title "Free Lance."—I am, yours, &c., PHILIP EVERITT.

London, October 20, 1890.

FRENCH CORRESPONDENCE.

(*From our own Correspondent.*)

Photography in the Island of Jersey—Emulation given to Photography in France—The Photo-Club of Paris—A Universal Flange—New Scientific Photo-chronographic Studies on Aquatic Propulsion, by M. Marey—L'Exposition des Sciences et des Arts Industriels at Paris—Proposed Exhibition at Moscow in 1891.

THE railway collision of August 18 on the Granville-Paris line of railway has prevented me from conversing on photographic subjects with the readers of THE BRITISH JOURNAL OF PHOTOGRAPHY, as the shock I received in that accident compelled me to abandon all work, especially that which would cause a strain on the brain. Being nearly recovered from my nervous irritability, I begin with pleasure my notes. During my excursion I visited the Isle of Jersey. This garden has been so often described that it would be fallacious on my part to recommence. I will therefore speak of the progress of our art, which I contemplated when going through that happy land. The establishment of M. Bandoux, under the intelligent direction of Mr. F. R. G. Stroud, the present owner, takes the lead in artistic productions, which are quite equal to those of the best houses in Paris. The happy few who have been blessed by the treat of a tour round this earthly paradise, have no doubt been able to judge of the work done by Mr. Stroud, for, as is the custom, this gentleman or his operators meet the coach by appointment and seize instantaneously the happy faces of the tourists, who receive a specimen the same evening. This method of operating Mr. Stroud assured me not only "brought grist to the mill," but was an excellent advertisement, and brought a numerous company to his studio. During my wanderings through the Isle I met with many an amateur taking a flying shot at the beauties of nature, a *souvenir* for the future. How happy must the young adept be in seizing so easily these mementoes to think that formerly only a few could indulge in such a pleasure. The art of drawing could only be attained by hard study and perseverance, and required time and patience to sketch the landscape—passing scenes could not be hoped for. How different now! Scenes can be faithfully delineated in the twinkle of an eye, and become a source of pleasure for ever.

Photography is becoming more and more in fashion every day on the Continent; all the large daily papers devote a column once a week to the *art à la mode*; amateurs and practitioners vie with each other in publishing manuals and guides for the study and practice of the pleasing art; it is fabulous the number of books sent out by Messrs. Ganthier-Villars et Fils on photography. Emulation does not stop here. New societies are rising everywhere, old societies are thriving at the same time. The Photo-Club, organized on the same basis as the Camera Club of London, is rising rapidly in favour, and will soon be in a position to take the lead. At their meeting on Wednesday evening week many proposals in the interests of the members were made and adopted. Many presentations of new cameras, apparatus, &c., were made. One drew my attention, that of a universal flange to hold any size lens. This flange is screwed upon the front board of the camera, and is constructed upon the principle of the "iris" diaphragm. When turned the full opening is attained; the lens is placed in the hole; the apparatus is turned in the contrary direction, and the "iris"-formed flanges pass between the ring and the body of the lens and hold it tight. A screw-head is turned, which fixes the "iris" flanges so that they cannot move. The ring of the lens is now screwed up. This gives a greater consolidation to the whole. Altogether a very useful accessory to the studio. A magic lantern representation terminated a very pleasant evening. In saying that it resembled the Camera Club of London, I need hardly say that the Club is composed of amateurs only. A large and well-lighted studio is at the disposal of the members to take the portraits of their family and friends; well fitted-up dark rooms and laboratories to make experiments, or develop the negatives made during a tour, are open

to the members, as well as the aid of a professional operator, all free of charge. The President of the evening, as well as the Secretary, informed me that their establishment was open to any member of the Camera Club during his passage through Paris.

M. Marcy, membre de l'Academie des Sciences, who has obtained such a reputation for his studies and photo-chronographic experiments upon the motions of quadrupeds and the movements of the feathered tribes, has now turned his attention to the locomotion of fishes and other aquatic animals, &c. Sometimes it is necessary to determinate the nature of the movements of the fin of a fish, which fin vibrates or undulates with such rapidity that the eye cannot follow it. M. Marcy, by the aid of photography, shows each undulation on paper and the time required by the fish to make such a vibration. Sometimes the contraction of a pouch drives out a certain quantity of liquid which gives motion to the animal. This propulsion is seized by photography. Aquatic locomotion presents great varieties of types, says M. Marcy, which can be now studied in a very precise manner, thanks to photography; and it may be presumed that when the knowledge of the variety of motion employed by nature be known, some one will be inspired to ameliorate the propulsions now used in navigating, or to invent a more rapid means than the steam propeller to get through the water.

If amateurs are on the *qui vive*, and introduce great modifications in the photographic art, professionals appear on the standstill. They were invited to take part in the "Exposition internationale des Sciences et des Arts industriels," now open in Paris, but few indeed responded to the invitation, and photography is hardly represented in that international *concours*.

A great exhibition is to be opened next year at Moscow, and the French are preparing to carry off honours in that strife for fame.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange 15×12 rapid rectilinear lens for half or whole-plate camera, three double backs, lens, and stand.—Address, A. JONES, 31, Percy-street, Tottenham Court-road.

Will exchange half-plate burnisher with spirit lamp, 12×10 burnisher (Marion's, for gas), Lancaster's Simplicity drop shutter with pneumatic release, Lancaster's view finder, and changing tent for developing, for 12×10 leather camera case, studio accessories, or Universal studio camera and slides.—Address, ARTHUR WHETTON, Photographer, Deddington.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," *2, York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

C. R. WILKINSON.—It is the alkali that is the accelerator.

H. J. GODBOLD.—The defects in the negative are due entirely to imperfect washing out of the hyposulphite of soda.

H. W. TUBB.—We have written to the party complained of. If you do not receive the testimonial at once, write again.

W. WICK.—The print is very much over-exposed. The paper is not at fault, otherwise the margin which was shielded from the light would not be bright and clear.

C. R. A.—You will not get on without a proper press. A small lithographic press, such as you require for experimental work, may frequently be met with, second hand, for four or five pounds.

A. HUMPHRIES.—You are evidently under a misconception with regard to the capabilities of the wet collodion process. Quite as large negatives, if not larger, have been taken with collodion as with dry plates.

SPECIFICATION.—If the specification is "out of print" it will not be reprinted if the patent has lapsed, but if it is still alive the specification will, no doubt, be reprinted. Write to the Comptroller, Patent Office, Publication Department, Cursitor-street, W.C.

HIGH PEAK.—All that has been published in connexion with orthochromatic photography has appeared in our columns. You will find it diffused through the last three or four volumes, to which we refer you. You will find several articles by Mr. C. H. Bothamley which are most valuable.

F. J. ROSSITER.—You cannot do better than advertise for specimens of the earlier processes in the columns devoted to advertisements. Hunt's *Photography* or Werge's *Evolution of Photography* form a fairly good history of photography; Hardwich's *Photographic Chemistry* for processes generally.

S. BELL.—The only method of obtaining deep purple-black tones on albumen paper is to strongly sensitise it and print deeply, and from a strong and vigorous negative. The toning solution is of only secondary importance if the negative be of the right character. Unless it is, no toning bath will yield rich blacks

J. SMALE & SON.—Shellac will answer fairly well, but wooden trays coated with paraffin-wax are preferable for containing silver solutions.

SCOTUS.—It must not be assumed that all photographic lenses are made by the persons whose names they bear, as many are only dealers who purchase the instruments and put their names upon them. Still, from a respectable house, you may reply upon a good article, although not necessarily made upon the premises.

R. HAWKINS.—Ordinary plate glass, even of the finest quality, is quite useless for a reversing mirror, whether it be fitted before or behind the lens. The glass for this purpose must be *optically* plane, which no commercial plate glass is. Any manufacturer of photographic lenses will supply the proper article, either plain or silvered.

TRAVELLER.—The print forwarded is an ordinary silver print, and not a mechanical one. It is surprising that such large and good prints can be supplied for a few pence each. We were recently shown some excellent photographs of Venice, about eleven by nine inches, that were purchased, retail, for about the equivalent of fourpence or fivepence each.

Z. A.—There is no "regulation" premium for apprentices; it is all a matter of private arrangement. We should say the sum mentioned is certainly an exorbitant one to be charged by such a second-rate establishment. As you are the lad's guardian, have it clearly stipulated in the indentures what branches of the business he is to be taught, wherever he is apprenticed.

SEPTIMUS.—The only way by which you can take full-length portraits in your studio is to obtain a shorter focus lens. With the one you have, eighteen to twenty feet are required between the camera and the sitter. One of nearly three inches shorter focus will be necessary. With such a lens good perspective will be impossible, but this cannot be helped if the studio cannot be lengthened.

C. H. EVANS writes: "Anent discolouration of bromides through imperfect washing of acid out of the print before fixing, would it be permissible to give a rinse with a weak alkali solution of carbonate of soda or ammonia?"—It is best to remove the whole of the acid by washing alone. Treatment with alkali is liable to cause a reprecipitation of the iron, so that it would be little or no better for the cleaning.

FITZ says: "My studio being under the Factories Act, would you kindly tell me through the columns of your JOURNAL if lady attendants in the reception room come under the regulations of the above Act?"—We presume so. The Act applies, we believe, to all females on the premises. The Factory Inspector of your district will give you all particulars, or you can obtain the Factories Act for a small sum from the Queen's printers, Great New-street.

RAPID.—1. All the brands of plates mentioned in your list are good, and are to be relied upon for all the purposes you require. For instantaneous work use the most rapid by either maker.—2. The longest focus lens will cover best, and will, all things being equal, work with the largest aperture. It is against our rule to recommend any particular maker's goods. You had better have the lenses on trial, as there is often a great variation in instruments, except by the leading opticians.

T. W. C. wishes to know the easiest way to test a lens to see if it works in focus.—The simplest method is to place, say, a newspaper some distance in front of the camera in a sloping position. Then mark an advertisement in the centre of the paper and focus accurately upon it and take a negative. If the point focussed upon comes out the sharpest, then the optical and chemical foci coincide. Should either before or behind the part that was focussed be the sharpest, then the foci are not coincident, and the necessary adjustment must be made after focussing. Before testing the lens the dark slide and the focussing screen should be carefully examined to see that they are in perfect register.

O. M. M. inquires:—"1. What size condenser is required to enlarge from half-plate up to 30×24, and what lens will be best, portrait or symmetrical?—2. Formula for intensifying negatives developed with hydroquinone?—3. Formula for reducing negatives developed with hydroquinone? Both reliable and easy to work, as I have just been using hydroquinone developer."—In reply: 1. To enlarge a full-sized half-plate the condenser should be not less than 8½ inches diameter. The lens may either be a portrait or symmetrical, whichever gives the flattest field when stopped down to an equal degree.—2. Any intensifier will answer.—3. The reducing agent we prefer is that of Mr. Howard Farmer, consisting of ferridcyanide of potassium with hyposulphite of soda.

R. H. LORD writes: "In your criticism of my picture, *Work and Play*, No. 478, you say, 'This is evidently an enlargement.' As the picture was taken direct the size it is exhibited, I shall be glad if you will kindly make this correction."

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, October 28, at the Exhibition, 5A, Pall Mall East, at half-past seven p.m., when the whole of the apparatus will be shown and explained. At the lantern show on Monday, October 27, the Field Club will exhibit their slides.

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THE BRITISH

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THE TREATMENT OF OVER-EXPOSURE.

In spite of the so-called "latitude" that most modern dry plates permit in the matter of exposure, it occasionally happens that mistakes are made of so serious a character as to be beyond the ordinary means of remedy. In such cases the best plan is, of course, to repeat the exposure if possible, but too often this is out of the question, and it then becomes necessary to resort to some special means. We were troubled with an instance of this kind a short time back, having exposed a number of extremely rapid plates under the misapprehension that they were of an entirely different and slower brand. Upon developing the first one, which proved a hopeless failure, the error was discovered, and the subjects being of some value, we set about to find the best means of saving the remainder.

An error of this description with plates of the rapidity of those in question is far more serious in its character than when the slower grades of films are involved, and in the case referred to the exposures had been at least ten times in excess of what would have really sufficed, while the plates were of a character that allowed very little latitude. The circumstances were, therefore, most unfavourable in every way, and offered but a poor prospect of eventual success. However, by the expenditure of a few more trial plates of the same kind we succeeded at last in judging a fairly favourable solution of the problem.

A plate similarly over-exposed was treated with a developer of pyro and ammonia containing a very large proportion of bromide, but this first trial only proved the perfect hopelessness of proceeding further in that direction. Mr. W. K. Burton has stated years ago that the only effect of bromide in such cases is to retard development without materially affecting the character of the ultimate image, and such was undoubtedly the case here.

In the next trial, hydroquinone was substituted for pyro, with carbonate of soda as the alkali, and again a very strong dose of bromide, in the hope that the increased restraining action exhibited by the latter, in conjunction with hydroquinone, might give a better result. To a certain extent this was the case, but still no practical advantage accrued. The image took over half an hour in making its appearance, and then came up all at once, the shadows being hopelessly veiled before anything more than a mere phantom had been secured. The effect of soaking a plate in a ten-grain solution of bromide of potassium previous to development was next tried, but even these strong measures proved of no avail. It is worthy of remark, in passing, that this was the earliest published method of developing gelatine plates, though the strength of the bromide solution was not so great as that just given. In the Almanac for 1874, Mr. P. Mawdsley, in his directions for the *Development of Gelatino-bromide Plates and Paper*, recommends soaking for "not less than five minutes" in a two and a half grain solution of bromide of potassium before commencing development, showing that at that early date the immense increase of sensitiveness was not practically recognised. The preliminary application was made for the purpose, as was then supposed, of preventing *fog*, and not, as was actually the case, to check a considerable excess of exposure. The emulsion of that day was, of course, far inferior in sensitiveness to that used now; otherwise, probably, even such treatment would have failed in producing clean images with the exposures then deemed necessary; but, as a matter of fact, we have seen negatives and prints made by Mr. Mawdsley in 1873 which were quite equal in that respect to any obtained at the present day.

Recognising the hopelessness of depending upon the mere use of bromide in any way, we cast about for some more energetic agent, and bethought ourselves of gallic acid, which we had previously found in 1886 to exercise a remarkably powerful restraining action when added to the pyro developer. Accordingly a saturated solution of gallic acid was made, and this was used in place of pure water, the other ingredients being added in various proportions. This gave a more promising result at first, but after a succession of trials, in which the quantity of bromide was steadily increased, a point was reached at which it ceased to produce further action, and still the desired end was not attained.

Still stronger measures were then taken, the plate being soaked before development in very dilute hydrochloric acid, but this, when when strong enough to produce any appreciable effect, was too little under control to recommend itself as a trustworthy remedy.

Bethinking ourselves of the well-known action of potassium bichromate in destroying the latent image and removing fog from emulsions, a preliminary bath of this salt was given; but here again, when the action became strong enough to produce any good effect, it was beyond control, or rather, the action proceeding invisibly, it was impossible to judge the correct moment at which to arrest it. Thus the boundary line between sufficient and too much was so sharply defined that it was a choice between a weak veiled image and one in which the shadows were completely eaten away. Given an image of the latter description, it was possible to develop it to any ordinary density, with the result that a hard, "black and white" negative was produced.

Almost giving up the task as hopeless, it occurred to us that if the progressive action of the bichromate could be

rendered visible and thereby brought under control, the problem was solved, but how this was to be effected was the puzzle, though not for long. Going back a few years we remembered some experiments made in connexion with a developing formula published, if we mistake not, by Mr. W. Hanson, of Leeds, in which bichromate of potassium was added to the pyro solution for the purpose of adding to the brightness and clearness of the negative. Here was the very effect we were in search of. At the time the formula appeared, we pointed out the danger of the addition of the bichromate on account of its powerful action on the undeveloped image, and stating the view that its use must necessarily involve a considerable increase of exposure; but we failed then to recognise in it a possible means for checking over-exposure.

We were not long in putting the matter to a practical test, the first trial sufficing to show that we were on the right tack at last, though not immediately successful. The mistake was made in using too much of the salt; and adding it all at once before commencing development. The effect of this was to apply too strong a check upon every portion of the image, high lights, and half tones alike, by which development was entirely arrested. Repeating the experiment, a minute quantity of solution was added to the developer at starting, and the effect of successive additions by means of a dropping tube as the development proceeded were watched and noted, with the result that the plan was found to be perfectly effectual and well under control.

The result was not arrived at in one or two trials, but our interest in the experiment as such had been aroused, and we devoted some time to it until we felt safe in applying it to the practical purpose originally intended. The result was that the whole of the remaining negatives were successfully developed, and if not as perfect as might have been the case with correct exposures, still they all gave fairly good prints instead of being hopelessly lost. The circumstances, to be sure, were aggravated, and the remedy was the only one of any avail. Under less pronounced conditions, therefore, there is no reason to doubt that still better results would have been secured; and it seems probable that the plan may take a permanent place for use in cases of emergency.

It is scarcely possible to lay down any definite rules for general adoption, as so much necessarily depends upon the character of the plate and the degree of over-exposure; but we think the following brief directions may be accepted as a guide. The strength of solution of bichromate employed in our experiments was "five per cent.," or about twenty-five grains to the ounce, but it would, perhaps, be safer to use it much weaker, say ten grains to the ounce, and to add it as required from a dropping bottle. In cases of known over-exposure, such as we have described, it may be added to the developer before its application to the plate; but where it is only a case of suspicion, it will be better to try the effect of the plain ordinary developer first, and to apply the check as required. The capability of doing this renders the method one of easy adoption, even in cases of over-exposure arising unexpectedly, and a dropping bottle containing bichromate solution may be found a useful addition to the laboratory.

It should be borne in mind that the action of the bichromate will be stronger in proportion to the quantity of bromide present, and this must therefore be taken into account. If the development be commenced with a normal proportion of bromide, *i.e.*, sufficient for the ordinary requirements of the particular plate, and the necessity for the use of bichromate arises, no further addition of bromide need be made. If, on the other hand, a further addition of bromide has been made before using the bichromate, it will be necessary to make due allowance when adding the latter. It will be also useful to bear in mind that as the development proceeds and more bromine is absorbed from the film, the effect of the bichromate becomes gradually more powerful, and that therefore its addition must be made with the utmost care in order to avoid destruction of the fine details in the shadows, which are last to make their appearance.

The negatives made with this addition are singularly bright and clear in the shadows, and where considerable density is required, will permit the development to be pushed to the utmost point without fog or veil. From this point of view it seems likely that the application may prove useful for a variety of purposes, but especially in the production of line or other negatives for "process" work, in which department gelatine is admittedly at a disadvantage as compared with collodion.

BACKGROUNDS AND HOW TO HANG THEM.

When dealing with this subject, especially in regard to the sloping of a background to any particular angle required, we promised to describe a method which we had seen where the difficulties inherent to such a plan had been successfully overcome. Premising that no claim for novelty was made, though as a matter of fact the photographer using them had planned their arrangement without having seen any similar plan, we may say that essentially it consisted in stretching the background on to a frame which ran on castors. It could thus be transported from one end of the room to another, from side to side at any angle whatever with regard to the dominant light direction. Further, this moveable screen was reversible, that is to say, there was, to begin with, a background on each side. One remarkable quality of the screen arrested our attention by reason of an accident. A blow happened to be given to it, but not an indentation was made, while with an ordinary background stretched on a frame a deep indentation would have been made that would not have disappeared for weeks.

The screen was built first of a stout wood framework, with crosspieces to prevent warping. A triangular end was then placed at each side to form a supporting foot to prevent a downfall, and to each of these triangles was placed at each corner of its base a good strong castor. We were fortunate in being able to see a portion of the next step in the building. Each side was covered with strong grey calico, carefully and evenly stretched, and then commenced the process for strengthening this calico, which was done by pasting it over with white paper, the kind termed by paperhangers white lining paper. It was cut off in lengths and pasted with the junction of the pieces made even laid against one another, and not overlapping—the paperhanger we saw engaged upon the work terming it jump-jointed—the object of this more difficult work being to avoid the junction showing if the paper were afterwards painted up. The coatings of paper dry, a fresh covering precisely similar was given, and also a third when the second was dry. The result was, in effect, the building up of a large sheet of cardboard, flat, strong, and durable. The surface was then ready for painting upon in either oil or distemper. Our informant said he always preferred to lay a ground of solid oil paint, whether the ultimate surface was to be either in distemper or turpentine flatting.

We may here interpolate an important caution. We have

explained that we saw one of these portable screens in course of construction, but its building up differed from what we have described, in that one side only was calico covered and papered, a new background, specially required, having been hastily stretched over one side. After the second coating of paper had been given, its contractile power was so strong that it had completely warped the strong woodwork, curving it to the shape somewhat of a saucer. The result was, the background first fastened had to be removed, and the calico covering and papering adopted. We have since learnt that three coats were given before the warp was reduced, and that the drying of the third produced a warping in a contrary direction, which was almost, but not quite, remedied by a third coating of paper upon the side originally covered, it having had two coats only. It is thus obvious that whenever such a screen is covered with paper it must be treated alike on each side at every stage. The immense pull the drying paper can exercise may be conceived when we say that the framework was of well-seasoned timber nearly three inches thick.

The particular backgrounds we saw on the occasion of our visit were three in number, and they were wheeled and twisted and turned with the utmost ease and celerity. It would be difficult to imagine a more ready means of utilising to the full the power of a background. We have often seen in pictures with pictorial surroundings a well-posed figure exceedingly badly arranged in regard to the background, and upon our criticising it receiving the reply that the subject had fallen in such a pretty position the operator was afraid to disturb her lest he could not repeat it. With a background on castors this would not happen.

We will conclude this portion of our subject by explaining that the built-up screen of calico and cloth we have described was not necessarily to be painted at all. It was always prepared whenever a fresh pictorial background was taken into use, the cardboard backing forming a perfect protection against an awkward push with a head-rest, the careless crushing of a table against, or, in fact, any of the numberless accidents to which it is evident the average background has to submit.

NATURE AND PROPORTIONS OF EMULSIFIED SILVER HALOIDS.

In the course of the first part of his extremely valuable article on the reversal of the negative image by thio-carbamides, Colonel Waterhouse remarks that "now dry plates are so invaluable and so largely used for scientific researches of all kinds, it would be a great convenience, at any rate to distant workers, if dry plate makers could indicate on their dry plate packages the nature and proportions of the haloid salts used in the emulsion." This suggestion is a happy and valuable one, but we are certain we should be doing Colonel Waterhouse some injustice if we attributed to him any expectation of seeing it carried out while human nature remains as it is.

There is, of course, no difficulty in deciding for one's self what are the component haloids of a particular emulsion, but if we wish to find out the proportion of iodide to bromide of silver it is, perhaps, barely necessary to say that these are the silver salts usually employed for negative films—the obstacles in the way are practically insuperable; at any rate, to all but the most skilful. Most brands of plates are made in three degrees of rapidity—slow, medium, and very rapid—and we are probably correct in surmising that the first-named kind invariably consists of a mixture of iodide and bromide, that the medium are of pure bromide, and that the very rapid, like the slow, are often of bromo-iodide, although the proportions and method of preparation are quite different. At the same time, many of the very rapid brands are still formed of pure bromide only. Facts like these concerning the nature of the haloid salts used in modern emulsions are no secrets, being far too obvious to most experts, although the plate makers maintain an air of mystery on the subject that puzzles and deludes many who are by no means without a large fund of intelligence.

Looked at from their own standpoint, or, indeed, from that of most rational outsiders, it would be highly unwise of plate makers to label their boxes with the information Colonel Waterhouse would like to have. In a commercial sense such a proceeding would amount to a height of self-sacrifice so lofty as to verge on the sublime. Besides, such information, to all but a small minority of plate users, would be neither useful nor intelligible. The average amateur and the ordinary photographer are quite uninterested in fundamental niceties so long as they are successful in exposure and development.

During the past few years several manufacturers who made a feature of calling their plates "bromo-iodide" have dropped out of the market, although others who have adhered to such vagaries of nomenclature as "twenty times," or "ordinary," or "slow," have maintained their position. In taking the public into one's confidence it is possible to be too generous. Again, have not trade rivals eyes to see? Numerous secret prepartions found in commerce owe a great deal of success to the ignorance of consumers and competitors as to ingredients and proportions.

There is no doubt at all that experimenters and investigators, as well as science generally, would reap considerable gain from the diffusion of a more perfect knowledge of the precise constitution of sensitive films. At present, on account of the deficiency, most of the experiments of which commercial sensitive compounds form the subject are only of particular, or rather restricted, value. So many brands of plates are pitted one against the other, and results arrived at which are rarely capable of accurate repetition or confirmation, and consequently form no reliable source for common reference. The experimentalists are forced to proceed on the assumption that they are ignorant of the precise nature and proportions of the haloids; whereas, if they knew that a certain emulsion consisted of iodide and bromide in given proportions, their experiments would be simplified, and the results of them more instructive.

This leads us to suggest that in cases where the information is asked for by persons whose eminence in science and personal reputation are sufficient guarantees of their good faith, plate makers might advantageously, as well as safely, communicate it. It would be in every way better to know the action of chemical compounds upon sensitive films of a precisely ascertained nature and proportion than it is to learn that the plates of one maker have properties in which those of another are lacking. We received this impression when perusing Colonel Waterhouse's article. "Different makes of plates," says that gentleman, "show different capabilities of reversal" (with thio-carbamides). "Possibly variations . . . will have to be made for different makes." Experimental work of this kind would obviously be much easier if we had a better knowledge of the plates. Some day we may obtain a standard emulsion, or emulsions, for universal reference. In the meantime we submit our suggestion to scientific men and plate makers alike, in the hope that it may be found of service.

To many it would be interesting to know the exact details of the preparation of ready-sensitised paper, of emulsion papers, of innumerable developing, intensifying, and other solutions, though we do not suppose that such knowledge will ever be available. But the aspiration will illustrate the extent to which photography has, if we may use the term in this connexion, to go on in the dark. For example, the causes of the diseases of ready-sensitised paper would possibly remain no longer obscure if we could be certain of the method of its preparation from start to finish. Moreover, similar information would be of the highest service in regard to card mounts, which often cause great trouble to photographers.

The example set by the Photographic Club on Friday night last is one that might well be followed by every Photographic Society in the kingdom. The Club arranged a lantern exhibition, with music, the proceeds to be presented to the Photographers' Benevolent Association. From the number of tickets sold and the crowded hall, there is little doubt that a very acceptable sum will be handed to this deserving institution. Every Society can get up a tolerably good lantern show, and, doubtless, numbers amongst its members some amateur musicians. If they would devote one night annually, as the Club have done, for the benefit of the Association, the members and their friends would find it a very enjoyable evening, with the satisfaction of knowing that the sum realised, however small, will be very acceptable to the Association, which is much in want of funds. The idea is commended to the Executive of every British Society.

The *Pall Mall Gazette* is apparently under a misconception with regard to photographers and their copyrights, for after referring to Mr. Byrne *versus* Lord George Hamilton, they say he (Mr. Byrne) is not the only photographer whose treatment of public men is peculiar. Mr. Barraud, of Oxford-street, appears to be another, although in a different way. It appears, from an extract from a Scottish paper, that the publication of the "combined portrait of Mr. and Mrs. Gladstone was withheld in consequence of the objections of the photographer, although Mr. Gladstone's consent was made known to him." Our evening contemporary adds, "It seems hard that a member of Parliament should not be able to present his photograph to his constituents 'in consequence of the objections of the photographer.'"

We do not know anything of the circumstances in the case of Mr. Barraud, but one thing is certain, and it is this: If any one, whether a celebrity or not, sits at the photographer's solicitation, and is supplied with copies without payment, as is the universal custom with public characters throughout the profession—Mr. Byrne, perhaps, excepted—the copyright in the portrait is the property of the photographer. The sitter has no more right to give his consent to its publication by others than he has to that of any other person. If members of Parliament wish to control the publication of their portraits, they must pay for the sittings, instead of being taken gratuitously. Why would photographers be at the trouble and expense of taking portraits free of charge if they did not acquire the sole copyright in their work?

The "consent" of even greater personages than members of Parliament will not override the law of copyright. Here is a case that was brought under our notice some years back. A well-known firm of engravers desired to publish a large portrait of a prominent member of the Royal Family. Consent was given, and sittings accorded; but with the view of curtailing the number of the latter the artist was requested to do as much of the work as possible from a photograph that had been taken by a London firm some time before at their solicitation. This was done, and when the work was finished and the portrait issued, the photographers commenced proceedings for infringement of their copyright, and the engravers had to pay a considerable sum to compromise the matter.

There has been a great fall in the price of silver, over sixpence per ounce. A few weeks back it was 54½*d.*, one day this week it was quoted at 47¾*d.* per ounce. This great relapse in price is almost, if not quite, unprecedented within so brief a period. The fall in the value of the metal has been accompanied by a reduction in the price of the nitrate, though not to a corresponding extent at present.

Photographic exhibitors at the Edinburgh International Exhibition have no reason to complain of the number of gold and silver medals awarded amongst them. Awarding and giving medals are two different things in connexion with this show. If the exhibitors wish to have the medals they have been awarded, they can only do so by purchase. Some exhibitors have made complaints of this arrangement in the daily press, but we consider they have no right to grumble now, as this condition was distinctly stated in the prospectus first issued by the Executive. This is the first occasion, we believe, at any international exhibition in the United Kingdom where a charge has been made for the medals awarded, though there are two or three instances where it has been done on the Continent. Of course, when the medals are sold the Executive can afford to be more lavish in their distribution. Few of the photographers who have gained them will, we imagine, go to the expense of possessing them, particularly the gold ones.

A short time back we referred to prints made on opal glass which could be viewed either by reflected light or as transparencies. These pictures make excellent slides for the stereoscope, as they may be seen either way, and thus they become a novelty. Unfortunately, however, most of the opal glass now in the market is too coarsely ground for small and delicate pictures. Also, it is much thicker than is desirable, as, when protected with a glass in front, it becomes too bulky to be convenient in the stereoscope, as well as being too opaque for the picture to be seen to the best advantage when viewed as a transparency. Possibly those who supply sensitive opal plates may be able to furnish plates of the stereoscopic size with thin glass and a finely ground surface. Opal, with the surface and substance of the glass used for backing the French stereoscopic slides, would answer the purpose admirably.

A daily contemporary announces that two Frenchmen intend to explore the North Pole in a balloon, and that photography will form one of the leading features of the expedition, so also will meteorological and astronomical observations. Photographic "views the North Pole" would certainly be interesting, and these, our contemporary says, they purpose taking. As the expedition will not start before 1892, there is plenty of time for completing the arrangements. We wish the expedition every success.

Photographers had undoubtedly good ground for their complaints of the weather during the summer months; but they have been favoured with one of the finest autumns on record for many years past. The weather has been genial, and there has been an absence of wind, which is quite exceptional at this season of the year. Although the leaves began to change their colour earlier than usual, they have obligingly remained on the trees longer than is generally the case under similar circumstances. As a rule, spring and autumn landscapes are preferable to those taken in the height of summer. Most of Mr. Vernon Heath's best landscapes were, we believe, taken in the autumn.

PHOTOGRAPHIC SOCIETY'S EXHIBITION.— V.

Harry Tolley (No. 396 and other pictures).—There are eight all hung together, one being the medal picture, and an exceedingly choice collection is the result. Three subjects, where moveable objects are introduced, show artistic design in their arrangement. The scale of tone has been well manipulated, and a most valuable study—that

of endeavouring to arrange the highest lights in the composition in the most effective and harmonious position—has received close attention. These subjects are very simple in their normal condition; but in the selection of figures, both human and animal, the artistic capacity has had full play, with a most successful result. The first three pictures contain agricultural men and horses, who have been placed in the right position for assisting not only the light and dark portions of the picture by their possession of great contrast, but they produce just that amount of personal interest which confers upon an otherwise ordinary bit of nature that sympathy and attention which converts the commonplace into the picturesque and pleasing. There are some other photographs of nature by this exhibitor without figures. Here again artistic expression has been most carefully studied, inasmuch as the natural objects possess in themselves a higher grade of character, and so can depend on their own merits. It is in this perception of what is effective, and the converse, which just makes all the difference between two otherwise well-manipulated pictures.

H. Dudley Arnott (No. 413), *Norwich Cathedral*.—This is a large picture, about 24 × 18, and being bromide, we assume is an enlargement from a small negative, which must have been an exceedingly good one and full of detail. These interiors are exceedingly difficult to deal with, the colour of the wood being so opposed to the very light stonework that it becomes almost impossible to render the original quite in its apparent effectiveness. This photograph, however, has been very carefully manipulated, and suggests the effect of the original.

Henry Stevens (No. 415), *Esquimaux Chief*.—The studies of figure subjects, mostly heads, which this exhibitor once famous for his unique pictures of flowers) now shows, and all of which are marked "taken direct and untouched," are evidences of great perseverance in grappling with the difficulties of figure studies when compared with immovable objects. They evince a determination to succeed, and there are signs in the present exhibits that show much thought and design have been given to these various studies. We think the best is the *Esquimaux Chief*, which has been very well arranged as a model, and then very nicely photographed. Other studies of young girls' heads also evince considerable thought in the arrangement, and as specimens of pure scientific work, without adornment, are very interesting. In some latter-day photographs by others, where the nature has been worked out by uneducated hands, it is not a little pleasant to see some specimens where nature is revealed without sophistication.

F. Thurston (No. 420), *Right Hon. W. E. Gladstone, M.P.*—This is a carbon enlargement, which has one good quality about it: the portrait has been kept almost the lightest part of the photograph, and it may be alluded to as constituting a most essential element in portrait work, which is very well shown in this study. There is, however, one matter to which we call attention: the large amount of picture when compared with the size of the head. This causes the head to appear small, otherwise for this little matter the whole treatment of the subject is very quiet and good.

W. Barry (No. 431), *Naples Fisherman*.—Another carbon enlargement, very nicely done from the original negative, which shows good work on the part of the exhibitor. The figure has been very carefully posed, the light dress exceedingly well rendered, and then comes the too dark effects on the shaded side of the face, as the arrangement is for an outdoor scene. How could such a dark side be possible in the open air? The picture otherwise has so many good points that it merits close attention.

John Collier (No. 432), *Cardinal Newman*.—This is a very good study of the late Cardinal, enlarged in carbon, taken almost profile, sitting on a chair with one arm resting on a table. In this study the head and face have been made the most prominent light in the picture. the shadows and shades on the face have not been exaggerated, the result being very natural and effective. The same treatment has been given to a series of portraits in No. 651; these also have been treated in the same way, and a lady's portrait in the centre of the nine exhibits shows some skill in the arrangement of drapery flowing over both shoulders. This has been most carefully arranged, and although very light in tone, does not deprive the face of its rightful position as the centre of attention, which a portrait should be.

Hon. Slingsby Bethell, C.B. (No. 443), *New Forest*.—This is a bromide enlargement, and whatever size the original negative may be, it has been well manipulated, there being a very careful attention to detail in the old stems of trees, which form the chief point of interest. They have only been taken about half way up in height, a selection which does not always result in the best pictorial view; at the same time, the two trees chosen for the purpose are very picturesque, and have been well selected. Nos. 550 and 551 are bromide enlargements of tapestry. The negative—presumably a small one—must have been very carefully manipulated to produce so much detail as these copies show; and, irrespective of the translation of colour into proper values in black and white, the results here shown are certainly very interesting, and deserve much praise.

Gambier Bolton.—Possibly some few remarks in reference to our criticism on No. 347 by this exhibitor may not be out of place, and we cannot but allude to possible difficulties which may arise when a picture has no name given to it, but only a quotation, which can just as appropriately be attached to any other exhibit. However that may be, we will endeavour to make amends by stating that the photograph is that of a kitten taken with a perfectly plain background, and is an attractive picture from its well-selected position and its photographic rendering. The *World of Wonder in her Eyes*, to quote its only title, is exceedingly well caught, and a great photographic result has been achieved from a small model.

F. Downer (Nos. 449, 450, 451).—These three photographs are carbon enlargements, and as pictures, where Professor Herkomer, R.A., is playing the part of 'Philippo,' are all alike in their backgrounds, which are very light. This gives prominence to the outline of the various attitudes; and as the celebrated artist painter is also a very good actor, it follows that the attitudes receive their expressiveness from a high source. At the same time, much credit is due to the exhibitor for the photographic rendering of the same.

Window & Grove (Nos. 464, 465), *Portraits*.—Two frames of portraits which are very good specimens of the original method of producing photographic work; that is, as closely like the object as the scientific materials would permit, which, after all the latest departures from absolute truth, both in the treatment and the abnormal conditions of every-day life as regards lighting, as seen on the faces of our friends, is very welcome, because we are asked to look at the portrait first, and anything else afterwards. In a study the vagaries of individuality may be looked at with pity, if not always with sympathy, but in a portrait, where photography comes forward to assert facts, those should be given with the least possible amount of absolute wrong, which we contend is the case when the deep shades and the unskilled working are so prominent. We deeply feel the importance of this subject, and therefore our remarks are also deep.

S. T. Chang (No. 442 and twelve other smaller pictures).—We notice these pictures for the purpose of calling attention to the interesting fact that these exhibits have been produced by a member of the Chinese Legation, who is now so well known at many photographic meetings. The picture selected for notice is a view of Conway Castle, showing a selection of objects for foreground matter by this indefatigable worker which will soon result in some studies of a more advanced character.

H. S. Mendelssohn (No. 580 and six other portraits of ladies).—These are portraits treated somewhat after the manner of studies, and we must allude to some background portions of three, where the same bit photographed, as an objectionable spot of light tone, which, apparently, being jealous of the fair sitters, asserts its presence in arresting attention from them; there is also an angularity in the furniture which forms a false discord to the outline of the light draperies, which, if otherwise treated, might have resulted in more pleasant pictorial results.

Fred W. Jackson (No. 615), *East Anglia*.—A series of eight small bits of architectural subjects, with some river studies. These photographs, although limited in size, show a taste for picture making, both in choice of subject and treatment; and it may be assumed that in a short time some more important and advanced pictures will be shown.

A. R. Dresser (No. 617), *At the Zoo with a Hand Camera*.—A frame containing sixteen studies of animals, including the zebra, and birds, where the position of each appears exceedingly well chosen, and

possibly more natural than when a fixed camera has been used. The capacity for moving with the object which the hand camera permits has most certainly presented some phases of position which are very interesting.

J. W. Holcombe (No. 625), *Italian Ideals*.—There sixteen studies of various subjects in this frame, consisting of figures and views, which all seem to contain the choicest material for picture making, and which have been artistically treated for position and effect, but they must not be considered too closely from the photographic side, which, if it had received as much careful attention as the point referred to, would have resulted in some very good work. The scientific claims of photography must receive as much attention as the artistic.

H. Collis Pettit (Nos. 53 and 284), *Langdale Pikes* and *Derwentwater*.—Two large bromide enlargements, about 30 × 20 inches, of some well-chosen views in the Lake district, which show that the original negatives must have been very carefully treated to have produced such good enlarged results; and yet there arises a sense of something not quite satisfactory from the pictorial point of view, which we think arises from their colour, which is that of a greyish tone; a warmer tinge would have entirely changed this result, and have produced a sympathetic interest in these otherwise very choice results of photographic work.

REMOVING SILVER STAINS FROM A NEGATIVE.

A VERY frequent trouble in some photographic establishments is a silver stain on the negative caused by the paper during printing.

The negative may have been hurriedly put out to print before being quite dry, and may have been left out during rain; the sensitive paper, by one unfortunate accident or another, may have become wet and adhered to the negative, resulting in a brown stain, which, unless removed, renders the negative absolutely useless for good work. Various remedies have been suggested for its removal with more or less satisfactory results, mostly less.

The following method which occurred to me, and which has thoroughly succeeded in my hands, is to flood the plate with a solution of mercury bichloride.

Let the bleaching action proceed to a very slight extent; in fact, watch the negative until the stains are just gone, and then wash very abundantly with water.

If the mercury treatment be carried too far, the negative will be reduced in density to some extent, but if stopped in time, it is the readiest and most effectual plan for removing silver stains from the gelatine film. Should the negative have been varnished, it will, of course, be necessary to remove the varnish before applying the mercury. This can be done by soaking in warm alcohol.

THOMAS MAITLAND LAWS.

MIXED DEVELOPERS.

A YEAR or two ago, when hydroquinone was commencing to be popular, and almost every one had something to say about it, I noticed a statement reported at one of the meetings as to the importance of not using the new developer in vessels that had been used for pyro, as the slightest trace of the latter insured failure. This rather surprised me, for from the character of the two substances I could see no reason for the effect. To put the matter to a practical test, I mixed pyro and hydroquinone in equal parts with the usual proportions of sulphite, and compounded a developer which, with carbonate of soda, did not seem to differ very materially in its results from pyro and soda alone, though it was much slower in action. According to the above-quoted authority the result should have have been slightly different.

However, there appeared to be no advantage—rather the reverse—in the mixture, so it was given up. Shortly afterwards, or about the same time, a suggestion was made, in connexion with the slowness of action of hydroquinone, that the development should be commenced with pyro and finished with hydroquinone. This proved to possess the advantage that the image could be started with the more rapidly acting pyro, and finished with character and qualities of the newer developer, so securing the advantages of both. Another point in favour of this method is found in cases where density is difficult to attain with pyro, namely, that hydroquinone may be used as an intensifier. In this sense the double application is reasonable enough, but I scarcely think that for the sake of saving a few seconds in development it is worth while to employ two separate solutions to perform the work of one at double expense.

In the case of eikonogen the matter is slightly different, for I think it is generally conceded that with a very brief exposure more detail is obtained than is possible with pyro under precisely similar conditions; but the result is accompanied by the drawback of difficulty in getting printing density. Here the application of hydroquinone as an intensifier seems perfectly legitimate, for in cases of under-exposure, or where the exposure is necessarily as rapid as possible, the valuable services of both eikonogen and hydroquinone may be combined.

Conversely, in using hydroquinone, if preference be given to that developer, should there be a difficulty in obtaining detail from under-exposure, eikonogen may be used with advantage in finishing the work the slower solution has failed to perform, and I have more than once availed myself of this method of getting the best out of an under-exposed negative. In such cases there is no absolute necessity to wash the plate between the two applications, though it is perhaps better to do so, if only in order to get rid of the slowing action of the partially spent developer.

Here, by the way, is a fact not generally recognised, though it is years since it was first pointed out, that where a negative requires "pushing" it is far better to wash off the partially spent developer and to apply a fresh one *of the same strength* than to go on strengthening the first. The spent developer contains a greater proportion of restrainer than it did at first, and requires a relatively larger addition of alkali to produce the same result than it would do if the quantity of bromide it contains could be reduced. The larger dose of alkali brings increased risk of fog, hence it is better to start fresh with the normal proportions.

I notice in last week's "Foreign Notes and News" that Dr. Liesegang has recommended a combined hydroquinone and eikonogen developer as combining the good qualities of the two elements. I made a similar experiment some months ago, but with different proportions to those stated in Dr. Liesegang's formula, my quantities being equal parts—two grains of each to the ounce of solution—instead of two grains of hydroquinone and six grains of eikonogen as recommended by him. With the smaller proportion of eikonogen the rapidity of action is very much increased as compared with hydroquinone alone, being about equal to that of pyro, while the result is almost identical with that of hydroquinone by itself. We have thus a ready means of increasing the working rapidity of hydroquinone without altering the character of its performance, and have, in fact, a "stainless" developer that acts as quickly as pyro.

Those who complain of "hard" results with hydroquinone may find an advantage in increasing the proportion of eikonogen so as to introduce more of the character of the latter into the solution. Such a combination gives an image combining more detail with the same amount of vigour than would be obtained with hydroquinone alone; and naturally, as the proportion is increased, so will the image be softer.

With the mixture of equal parts the character of the hydroquinone does not appear to be altered in the slightest degree, except in the matter of the time the image takes to develop. I find the same tendency to "patchy" development, especially in the presence of bromide, that has been noticed in connexion with hydroquinone alone, more particularly on paper. Why this greater tendency to abnormal action upon gelatino-bromide *paper* than upon *glass* is a puzzle which, perhaps, only the makers can explain. In any case, where such patchiness presents itself with any particular kind of plates or paper, the addition of eikonogen in increased proportions will, no doubt, prove a remedy. I have not to my recollection noticed the effect with the 2 : 1 proportions, though that may be simply from not having used those proportions on plates or paper of the right kind to produce it.

I think the mixture of hydroquinone and eikonogen is likely to prove a useful and practical one, and not, like the corresponding combination with pyro, merely a useless complication.

W. B. Bolton.

PRINTING ON ALBUMEN PAPER.

What can be said of albumen paper, that long-suffering, ill-used servant of the photographer? How often has it been abused in the columns of our periodicals; how often do we hear the cry that it does not fill the requirements of the photographer; and how often have manufacturers endeavoured to displace it in public favour by the introduction of collodion and gelatine papers!

Notwithstanding that albumen paper has long outlived its infancy, it is still subject to many diseases incident to childhood, namely, scarlet-rash, measles, spotted fever, and eruptions of the skin, &c., and then the many cases of general debility and weakness; that impure, impoverished condition of the blood, producing the distressing malady —blisters, which is the worst of all, and by far the most difficult of cure. All this may be true, and yet I know nothing more amenable of kind treatment than albumen paper.

It will not be necessary to go into the particulars of its manufacture, they are too well known. In fact, nothing that I can say is entirely new. The whole story is something more than a "twice told tale." With the full knowledge of its manufacture, and with the instruction given in the standard text-books, it is difficult to understand why so many complaints appear in the columns of our magazines. One cannot run through a copy of any one of our photographic journals without meeting subjects with such titles as *How to Prevent Measles, How to Prevent Blisters, What I Know about Blisters*, &c.

A photographer from Texas, writing to *Anthony's Photographic Bulletin*, says that for ten years he has been trying to find a brand of paper that would blister under his treatment. Another retorts in the next number of the same magazine that all brother —— has to do is to come over to his country and he will be seeking for a brand of paper that will *not* blister. One will advocate plenty of alkali all through the manipulations, and a weak hypo bath with about an ounce of strong ammonia to each gallon of solution, and defies blisters. Another says, Not so much ammonia and strong fixing bath. One suggests from thirty to forty minutes fuming, another twenty to twenty-five minutes. One writes that the water is so hard in his locality that he can't do anything with his prints in toning and fixing unless he first softens the water with more lime or ammonia, and that his prints were covered with a white deposit, which he cleaned off with acid solution after they were fixed and washed.

It is not my purpose to enter into an argument as to the best method one should employ in the production of silver prints on albumen paper. Any of the methods given in our standard text-books are thoroughly reliable, and the mere fact of their being published in these books is a sufficient guarantee of merit. Therefore, this being the case, it simply resolves itself into the manipulation and the working. There are certain rules to be observed, namely, cleanliness and an attentive regard to the condition of the chemicals and weather. This done, the intelligent printer is prepared for any emergency, and watches the barometer very much as a physician would watch the pulse of his patient, and can guard against the varying conditions of the temperature, and thereby prevent the ills so much complained of. A little experience and observation will soon teach him that red measles indicate weak silver, or not an over-strong bath and insufficient fuming: that black measles show that his paper is insufficiently dry before fuming; that rusty brown printing means an acid condition of the silver solution, or a bath very much clogged with impurities, albumen, &c. These two faults will also produce red measles. (At a time like this the bath must be renovated by evaporating and sunning.) That prints which come up hard and blue, lacking brilliancy, and with a crackling appearance, indicate a very alkaline condition of the bath. Albumen paper will take up the silver solution more readily and evenly if it is previously dampened in a box built for the purpose than it will in a dry condition. When it is slightly limp, the tendency to tear in cold weather will be largely overcome, but this will not occur if the sensitising room is kept at a uniform temperature of 70°. Again, prints bronzing too deeply, even in the light shadows, indicates too much strength of silver; and that this same strong silver will also produce measles of a peculiar kind, owing to the lack of silver absorption in the sheet of paper.

Do not forget that strong silver has a coagulating effect on the albumen, and that the paper must be floated sufficiently long to permit the saturation of the albumen film. If this is not done, the effect will be much the same as when the silver is weak. In toning, the intelligent printer will learn that in those prints which evinced symptoms of measles the disease will develop with frightful rapidity, and that the prints are for ever ruined. He will observe that the rusty brown prints cannot be improved in toning.

He will also have cause to remember that prints which indicate excess of alkali will, ten chances to one, soften in the toning bath, and the surface is likely to rub completely off, and that a too rapid action of the chloride of gold will cause a precipitation of the metal in the form of minute red spots. In such a case common salt added in small quantities will act as a restrainer. Any one can hinder the toning by too much salt or too much soda, and also thus assist in softening the albumen, causing blisters. All these things will teach the printer that in no case are extremes of strength or weakness, alkalinity or acidity, desirable; and that the sure road to success is in the "happy medium" path. Now, we must refer again to the diseases of the blood, namely, blisters.

We all know that strong acids and strong alkalies possess a wonderful affinity for soluble matter, and that for which the acid has no liking the alkali is sure to have a deep regard. Few things are beyond the reach of both. Therefore, it follows that if any substance soluble in acids or alkalies is subjected to the action of acid or alkali solutions sufficiently long, a complete disintegration of the particles will take place. So it follows that a silver bath made strongly alkali starts up the action of dissolution in the albumen sheet, which is supplemented by heavy fuming carrying on the action still further, and by the time it reaches the toning bath the albumen is quite ready at times to part company with its support. In some cases the whole surface is affected; in others it spots only. On the other hand, a treatment in which there is too much acid will act in much the same manner. Here, then, to my mind, is the cause of blisters in albumen.

The above statement being accepted as a fact, there will be no difficulty in avoiding blisters. Each worker must be influenced by the conditions under which he labours. If he is located in a district where the water he is obliged to use is about normal, we may say then there need be no difficulty in keeping the middle path. On the other hand, if he lives in a district where the water is thoroughly impregnated and charged with lime and salts of magnesia, then he had best adopt the plan of working his chemicals slightly acid, and in some cases it may be necessary to treat the prints before toning with a bath of acetic acid water, thereby counteracting the evil influence of the alkaline water. The actual cause, then, of blisters is the softening of the albumen film in spots that have been the most susceptible to the softening influence. This action has not been continued sufficiently long to effect a dissolution of the film itself, but has only acted in such a way as to loosen it from its support. Once loose, the water and air work their way through the porous back of the sheet, and consequently blisters. If the effect has been produced by excess of alkali, one hardly wants to increase the evil by adding ammonia or soda to the hypo solution. I doubt if softening is ever occasioned by extreme acidity. The prevailing idea is that everything should be worked in an alkaline condition; therefore, one would hardly look for excess of acid in a case of blisters. As I said in the first place, it is not my intention to make a long argument, and have dwelt upon the subject of blisters because I think they are the greatest source of trouble.

One other point is the stretching of the paper. This is an important matter, especially in portrait work; for unless the printer is careful to cut his paper all one way of the sheet, a curious assortment of fat and lean portraits will be the result. This is the only way to avoid the difficulty. It can be partially overcome by immersing the prints in glycerine and alcohol; but this, aside from the expense, would require too great an outlay of time for commercial work.

In conclusion, I would say that I have made no mention of any particular brand of paper. I believe that all the standard makes are good, and can be successfully worked by any of the ordinary methods, providing a proper amount of intelligence is incorporated into the manipulations.

Chas. T. Fellows.

—*St. Louis and Canadian Photographer.*

THE FUTURE OF AMATEUR PHOTOGRAPHY.

A visitor to the Exhibition of the Photographic Society in Pall Mall East, initiated in some degree into the mysteries of the popular art, and impressed by the latest discoveries of some of its more nimble-witted devotees, might be pardoned for indulging in extravagant anticipations of the future of amateur photography. He might picture to himself the day when all that will be necessary on behalf of the new aspirant will be to go to a dealer and inquire for a "patent automatic self-photographing camera," some "self-developing plates," and a packet of "can't-go-wrong" "printing paper." Thus furnished, he will touch a spring or

press a button, pour out some ready-mixed solution from a bottle, and in the twinkling of an eye produce a portrait of a friend, a bit of landscape, or a street scene, and be able to say with a blush of conscious pride, "Alone I did it."

Once on a time photography—even of the amateur kind, what little there was of it—was to a large degree an art, and to a considerable extent a science. There are those who say it is so now; though even they admit that its rough paths have been made marvellously smooth. Then the operator had to understand his business. He had to have a considerable knowledge of chemistry, to be a skilled, careful, and methodical manipulator, and to learn by experience, long and painfully acquired, to avoid the myriad pitfalls that beset his path. He was lumbered with heavy apparatus and clumsy accessories. He was tortured by a silver bath that had an unhappy knack of going wrong at the most inconvenient time, and which would not come right till it had been filtered and shaken, sunned and boiled—sometimes a great deal more. And he was painfully dependent on the weather, and on the capacity of his sitters to sit in a strained attitude for an unconscionable length of time.

Now, sunshine is voted a bore. A nice cloudy day, with plenty of rolling cumuli or scattered cirrus to reflect and subdue the light and avoid harsh contrasts, is the amateur's delight. He sallies forth with the most compact of cameras and the neatest of stands; total weight some fifteen or twenty pounds avoirdupois. He shoots away—blazes, in fact, like a sportsman—at every promising bit of landscape he comes across. There is no preliminary preparation of plates, and he can postpone any further dealing with his "snap shots" for a month or two if he likes. And then the developing of the plate or film is so simple. You take it out, pour over it one solution, dip it in another, and finish up with a rinse under the tap. It is here modern discovery comes to the help of the hapless amateur. In the olden days it was necessary to get a negative of "proper printing density" with "plenty of half tone" and "nice gradations of tone from the dense white of the high lights to the clear glass of the shadows." These things sound very nice and learned, but, oh, how they worried one! If the negative was too thin from over-exposure, the resulting print looked grey, flat, and generally unimpressive. If it was dense from under-exposure and over-development to bring out the lagging detail, it looked all black and white, chalky and disagreeable. But now almost any sort of negative will do. All that is required is to have an intimate acquaintance with a manufacturer's catalogue. If the negative happens to come out right, well and good. There is abundant choice as to the use to be made of it. If it does not, do not be disheartened. Some time ago a couple of Germans introduced a printing paper which was almost a heaven-sent boon. Negatives otherwise useless became immediately of value. Good, kind men, how many blessings have been showered upon their heads! From how many scrap-books have been torn disappointing prints, faint and shadowy, to be replaced by pictures full of vigour and brightness, and all that the heart could desire! Is it not admitted that Liesegang and Obernetter are benefactors to mankind—of the amateur photographic persuasion?

But even this did not satisfy everybody. Even the amateur photographer likes to be in the fashion, and though he at first gleefully entered upon the resurrection of much he had abandoned in despair, he still sighed for the unattained. The pictures were terribly glossy, and a perverse fashion has decreed that glossy pictures are decidedly *outré*. Not long, however, did he sigh in vain. Some other beneficient individual, with a passion for trying the most outrageous experiments, found that by printing under green glass the weak and generally useless negative gives not only a good print, but the cold, black tone that is a delight to the fashionably artistic eye. And so it has come about that the heart of the amateur is glad, for his work is easy and his burden light. Farewell for ever to the bulky tent, the weighty utensils, and the chemical compounds, to the troubles of which the tortures of Tantalus were as naught. Farewell to long confinement in close, dark, stuffy rooms, to long and tedious manipulations, and to hard and fast rules and regulations. All is easy, and nothing, or next to nothing, is wrong; for not only has the difficulty of making negatives been got over, but fashion has stepped in and bridged another pitfall. In those older times—the art and science era which has been succeeded by the mechanical and the automatic—it was always insisted upon that a picture should be sharp and its points readily recognisable. Not so now. There are, of course, people of an old-fashioned turn of mind, who, when they see a photograph, whether portrait or landscape, like to see it look clear and brisk. But that is not the present fashion. What is now admired by certain people who aspire to be leaders—witness the awards at the present exhibition—are "fuzzy" productions, of which little or nothing is distinct. Naturally, the inexpert foster this idea. There is no longer a necessity for a sharp focus; no longer for expensive lenses to get an unimpeachable definition. If the resulting negative is not sharp, print it on dirty brown, rough paper, and you have a fashionable print. Only contrive to give it a "greenery-yallery" look, and it will pass. Some one will say it has "soul" and "poetry" in it. If it has a dim and distant look, a faded far, far away appearance, so much the more readily will the soul and the poetry be discernible.

It seems, therefore, that the dream of the *dilettante* amateur is on the way to speedy accomplishment. Already is the camera packed up in a neat box. A turn of the screw changes the plate, and the pressure of a button or the pulling of a piece of string gives the exposure. Even a near approach to the self-developing plate is in the market; for an ingenious firm has introduced one ready charged with the chemicals used for development, and all that is needed is to take it out of the camera and wash it under a tap. With regard to the third *desideratum*, there is still further room for improvement before the printing paper comes to the never-go-wrong stage; though some passable results are to be got in black and also in blue by "washing-under-the-tap processes." And then the saving in "messiness" is so commendable. No longer need the fingers be stained with chemicals that defied soap, water, and pumice stone. Even the sticky starch paste can be abandoned, for cards can be procured on which it is only necessary to lay the wet print and pass it through the family mangle or wringing machine and the mounting is complete. The manufacturers have certainly done wonders in easing the task of the ambitious, but not over-zealous, amateur, who likes everything done for him, and it is only necessary for him to follow the historic advice of the celebrated painter and throw in a dash of brains.

In the face of such a revolution in the exclusively amateur branch, the possibilities for the future seem boundless. The baggage of the art has been brought down, one might suppose, to the irreducible minimum, and the process part almost eliminated. All that remains is to bring down the higher branches to the same condition. Perhaps some one will now invent a cheap and easy method of artistic portraiture without the aid of special and expensive apparatus, costly studios, and much devotion to the work. There is still room for the simplification of those productions which rank as fine art. The "results" of the amateur armed with the simplified apparatus are wonderfully effective, and it cannot be said that the popularising and simplifying of the processes has been degrading to photography. What has happened is that the art and science part has been largely shifted from the photographer to the manufacturer. So far so good, but it has further to go. When work equalling fine line engraving, when perfect chiaroscuro and artistic arrangement of detail, can be procured on the push-button system, then will the amateur feel that he has indeed supplanted the professional, and that it is within his power to beat him on his own ground. Whether this will be realised of course remains to be seen. That there will be further advances there can be no doubt; but, on the principle that lightly gained is lightly valued, it is, perhaps, not altogether to be desired that the necessity for artistic instinct and persevering patience should give place entirely to pressing a button and swilling something under a tap.

—*Globe.*

WILD BEAST PHOTOGRAPHY.

A Morning with Mr. Gambier Bolton, F.Z.S.

(*From the "Pall Mall Gazette."*)

In the queer little back garden of a queer little house, in a queer little road, which is composed of many other queer little houses mostly of a shy and retiring nature, and within a thousand miles of the Zoo, Mr. Bolton has his headquarters and studio, the latter, as he remarks, being the largest in the world, for it is the world itself. Picture not artistic luxury, but conjure up a clump of gnarled and withered timber which still bears a scanty crop of foliage, and is apparently sent by nature for the purpose of holding the extremely heavy sootfall peculiar to the neighbourhood. On a rough wooden platform, supported by trestles, a monster yellow Tom sits trimming his whiskers, and gazing with melancholy indifference at a grey Tom who has taken up his position on a neighbouring wall, and is twisting his tail about in an aggravating way, as if on sport intent. The fact is that the yellow Tom has no tail, being a Manxman, and the two are rivals in love, and grey Tom is laughing at him. The Manxman is Mr. Bolton's favourite puss who earns a respectable livelihood by tantalising dogs. I have heard of many queer professions (writes our representative who recently spent a morning with Mr. Bolton), but this is surely the queerest on record. Let me explain why the Manxman has taken up this line of business in preference to mousing, or ratting, or killing off the sparrows. Dog owners who want really artistic photographs of their favourites take them up to the queer little house, but you can't take a good photograph of a dog in a room or an indoor studio. He may be shy, or sulky, or savage. So Mr. Bolton just turns him into the queer little back garden, and watches him for half an hour from the window. He is then put on to the platform, and the camera is made ready. But a dog on a platform is a melancholy object. He is probably depressed by his strange surroundings, his face is long, his ears are limp, his legs are loose, and his *tail is down*. The Manxman is now introduced. Watch him stealing furtively along the path until he catches the eye of the sitter—hey, presto!—the eyes sparkle, the ears are erect, the legs stiffen, and—gentlemen—the *tail is up*, and the trick is done. Sometimes the Manxman fails, in which case the monkey appears on the scene. He had a good training at Mr. Carrington's. If both the Manxman and monkey fail, the squeaking rat is introduced, with instantaneous effect. The queer little back garden contains other receptacles for animals, namely, a few cats and kittens, which have been used as models this past season, and there is a red dachshund—Bruce, the picker-up. I think his profession is even more peculiar than that of the yellow Manxman, the professional tail-raiser. Several cats and dogs having been poisoned in the neighbourhood, Bruce is turned loose night and day to pick up any little trifles, such as a lump of meat, liver, or bread containing prussic acid, &c., which might

find its way over the wall and into the interiors of the valuable canine and feline boarders and residents in that queer little establishment. And here comes the resident model, "Pickle," a smart little fox terrier who has the knack of always standing or lying in a picturesque position. In taking your walks abroad you must often have been struck by the splendid picture-photographs of lions, tigers, elephants, hippos, zebras, and ever so many other wild beasts which are exhibited in some of the shop windows. These are the results of Mr. Bolton's prolonged and assiduous studies and experiments, which I am now about to describe.

On an easel in Mr. Bolton's little drawing-room stands a magnificent picture (from a plate 44 × 36 inches), or, to be technically correct, a carbon photograph, of "Prince," the great lion at the Zoo. "I spent three days of five hours each in producing a satisfactory negative of that," said Mr. Bolton; "there's patience for you. You see, my Draconian rule in animal photography, which I have made my speciality, is: the animal shall be standing, free of the bars, free of shadow, and all four legs and the tail showing, with a natural background. No dodging and no combinations and no double printing for me, or naturalists and scientists would bid me go hang."

For three days, then, Mr. Bolton tried to take the big lion, and success rewarded his efforts at last. The photographer who deals with lions and tigers has often a good "run for his money," as the sportsmen say, for the lens of the camera is thrust between the bars of the cage. Mr. Bolton has had more than one narrow escape. Once, for instance, he was taking the big tiger at the Zoo; the lens was in position through the bars and Mr. Bolton's head was under the cloth intent upon his work, when he heard a scream, and, before he could say Jack Robinson, the lens was rolling on the floor of the cage and the cloth was torn off his head by the terrible claws of the man-eater. Since then Mr. Bolton has been more careful. One of his precautions, by the way, is to smoke, for the beasts cannot endure the smell of the weed. If one reflects for a minute it is easy to understand the difficulties of taking one of these wild beasts, for they are no flash photographs taken by hand in a sixtieth or in the three-thousandth part of a second, like Mr. Muybridge's amusing series. Mr. Bolton gives the plate an exposure of a second or a second and a half, and a lion and a tiger seldom remains stationary for that period. The keepers sometimes help him by exciting the animal, or he plays a tune on a set of bagpipes which may be bought from the man on the curbstone for a penny. "But the most difficult of all animals, I think," continued Mr. Bolton, "is the Persian leopardess at the Zoological Gardens. The Polar bear is not easy, but you see I got him in three positions. Here he is standing up, there he is taking a dry swim, and there again you see him toss up, showing his hairy feet. It is all a matter of plates and patience. Again, it is not easy to take an oiled elephant on a warm day—oiled?—he is oiled to keep his skin in condition—the flies swoop down upon him, and both tail and trunk whizz round like a teetotum. To photograph animals at all well you must have the patience of Job and the luck of the Duke of Portland. And by the way, talking of the big Indian elephant at the Zoo, I may tell you that he is growing, and even now he is only a few inches shorter than Jumbo. The measuring mark is the tunnel at the Gardens. Now here"—pointing to a fine photo of a European bison—"I call that Patience on a Monument, for it took me four days, shut up in his shed, to fix him. This bison has a fondness for rolling in the straw; and, as straw disturbs the harmony of a picture, I was compelled to follow him round each day, and pick off the straws! —and patience was rewarded, as it always is."

Turning over the photographs which were strewn about the table, I found Guy Fawkes, the hippo at the Zoo. The difficulty in his case was to get the appearance of crackled roast pork of his skin. Here, again, is Big Jim, the Indian rhinoceros, and the Brazilian tapir—'the Conservative among animals,' as that distinguished zoologist, Professor Flower, calls him, as he is the oldest type of mammal. Then there is the giraffe—who was taken walking in the fifth part of a second—the Queen's lion, and Prince Albert Victor's tiger cubs. Mr. Bolton is particularly proud of his photographs of zebras, and points out how necessary good representations of animals which are likely to become extinct will be to the naturalist in days to come. Here, again, is a photograph of three smiling crocodiles taken in Paris the other day. Well may they smile, for have they not just breakfasted on kittens and puppies? And here, again, is a wonderful representation of the roaring sea-lion, also taken in Paris. Note the sheen on his fur, produced by the sun shining on his wet coat.

Mr. Bolton has many amusing stories to tell of his adventures in Tring Park, when he was taking photographs of Mr. Walter Rothschild's famous collection of kangaroos, wallabies, emus, and rheas. It is no joke stalking a giant kangaroo on a hot day over the glades of a park which covers nearly four hundred acres, and staggering under the weight of a full-plate camera. In three days the photographer used 150 plates, of which only sixteen were perfect. "About my usual average," said Mr. Bolton. Mr. Rothschild (a son of Lord Nathaniel) is an ardent naturalist, and one of his most treasured acquisitions is a kiwi. The kiwi has no tail and no wings, and is nearly as scarce as the dodo. You may have roughed it in New Zealand wilds, and lived for years among the timber-clothed spurs of the wildest mountain ranges, without encountering this strangest of birds. But there is a live and blinking specimen of him at Tring, and here among Mr. Bolton's wonderful collection he is to be found, closely resembling a tripod, for he sleeps standing, and to support himself he digs his long beak into the ground. Another curiosity is the contumacious Australian cassowary, which is another of Mr. Rothschild's treasures. Mr. Bolton was defended from his attacks by two gamekeepers holding hurdles in front of the camera.

On the walls of the little sitting-room hangs a fine carbon print of a bloodhound, which is one of Mr. Bolton's triumphs, for he took him eighty-four times before this result was attained. It is Mr. Krehl's champion, Cromwell, who is now known as the plate-smasher. This difficulty is easily understood when you look at the long ears of Cromwell. When his nose is still these ears are still going like a pendulum. How much the public appreciates a good thing when they see it will be understood when I mention the fact that four thousand copies of Mr. Bolton's well-known row of five bloodhound puppies alone have been sold. This fine specimen of a bob-tailed sheep-dog is known as Wall-eyed Bob, and the wall-eyed feature of Bob's face is also the feature of the photograph. Bob, by the way, was induced to stand by means of a certain monkey, who is a favourite model of Mr. Bolton, and you may see him depicted by the sun in the act of catching an active member of the flea community on his foot, which he calls "a critical moment." This is the result of over thirty shots.

Mr. Bolton divides his work into four series: animals, birds, dogs, and bones. These last he photographs for comparative anatomists, and a collection of them hangs in the Geological Galleries of the British Museum South Kensington; and, shade of Poe! he uses a seven-year-old pall, which was bought cheap from a sexton, for a background, and who can say it is not appropriate? Of the animals I have already given a brief description; the birds include a Stacy Marks' series, namely, the pelican and the marabout stork, which are most comic. Amongst the dogs is a splendid specimen of a very famous corded poodle, who bears a strong resemblance to a walking door-mat. This kind of dog is much used as the duck decoy abroad. He floats down stream, and the stupid ducks mistake his cords for a bunch of seaweed, until he appears in their midst and sends them flying towards his master, who is a-gunning on the bank.

The subject of animal photography is full of interest, but we must leave it for the present. In this week's *Pall Mall Budget* we shall reproduce a number of Mr. Bolton's animals.

Our Editorial Table.

Lantern Slides and How to Make Them.

By A. R. Dresser.

In this pamphlet, which is published by the Fry Manufacturing Co., 5, Chandos-street, W.C., Mr. Dresser explains the principles upon which exposure should be made, followed by observations on making slides by contact, by copying in the camera, developing, toning, and binding the finished slide. It is strictly practical throughout, and as Mr. Dresser is an expert in the production of lantern slides, this manual cannot fail to instruct.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 16,668.—"A New Combined Clamping Screw and Plumb-bob Level for Photographic Camera Stands and other Portable Stands of a like Nature." D. Cameron.—*Dated October 20, 1890.*

No. 16,696.—"Improvements in Photographic Shutters." G. H. P. Burne.—*Dated October 20, 1890.*

No. 16,803.—"Improvements in Hand Cameras." S. D. McKellen and E. A. McKellen.—*Dated October 22, 1890.*

PATENTS COMPLETED.

Improvements in or relating to Photographic Cameras.

A communication from Frank A. Brownell, of the City of Rochester, County of Monroe and State of New York, United States of America.

No. 359. Alfred Julius Boult, 323 High Holborn, Middlesex.—*October 4, 1890.*

The present invention has for its object to provide a camera that can be folded within small compass for carrying, and can be so extended as to take quite a large picture, and it further has for its object to provide said cameras with means for utilising roller holders for flexible film, thereby providing a comparatively small detective camera which is not only capable of taking large pictures, but also of containing sufficient material for a large number of them, these being the objects most sought after in articles of this description.

The camera body consists of a main frame, open at the rear and closed at the front by a door hinged to the bottom of the frame, and when folded down, constituting the bed on which the camera front slides. The bottom of the frame is extended to the rear, and forms a support for a casing preferably enclosing the rear of the camera, while the top is protected by a cover

hinged at the forward portion and fastened at the rear by a lock or catch, being capable of being lifted to expose the top of the roller holder and permit access to the back of the frame when desired. A suitable carrying strap is passed around the camera body, being confined by loops, and a handle is secured to the top.

The camera front carrying the lens and shutter is connected to the inside of the frame by the bellows and is arranged to slide in ways or guides on the base of the frame when within the camera casing and upon the upper side of the door, when the latter is down. While this way or guide may be of any desired construction, it is preferably formed of plates connected to the door and base respectively, small grooves being formed for the accommodation of the flanges or ears formed upon guiding and clamping plates mounted on the sides of an extension of the camera front. The clamping plates are provided at the top with flanges, and are secured to the sides of the extension by screws passing through elongated slots and entering said extension.

Pivoted upon the upper side of the extension is a plate having an operating projection or handle, and bent up at diagonally opposite corners to form cam ears, over which flanges project, so that when said plate is turned on its pivotal pin or screw said cams will engage and raise the plates clamping the lens, carrying front to one or other of the before-mentioned way or guide plates, said plates, therefore, constituting guide and clamping plates, as will be understood, so that the camera can be readily focussed by turning the plate to loosen the clamping plates, then adjusting the front on its ways, and turning the plate to clamp it firmly to its support. As it is designed to use this as a detective camera, dispensing with a ground focussing glass, a suitable index plate is provided on the inside of the door, and an index is provided on the camera front co-operating with it, so that the distance of the object to be photographed being known or approximated, the appropriate focus can readily be had.

The door is held in proper position when open by suitable slotted links pivoted to it, and co-operating with stop pins secured to the case through the slots. At the inner ends the slots in these links are slightly enlarged, and secured to the frame are springs normally pressing said links, so that when the door is open they will be moved so that the before-mentioned stop pins will enter the recesses at the ends, thereby preventing the closing of the cover without first pressing said links so as to remove the recesses from engagement with the pins. When the door is closed it is fastened by a spring catch at the top engaging a pin thereon, the operating end of the pin being beneath the cover, but capable of operation therethrough, and said door may be forced open when released from the catch by springs.

The parts so far described are capable of use upon any of the ordinary folding cameras now in use, whether closed at the rear or not, but as it is desirable to use a roller holder for film in the present camera, and further, to have it covered and capable of insertion and removal, there is provided at the back of the frame a chamber in which is located the roller holder.

The roller holder casing contains the ordinary film holding and feeding devices, and is provided with the operating handle of the winding wheel, projecting to the outside, and upon the lid or cover of the camera case is a button or disc projecting through, and having on its inside a slot which co-operates with said handle, so that the film may be fed forward without opening the cover. The indicating device for notifying the operator when an exposure of film is wound forward may be of any description, either arresting the winding devices, or it may be one of the audible kind, making a sharp click for each or any number of the revolutions of the measuring roller.

The front of the holder casing is provided with a bead, which it is desirable to have fit against or into the back of the camera frame, so that there will be no possibility of light leaking in and spoiling the film, and for the purpose of providing means for inserting the roller holder from the top and of moving it in squarely with the bead in the recess in the frame there are provided on each end arms pivoted to the frame, preferably curved and having slots on their outer portion with which co-operate pins on the holder ends, the parts being so arranged that the holder can be placed in the case with the pins in the slots, and when the plates are turned up the holder will be pressed up light-tight in proper position. The upper ends of the last-mentioned arms are provided with projections, co-operating with suitable recesses in the sides of the frame when the holder is in proper position, preventing its accidental removal, and said arms are sufficiently elastic to hold the projection normally in engagement. The extreme ends project above the casing in convenient position to be manipulated by the operator to insert and remove the roller holder when desired.

In cameras employing roller holders not having covering slides or plate holders which are applied before the camera is focussed, it is difficult to employ bellows between the lens frame and holder, for the reason that when the bellows is rapidly drawn out it will collapse, there being no aperture for admitting air to its interior save through the interstices between the holder and camera back, which are exceedingly small in a properly constructed instrument. This objection is, of course, more apparent in a folding camera, where it is necessary to draw the lens out quite a distance in order to obtain the first focus, and for the purpose of overcoming it there is provided a channel or passage, open to the external air, from the interior of the camera, which will permit the ingress of air without admitting light to fog the plate or film. If the roller holder has a large space behind the film support it is preferred to form an opening in the bottom, which, when the holder is in proper position, registers with a channel connected by other channels with suitable apertures in the base beneath the bellows or at any other point. By this arrangement the camera front can be extended or closed within the casing without liability of the bellows collapsing or getting out of shape by the pressure of the air.

Pivoted to the door is a finder, consisting of a casing with a lens, mirror, and ground glass as usual, the supporting brackets being preferably located at one corner of said casing, whereby it can be turned so as to present the ground glass upwards, or so as to present it at the side if the camera is supported on a tripod, as may be done by a securing screw entering a nut or socket in the camera base. A spring secured to the door operates on a pin on the finder casing to hold it against the door in whichever position it may be adjusted.

The shutter employed may be of any desired construction, but it is preferably such as will not open the lens opening while being set, as there is no slide interposed between the latter and the film, though, of course, a suitable slide could be employed if desired.

The manner of using the camera will be apparent to those skilled in the art, and no further description is therefore necessary.

The before-described apparatus is capable of being modified in many ways without departure from the spirit of this invention.

Improvement in Photographic Objectives.

No. 12,741. Ernst Gundlach, 112, South-avenue, Rochester, New York, United States of America.—*October* 4, 1890.

My improvement relates especially to photographic objectives, or combinations of optical lenses used for the purpose of taking photographic portraits, views, and other subjects.

All the best photographic objectives of modern type consist of two achromatic or aplanatic meniscuses, this form of lenses being the best adapted for for the purpose of obtaining a wide angular field, with a minimum of distortion at or near the edges of the picture. But while for said purpose the meniscal form offers great advantages over any other kind of lenses, a disadvantage of the same, however, lies in the difficulty of correcting its optical aberrations, both the spherical and the chromatic, at the same time, without leaving too great amounts of the so-called "aberrations of second order."

The object of my improvement is the reduction of said secondary errors to an imperceptible minimum.

I describe my invention as follows :—

Owing to the fact that the ratio of the colour—dispersive power of flint glass to its medium refractive power (line D)—commonly called "dispersive power" or "dispersion"—is greater than that of crown glass, an achromatic lens can be produced by the combination of a (positive) crown-glass lens with a negative flint-glass lens, the dispersive power of which is equal in amount to that of the crown-glass lens ; for, with equal amounts of dispersive power (which neutralise each other), the (medium) refractive power of the crown-glass lens is greater than that of the flint-glass lens, and the preponderant part of that of the crown-glass lens forms the requisite positive focal power or focal length of the combination, thus being the true constituent of the achromatic lens. ("Focal power" I term the amplifying or reducing power of a lens in relation to, or expressed by, its focal length, the focal power being inversely as the focal length.)

The ratio of the focal power of the crown-glass lens to that of the flint-glass lens of an achromatic combination is as the ratio of the dispersive power of the flint glass to that of the crown glass employed for the construction of the lenses, and is inversely as the ratio of the focal power of the crown-glass lens to that of the combination.

From this follows that the greater the dispersive power of the flint glass employed, the lower a focal power of the crown-glass lens will be required for a given focal power of the combination or achromatic lens, and, consequently, the smaller the amonnt of colour-dispersion to be corrected by the flint-glass lens will be.

Furthermore, regarding the established fact that in an achromatic lens neither the spherical nor the chromatic aberration can be completely neutralised, but that a more or less small proportion of said errors—the aberrations of second order (consisting in an incomplete or under-correction of the central part, or toward the centre, and a corresponding over-correction toward the edge of the lens) will always remain, it follows from the foregoing conclusions that the amount of chromatic aberration of second order in an achromatic combination will be the smaller the greater the dispersive power of the flint glass employed.

While thus the amount of chromatic aberration of a single or uncorrected lens depends, with a given kind of glass, on its focal power or focal length alone, and is to be corrected accordingly, as was shown above, its spherical aberration depends also, and in a higher degree, on the form of the lens, that is, on the difference of the curvatures of its surfaces, and is the greater in amount the more the curvatures differ from each other. (An equal-sided lens is, under ordinary conditions of minimum, a meniscus of maximum spherical aberration.)

The spherical aberration of a positive lens may, therefore, be corrected by a negative lens of almost any focal power, if the curvatures of the same can be made to differ sufficiently to produce an amount of (negative) spherical aberration equal to that (positive) of the positive lens. If, therefore, the positive lens is of minimum spherical aberration, that is, equal-sided or nearly so, a negative meniscus of much lower focal power than that of the positive lens may neutralise or correct said aberration, and, since the differential part of the focal powers of the components forms the focal power of the combination, the latter may, in this case, be made to be nearly as great as that of the positive component of the combination.

But if the positive lens of the combination is in itself a meniscus, as is the case with the positive components of the modern photographic objective, then the focal power of its negative or correcting lens cannot be made to be much lower than that of the positive lens, because it would then be impossible to produce, even with the greatest admissible difference of its curvatures, the amount of negative spherical aberration required for the correction of the positive lens, and consequently the remaining focal power—that of the combination—will be very small in comparison with that of its positive component.

Hence the focal power of the crown-glass lens in an achromatic meniscus of a given focal power is to be comparatively great, and being besides this a meniscus itself, its spherical aberration must be accordingly great, thus leaving a correspondingly great amount of aberration of second order, after being combined with the flint-glass lens.

Having thus pointed out the distinguishing characteristics of the two optical aberrations of a lens, and explained their different conditions of correction, it remains to illustrate the principle after which both corrections are conjointly accomplished in the meniscus of the modern photographic objective.

Fig. 1 of the accompanying drawing represents, in axial section, an aplanatic or photographic meniscus of modern type. It is composed of a positive crown-glass lens (*a*) and a negative flint-glass lens (*c*), the latter being of longer

(negative) focus or lower focal power than the crown-glass lens, thus leaving the preponderant portion of the latter as the actual focal power or focal length of the combination. The sides (a) of the lenses are of equal radius of curvature and are cemented together, this arrangement being a necessity in photographic lenses.

Suppose, now, the flint-glass lens (c) to be made of ordinary flint glass, such as is commonly used in telescope objectives and similar achromatic lenses, then the internal sides (b) of the lenses, being, as may be assumed, of the proper (small) necessarily short curvature required for the correction of the spherical aberration in the meniscus, will be too short curved for the proper correction of the chromatic aberration, thus producing a corresponding over-correction of the latter. If, then, the curves (b) are flattened, the dispersion of both lenses will be reduced, of course but that of the flint-glass lens will decrease in a higher ratio than that of the crown-glass lens, owing to the higher dispersive power of the former, and if the flattening of the curves is continued, a point will soon be reached at which the dispersive powers are equal in amount which now, as will be remembered, is the condition for the correction of the aberration.

Fig. 2 is to illustrate this case, showing the inner curves (a), as being considerably flatter than the corresponding curves of Fig. 1, thus just correcting the aqueous aberration of the meniscus of which the flint-glass lens (c) is made of a high dispersive glass is assumed. The flattening of the inner curves, however, interferes with the correction of the spherical aberration, which is thereby reduced to a corresponding under-correction, as will be obvious.

Fig. 1. Fig. 2.

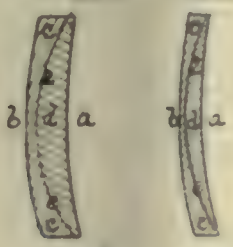
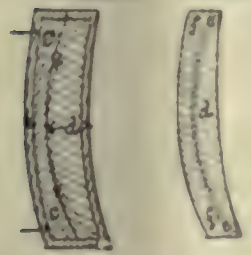


Fig. 3. Fig. 4.



It will now be readily understood that, owing to the peculiarly conflicting relations between the two aberrations as shown, it is impossible to combine the corrections of the two aberrations in a meniscus by the single means of a negative lens made of ordinary or any high dispersive flint glass in the manner described and illustrated, for with such glasses the chromatic aberration of the meniscus will always be considerably over-corrected when the spherical aberration is corrected, or the latter will be under-corrected when the former is right.

Considering, however, the causes of this interference, it suggests itself that, with a flint glass of a certain low dispersion, or with two glasses of a correspondingly low difference of dispersion, the desired result may be fully accomplished, and that such special properties of the glasses, as required, may be accurately predetermined by calculation. In fact, all that is required for the purpose is that the two lenses, *d* and *f* (Fig. 4), have just such relative dispersive as will neutralise each other, when the inner sides are of such short curvature (Fig. 1) as to neutralise the spherical aberrations of the lenses.

This principle was discovered many years ago by the late mathematician Steinheil, of Germany, and has been ever since and up to the present time generally adopted by all the leading opticians of the world as the basis *par excellence* for the manufacture of photographic objectives.

It will be remembered that the amount of chromatic aberration of second order in an achromatic lens will be the smaller the higher the colour-dispersive power of the flint glass employed for the negative lens; and further, that in an aplanatic meniscus the spherical aberration of second order is comparatively great, much greater than in ordinary aplanatic lenses. But notwithstanding this fact, the latter may also be considerably reduced by the employment of high dispersive flint glass, same as the chromatic aberration, for the reason that, as a matter of fact, a high dispersive flint glass has also a correspondingly high (medium) refractive power. Let us now apply these rules inversely to the meniscus of the modern photographic objective, as represented in Fig. 1—and it appears that, notwithstanding its valuable and superior properties, as described, a serious defect is nevertheless inherent to the same, consisting in an excessive amount of both aberrations of second order, as an inevitable consequence of the employment of a flint glass of extremely low dispersive power.

It is, therefore, the object of my invention to reduce these defects to a minimum, which end I accomplish as follows:—

I employ for the negative lens a high dispersive flint glass, and give the lens, with the proper proportional focal power for the correction of the chromatic aberration, such strong meniscal curvature—irrespective of the form of the crown-glass lens—as is required for the correction of the spherical aberration, and then adapt the form of the crown-glass lens to it in such a manner as to preserve the normal meniscal form of the combination.

In this way I reduce both aberrations of second order considerably, while, at the same time, fully preserving the valuable qualities consistent with the present photographic meniscus, as will be understood from the following.

Let us refer again to the meniscus (Fig. 2), in which the negative lens, *c*, is made of a high dispersive flint glass and the inner curves, *a*, are so much flattened that the chromatic aberration of the combination is corrected.

We remember that at this point the spherical aberration is only partly or under-corrected, and the problem is, therefore, to find a suitable way of altering the form, respectively shortening the meniscal curvature of the lens, *c*, without changing its focal power, and the external surfaces, *a* and *b*.

Let us suppose the lens, *c*, to be flexible, the lens *d*, however to be in a fluid state; let us further presume the whole to be enclosed in a vessel, for the purpose of preserving the outer form of the meniscus, the vessel, however, to be a little wider from *a* to *b*, so as to give the lens, *d*, more body, as shown in Fig. 3.

Now let the lens, *c*, be bent inward at its edge all around, while at its centre it is held against the side, *b*, of the vessel (as is indicated by the arrows) in order to shorten the meniscal curvature of the lens. This operation will produce a space between the lens, *c*, and the side, *b*, of the vessel, which will be filled up gradually, by a corresponding portion of the fluid, *d*, as the space increases.

Let the operation be continued until the curvature and the correspondingly increasing negative spherical aberration of the lens have reached the point where the latter (the aberration) is equal in amount to that of the crown-glass lens (or rather the fluid part of the combination), when the desired purpose will be accomplished. This stage of transformation is indicated in Fig. 3 by dotted lines, and Fig. 4 represents the new (thus created) type of aplanatic meniscus, as it is to be constructed for practical use, of the proper materials.

The form of the crown-glass lens, *d*, Fig. 4, has certainly undergone a material change at the same time with that of the flint-glass lens, as will be seen, apparently, and in fact, being now of but little less spherical aberration than the crown-glass lens, *d*, Fig. 1, of the ordinary doublet meniscus. But the superfluous portion of it has passed over to the other side of the flint-glass lens, forming there a new crown-glass lens, *f*, of nearly such a form, as if it had been mostly separated from *d* by a cut.

Thus the two new lenses, *d* and *f*, together, or their single equivalent, have a focal power and a meniscal curvature, which are nearly equal to those of *d*, Fig. 2, the aberrations of which latter are considerably less in amount than those of *d*, Fig. 1, as was shown before. Hence the correction of the aberrations of the combined lenses, *d* and *f*, Fig. 4, or their equivalent, will leave accordingly small amounts of the respective aberrations of second order.

It is well established in the optical science that the aberrations of second or higher order are the most essential defects in any known form of aplanatic objectives or optical apparatus, and that, although their complete removal being an impossibility, the reduction of the same in any measure, however small, signifies a valuable enhancement of the optical excellence of said apparatus. Therefore, I regard my new photographic meniscus described above and illustrated in Fig. 4, as being an essential improvement over that invented by Steinheil and represented in Fig. 1. As will be seen, the lens is a triplet, novel in the form of its components and in the order of their combination. A particular novelty in this compound is the negative crown-glass lens *f*, such kind of lenses having not been employed in positive aplanatic meniscuses heretofore.

Definitions.

"Positive lens" I term any of the following:

1, a plano-convex lens,

2, a double-convex lens,

3, a concavo-convex lens, the convex side of which has a short radius of curvature than the concave side.

"Negative lens" I term any of the following:

1, a plano-concave lens,

2, a double-concave lens,

3, a concavo-convex lens, the convex side of which has a longer radius of curvature than the concave side.

A meniscus is a concavo-convex lens.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—In a photographic objective, a compound meniscus, consisting of a negative flint-glass meniscus, a negative crown-glass meniscus, and a positive crown-glass meniscus, so combined that the flint-glass meniscus is enclosed by the two crown-glass meniscuses, facing with its convex side toward the concave side of the negative crown-glass meniscus, and with its concave side toward the convex side of the positive crown-glass meniscus.

Improvements in Photographic Apparatus.

No. 12,706. Edmond Bloch, Paris.—*October* 4, 1890.

My invention relates to apparatus for taking instantaneous photographs of any desired object, whether moving or at rest, without the apparatus and operation being noticed by bystanders. The apparatus is small, and easily concealed, and is intended more especially to be carried under and be concealed by the necktie of the person using it, the lens taking the place of the scarf-pin ordinarily worn.

It consists of a thin, rectangular, flat box, provided with a cover. Sensitive photographic plates of any of the usual well-known kinds, square or round, are placed in frames, soldered to an endless chain, which passes round two corresponding wheels or pinions. By turning the pinion, by means of a button placed outside the box, each plate in succession can be brought opposite to a circular opening in the upper part of the box, and behind the lens. A spring keeps in its place the plate, which is behind the opening. The lens can be

instantaneously uncovered when desired by a movable shutter opened by pulling a string, or by pressing an elastic ball, in the well understood way.

The lens and the shutter, with the mechanism for opening the latter, are contained in a recess, or cell, projecting in front of the box.

The sensitive plates may be of any shape, number, and size, as may be desired, and the entire apparatus can be very readily and easily concealed under the clothing, especially behind a necktie or scarf, so that any person or objects can be instantaneously photographed.

The apparatus may be made of wood, metal, or other suitable material.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—The apparatus for instantaneously photographing persons or objects, consisting of a flat box, the movable cells, containing sensitive plates, adjustable by a button, a spring lens, and instantaneous shutter, the apparatus being concealed behind the necktie, or scarf, or other part of the clothing of the person using it.

IMPROVEMENTS IN OR CONNECTED WITH PHOTOGRAPHIC CAMERAS.

No. 16,558. HERBERT GEORGE HEYBURN, 16, Upper Montague-street, Middlesex.—*October* 4, 1890.

My invention has for its object to provide a combined camera and box or receptacle for sensitised plates or surfaces which is very simple in construction and not liable to get out of order, the plates or sensitised surfaces being successively discharged, exposed, and then returned to the box in any desired order. According to my invention, I so combine the storage box with or attach it to the camera that it can be moved relatively thereto, so that either of the plates therein can be brought opposite to a slot in the camera sufficiently wide to admit only one plate at a time therethrough, and into the guides or supports for the plate in the camera. In connexion with the storage box, I use a shutter, which can be brought into such a position that it leaves only the desired one of the plates in the storage box at liberty to pass out therefrom. The portion of this shutter which protrudes from the apparatus may be marked so that it can readily be used as an indicator as to which of the plates is at liberty to be passed into the camera when it is brought into line with the slot in the camera. Whilst not limiting myself to precise details, I will describe more particularly an arrangement which will answer well in order to more clearly explain the nature of my invention.

The apparatus consists of a box for plates or sensitised surfaces and a camera, which can be fitted up side by side so as to take up as little space as possible. This storage box is provided with grooves or ledges to receive the plates or sensitised surfaces. The side of this box is provided with the aforesaid shutter, which I prefer to be a jointed one, similar in construction to the well-known Venetian shutter. This shutter is provided with an opening which admits of any plate falling through when opposite to it. The camera may have either a rigid or sliding body, or be constructed with a bellows, or in any of the ordinary or other convenient forms, with usual adjustments, but without any removable or separate back or slide. The end opposite to where the lens is attached is provided with grooves in the position to receive the plates or sensitised surfaces for exposure, which enter through an opening in the side next to the storage box.

Having brought the opening in the storage-box shutter opposite the plate it is desired to expose, that opening is, by moving the storage box, brought opposite to the slot in the side of the camera, and, by tilting the plate, is caused to pass from the storage box through the opening left for it by the shutter, and through the slot in the camera into the grooves for exposure in the camera. The storage box being now returned to its normal position, covers the opening in the camera, and the slide can only be returned to the box by reversing the operation. The portion of the Venetian-lid shutter that is drawn from the storage box will fold over the box, and it may be conveniently provided with a stop to regulate the position of the box itself and to insure the openings being brought opposite one another. The ribs of the shutter may be numbered to indicate which plate is free to move, and a handle on the top of the box itself will enable its being easily drawn along relatively to the camera for the withdrawal or replacement of a plate.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 4.....	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 4.....	North London	Wellington Hall, Islington, N.
,, 4.....	Holmfirth	
,, 4.....	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 4.....	Sheffield Photo. Society.....	Masonic Hall, Surrey-street.
,, 4.....	Paisley	Paisley Museum.
,, 4.....	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 5.....	Coventry and Midland	The Dispensary, Coventry.
,, 5.....	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 5.....	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 6.....	Bolton Photographic Society ...	The Baths, Bridgman-street.
,, 6.....	Leeds	Leeds Mechanics' Institute.
,, 6.....	Dundee and East of Scotland ...	Lamb's Hotel, Dundee.
,, 6.....	Glasgow Photo. Association.....	Religious Institn., 177, Buchanan-st
,, 6.....	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 7.....	Sheffield Camera Club	Whiteley's Institute, New Surrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

OCTOBER 28.—Technical meeting.—Mr. T. Sebastian Davis in the chair.

In accordance with the annual custom, the October technical meeting was occupied by the display and explanation of the apparatus in the Society's exhibition.

The first exhibit shown was Watkins's exposure meter. Mr. WATKINS said that methods of calculation hitherto in use for exposure had not been satisfactory through not being based upon recognition of all the factors that entered into the case. These factors were the light, the speed of the plate, the subject, the diaphragm, and sometimes, but not always, distance had also to be reckoned for. Each factor had a distinct influence, and should be reckoned separately. If it was attempted to take two factors together the result is generally confusion. In the instrument which he showed there were various columns arranged for convenience on a cylinder in the form of a slide rule. The actinometer which he employed was furnished with paper coated with gelatino-bromide of silver emulsion and treated with nitrite of potash. The method of observation was to note the time required for the paper to darken to a standard tint, a weight suspended by a chain is kept swinging, and the oscillations counted. This was more convenient than looking at a watch, as the paper could be observed continuously. The next factor was the rapidity of the plate, and the column appropriated to this point was fixed to the proper number with regard to the first column, and so on with the other factors and columns, the last of which would be found to point to a number indicating the exposure required.

Mr. T. SAMUELS showed a camera and stand arranged for work, but with the packing cases still so conveniently attached to them that it was the work of a very short time to repack for transport. At the front of the camera was a sliding U piece, which allowed a considerable rising and falling motion to the front as well as a lateral and swinging one. The camera was also furnished with a scale for focussing, and he found this work so satisfactorily that when he looked at the focussing screen it was merely necessary to observe the amount of subject upon it. He also showed camera cases made of stout Willesden paper, which appeared to be effective and easily constructed.

Dr. LINDSAY JOHNSON showed some pencils for writing upon glass or metal which he thought would prove serviceable in photography. He had seen them at the Berlin Medical Congress, but he thought they would be very serviceable for writing on negatives and for working on the back of them as well as on the front, if necessary. He thought in this way we might obtain the beautiful effects of light touches seen in Mr. Davison's pictures.

Mr. ARNOLD SPILLER inquired whether the pencils etched the glass.

Mr. L. WARNERKE said they did not, but contained wax, which adhered to the glass.

Dr. JOHNSON also showed a lens by Hartneck in which the boro-silicate glass of Jena had been used. He had not made a complete examination as to its merits, but was inclined to think that there was less astigmatism and less flatness of field than in the ordinary rapid doublets.

Mr. W. H. Humphries showed a hand camera; the plates were in metal holders pivoted on the top.

Messrs. Morley & Cooper showed an automatic time and instantaneous shutter of French origin, also a light camera and stand.

Mr. G. Renwick's exhibit consisted of a dark slide, the shutter of which had a locking arrangement, preventing a second exposure being given to the same plate.

Messrs. Lewis's automatic plate rocker was wound up and shown in action, and the Excelsior plate washer, by W. Rooke, was next produced. The novel point in this appliance was that the spray pipe, being attached to floats working in side chambers, was kept at a given height from the surface of the water.

Messrs. Swinden & Earp's hand camera and Pearson & Denham's reducing camera were next shown.

Messrs. Marion's exhibit, including Bain's, Kershaw's, and Cloakley's shutters were then shown in action. Krugener's Simplex camera was also displayed.

Messrs Mawson & Swan showed Payne's photo-micrographic apparatus, Lomen's reflex and sport cameras, and Hume's cantilever enlarging apparatus.

A camera with aluminium fittings, conferring great lightness, was shown by Mr. J. R. Gotz; and after the exhibits of Messrs. England, Shew, and Crouch had been shown, the meeting was adjourned.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 23,—Mr. C. H. Cooke in the chair.

Mr. G. W. ATKINS desired to correct what he thought was a wrong deduction in his paper on *Stereoscopic Photography* read at the preceding meeting of the Association. He had now come to the conclusion that the effect of great separation of the lenses in taking a stereoscopic view was not to cause a round object to appear oval, but to cause an exaggerated or fast-receding perspective.

The CHAIRMAN referred to exaggerated or false perspective as belonging to photographs taken with wide-angle lenses, and instanced a case in which a vase at the side of the picture had been represented as being higher on one side than the other.

Mr. W. E. DEBENHAM said the violent perspective seen in pictures including very wide angles was not false or even exaggerated (which meant something beyond what was true), but was the only perspective in which they could be represented from the standpoint and line of sight chosen, and everything would fall into its place if viewed at a distance equal to that of the focus of the lens used. The perspective of the marginal part of a picture distant from the point of sight would look wrong if that part were cut out and placed as a separate picture in the line of sight, although in its proper place it was quite correct. He illustrated his remarks by diagrams on the blackboard, and showed a drawing of a building in which, although the walls were rectangular, the vanishing lines converged towards the same hand. This might be true perspective at the side of the picture, although if cut out and looked at by itself an impression of falseness was conveyed. The direction in which the parallel lines of a building converged did not depend absolutely upon which end of the building was nearest to the spectator, but upon which end of it was in a plane at right angles to the line of sight nearer to the spectator.

Mr. W. WOODBURY showed some specimens of "celerotype" printing, a process which was stated to be one of printing by means of an emulsion of citrated chloride of silver. The printing, he stated, was about twice as

rapid as that upon albumen paper, and the prints were amenable to any toning bath. Another advantage was that better prints could be obtained from weak negatives than upon albumen paper. The photograph was upon the surface, and the paper being coated with a chalk facing before being covered with emulsion, the image was very fine and the detail preserved better than with albumen paper.

Mr. F. A. Bridge had found a practical difficulty in working with this paper from the strong curling that took place in the water and toning solutions.

Mr. T. E. Freshwater drew attention to a page of illustrations in the current number of *Punch* which he thought contained a slur on photographers, and several members expressed their regret that the public should suppose that actions such as were here satirised would find any sympathy, support, or imitation from the body of photographers at large.

CAMERA CLUB.

October 23.—Mr. A. Maskell in the chair.

Mr. E. J. Humphrey read a paper entitled *The Direct Reproduction of Negatives and Positives*. Mr. Humphrey described his method of obtaining positives and negatives direct from positives and negatives in one operation. He stated that he had been led to his experiments by something which transpired between himself and Mr. Bergheim, a well-known Austrian amateur, whom he had the pleasure of introducing to the Club as a member. The method, put briefly, was to give an exposure many times greater than that for normal development and then to develop with an extremely dilute developer. The result was a very printable negative from a negative or fair positive from a positive. Prints taken from these secondary negatives were handed round, and the lecturer said he hoped to so improve the results as to obtain the second negative as free from the appearance of fog as the original. Positive prints upon platinotype paper made into excellent transparencies by treatment with paraffin were also shown.

A long and interesting conversation then took place upon the subject of the reversals involved in the process.

On Thursday, November 6, Mr. J. Gale will read a paper entitled *Country Rambles with a Camera*. The paper will be illustrated by lantern slides. Meeting at half-past eight p.m.

HOLBORN CAMERA CLUB.

October 24.—Slides by Messrs. Chang, Thorpe Thompson, and Bayston were shown before an interested audience of members and friends; after which prints on Fallowfield's aristotype and Blackfriars celerotype paper were passed round.

Several members then left and went on to see the finish of the Photographers' Benevolent Association entertainment at Anderton's afterwards.

THE LANTERN SOCIETY.

The first meeting of the season was held at 20, Hanover-square, on October 13, when Mr. Andrew Pringle gave an address on *The Modern Applications and Appliances of the Lantern*. After briefly alluding to the early history of the lantern, the lecturer proceeded to consider the various parts of a lantern, taking in order the body, where he dealt on the advantage of portability, showing a small iron lantern which, whilst capable of doing all that a lantern of ordinary construction would do, packed with all its parts complete into a box a quarter the size of an ordinary one; the condenser, describing the different forms which have been designed and used at different times; the lens, comparing the ordinary lantern objective with portrait and other types of lenses; and the illuminant, describing the early form of limelight as designed by Drummond and Bazeley, and going into the essentials of a good lime jet; also showing a Brockie incandescent lamp for use with the lantern. He then went on to discuss the uses and advantages of the lantern from an educational and scientific point, and showed several experiments on the screen with a projection microscope, &c.

The screen used by the lecturer was a portable one designed by himself, with the view of being made as handy as possible for travelling. Amongst other things, Mr. Pringle showed a scientific biunial, designed for showing diagrams, &c., on the screen before a class, and a projection microscope of a most simple construction, designed by himself. Several pieces of lantern apparatus were exhibited, amongst them being a lantern constructed by Mr. J. H. Steward for using an incandescent lamp of one hundred candle power.

WEST LONDON PHOTOGRAPHIC SOCIETY.

October 24.—Mr. C. Bilton (the retiring President) introduced Mr. Walter Adam Brown, who had been elected to the office for the year 1890-91.

Mr. William Schooling, F.R.A.S., was elected a member.

In answer to a question as to the best means of reducing a negative which had been over-intensified with mercury, Mr. Whiting said that Howard Farmer's reducing solution, composed of ferricyanide of potassium and hypo would generally be found to answer well, but in the case of a yellow negative he preferred to use ozone bleach.

Mr. W. A. Brown, in the course of his inaugural address, thanked the members for the honour conferred upon him. He did not propose to detain them by making a long speech, although a gentleman had suggested to him at the last meeting a scheme which it was said would meet with the approval of every one, namely, that he should give a history of photography from its birth. He did not know what the feelings of the members were, but for himself he shuddered at the very suggestion, and intended to confine his remarks within a very much smaller compass. In the first place, it seemed to him that photography was purely in its infancy, notwithstanding the vast improvements which had been made since its discovery, both in the direction of *technique* and of art, and no one could prophesy the changes which might occur even during the short period of their own lives; much remained to be discovered. Many present would probably recollect that their early attempts at securing the likenesses of friends did not meet with the approbation which was expected. He could recall a warm invitation from an acquaintance, which, however, was coupled with the limitation that he did not bring his camera; since then he was glad to say the restriction had been withdrawn, so possibly his attempts at portraiture had somewhat improved. In regard to landscape work the photographer was brought face to face with the serious drawback that however successful in other respects the photograph might be it always lacked colour, skies also were difficult to obtain in the same negative, and the relative values of distances were often misrepresented. It was one thing to see a pretty composition on the screen, and quite another to produce the same result in the photograph, which was often not so much the fault of the photographer as of the plate. Although he spoke with an indifferent knowledge of the subject, he did not think natural colours would ever be produced in the negative, but in regard to the true rendering of skies the present difficulties would be overcome. Speaking of the manipulation of the plate, he thought very considerable art might be exhibited in its development. A very great amount of art was necessary in selecting the picture and arranging it on the plate, for they must not forget that they could not manipulate a foreground like a painter, they must take nature as they found it, or leave it alone; many a good picture was spoilt by bad development, and in the same way many a badly exposed plate could be saved by skilful treatment. When it came to the after-operation of washing, &c., the work was mere drudgery. In the first handbook he had read it was stated that washing by hand was the most effectual method, and recommended that twenty changes of water should be given, with an interval of ten minutes between each change. Those who were fond of figures would find that that was a very protracted operation, and to a busy man a great waste of time. Although print and negative washers existed in every conceivable variety, it seemed to him that the washing itself might be obviated, and that the same chemical aid which introduced the hypo might be invoked to eject it in the same summary manner. Speaking of the photographer rather than of the materials, he could not help noticing the large number of people who took out six plates, and were not happy unless they shot them all off before returning. That should be altered. Comparing the photographer with the painter, the latter did not try to paint everything he came across; he selected his subject with great care and deliberation. The same principle should guide the photographer, who should bring the plates home unexposed rather than expose them recklessly on unsuitable subjects. Another fault with amateurs was the incessant craving after novelties. Before a particular make of plate was mastered it was discarded, and a fresh brand chosen. It was the same with the shutters, lenses, and other things. He would impress upon them the many advantages to be derived from joining a Society, and he congratulated them upon the good position to which their own had attained. The amount of knowledge that was communicated from one to another by means of the Society's meetings was really astonishing. They were fortunate in possessing such a strong Executive, and in their Secretary they had a man to whom photography and its associations were so dear that he was almost saying Mr. Hodges was "touched" on photography. In conclusion, he thought it would be a great boon to their own and other Societies if they could combine together in the same way as angling Societies had done, and obtain the privilege of getting railway tickets issued to them at reduced rates.

The optical lantern, under the superintendence of Mr. Horton, was then put in operation, and a large number of slides exhibited. A fine series in wet collodion, by Mr. C. Whiting, of Shakespeare's birthplace and the neighbourhood of Stratford-on-Avon, was much admired. Messrs. Wilson, Dixon, Lawley, Livingstone, Kellow, Hodges, and Winter also showed slides; a highly successful evening being brought to a close by the exhibition of some fine slides kindly lent by Messrs. Fry & Co.

Next meeting, November 14, when Mr. Jones will give a demonstration on printing in platinum.

HACKNEY PHOTOGRAPHIC SOCIETY.

October 23,—Dr. Roland Smith in the chair.

In accordance with desire, several pleasing results of the Fry Manufacturing Company's samples were handed round, and from the fact that one or two shown were the work of tyros, good results would appear to be easy to arrive at.

Mr. John Howson gave a lecture and demonstration on *Alpha Paper Printing and Developing*. Many people had said that half tones were lost with this paper, but the productions shown (the work of a prominent professional) proved that this was not so. The emulsion on paper and plates was precisely the same, and any colour could be attained in the toning bath. Exposure should be made by scale, and not by guesswork. The burner to be used was an Argand two-light, at a distance of ten inches, the exposures taken as experiments to be one minute, one and a quarter minute, and one and a half minute.

During the demonstrations various questions were asked, and the paper was much appreciated. Various lantern plates were shown, illustrative of the tones obtainable by the process.

Mr. Beckitt showed a print on Alpha paper which had over twenty minutes' exposure, being an enlargement from a quarter-plate.

Mr. Howson said, in answer to the Secretary, that they had some three years old which was still being used.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

October 23,—The president (Mr. J. B. Stone, J.P., F.G.S.) in the chair.

A vote of thanks was passed to Mr. Harold Baker for a splendid set of slides he had presented to the Society.

Mr. T. Taylor exhibited a metal binder by Mr. Hughes, of London.

Mr. E. H. Jaques saw two or three objections to its use. 1st, they would let the dust in; 2nd, the metal would have a tendency to scratch the glass

and, 3rd, it adds weight to the slides. Good paper binding could easily be made with gelatine and sugar mixed with a little water.

Mr. TUCKER said if they were made of iron or steel they would be subject to rapid corrosion.

The PRESIDENT called on Mr. Place to put the different slides through the Society's new lantern, which had been subscribed and paid for by the members without touching the Club's funds.

Mr. Stone's slides were first passed through from pictures he had taken while on tour with the Vesey Club in Norway. Slides were also shown by Messrs. Owen, Thomason, Titley, Underwood, Harrison, Palethorpe, Jaques, Baxter, Pickard, Leeson, and about forty kindly sent by Messrs. Mawson & Swan.

Mr. STONE offered twenty-five of his 15×12 negatives of Warwickshire to the Survey Council, and prints from each in platinotype.

Mr. J. H. PICKARD reminded the members that there was only a month to prepare their pictures for the exhibition.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

OCTOBER 20.—Twenty-four new members were elected.

A paper on *Hand-camera Work*, by Mr. John Morison, jun., was read.

After an exhibition of novelties, the lantern was brought into requisition for slides from hand-camera work, showing some exceedingly good pictures on the screen, also some extremely amusing studies.

CONGRESS OF FRIENDS OF PHOTOGRAPHY IN BERLIN.

SEPTEMBER 29.—Captain Mensing in the chair.

Professor VOGEL, as business manager for the Congress, having opened the proceedings by announcing the programme of the Congress, the CHAIRMAN (Captain Mensing) welcomed the assembly in a speech of some length. Having thanked those present for their attendance, and alluded to the encouraging circumstance that representatives of a large number of provincial societies were in attendance—a result largely owing to the exertions of Messrs. Vogel, Allihn, and Schultz-Hencke—he proceeded to point out that the present Congress was distinguished from those held in other branches of science and technology by the fact that it included men of reputation in nearly all spheres of human activity. He then devoted some words to drawing attention to the exhibition held in connexion with the Congress, and concluding by directing attention to that portion of the programme dealing with the means to be in future adopted for forwarding the interests of the profession in which all were concerned.

The CHAIRMAN then proposed the election of Herr Schultz-Hencke as Secretary to the Congress, which proposal was immediately carried, whereupon Herr ALLIHN commenced his paper on the *Requirements and Construction of a Touring Camera*. The speaker dealt humorously with some of the more recent monstrosities of this species which are palmed off upon the too confiding amateur. He recommended sparing employment of metal and the greatest possible degree of lightness.

Dr. MIETHE then proceeded to give his paper on *Photographic Optics*, which was largely on the same lines as his former one read before the "Friends of Photography," and interesting from wealth of illustration and agreeable delivery.

Herr GAEDICKE then exhibited his new flash lamp with pneumatic liberator, and gave some demonstrations with it, showing the effect of his new "blitz-pulver," for which he claimed advantages over pure magnesium.

The principal interest of the evening, however, was evoked by Dr. Jeserich's paper on *Judicial Photography*, which was elaborately illustrated.

The first day's proceedings then came to a close.

The meeting of September 30 took place in the hall of the Zoological Garden, under the presidency of Herr Allihn, and was very numerously attended, ladies also taking part in the proceedings.

Dr. KARSTEN read a paper on *Warnerke's Sensitometer*, the general draft of which was as follows:—Warnerke's sensitometer is used by almost all dry plate makers for determining the sensibility of their plates. An exhaustive examination of the sensitometer must be directed to—(1) the testing of the source of light, *i.e.*, the Balmain plate; (2) the table of numbers. The examination of the Balmain plate should settle (*a*) to what extent the intensity diminishes with the exposure; (*b*) how far the absolute brilliancy or intensity depends on the mode of illumination; (*c*) what influence is exercised by temperature and colour when orthochromatic plates are employed. The first of these points had been tested by the author in conjunction with Professor L. Weber. The result of twelve series of experiments was to show that during the critical half minute in which the exposure was to take place the brilliancy diminished from 100 to 65. Warnerke's statement that the action remains *sufficiently* constant for a minute after the commencement of this action is therefore disproved, unless a very wide meaning be given to the word "sufficiently." Weber also made researches into the scale of numbers. An image of the separate squares was projected (? upon a screen), and their transparency determined by means of the photometer. Taking the transparency of No. 25 as 1, the transparency of the other squares was found to vary from the scale very considerably. Squares 16 to 19 especially showed very little variation in transparency, then occurred a sudden jump. It is true that the experiments only referred to one particular instrument, but they at any rate suffice to show that Warnerke's sensitometer is by no means so reliable as is generally supposed.

Dr. DUBOIS REYMOND then exhibited his new developer holder, recently described in "Foreign Notes and News," and explained its action, stating that he had kept hydroquinone solution nine months, and pyro and oxalate seven months, in it without deterioration. Some of the members then suggested the employment of a layer of vaseline or petroleum, but Dr. Dubois Reymond stated that he had thoroughly tested that, and found that it did *not* prevent brown colouration.

After some business matters had been dealt with by Dr. Vogel and others, and Herr Allihn had exhibited some photographs in "natural colours" (?), sent him by Herr Verescz, which showed no further progress in that direction, Dr. WITT proceeded to read his paper on *Primuline Printing and the Feer Process*. He stated that the process in question depended upon the employment of the so-called azo-bodies, which are, one and all of them, colouring matters of all shades except green. These dyes afford a means of producing photographs in any desired shade. The older process is that of Dr. Adolf Feer, of Lörrach; the other is the primuline process of Green and Gross, of Berne. The primuline process is confined to the employment of certain azo-compounds only, while in Feer's process they may all be employed. While the primuline process depends on the principle that the organic compounds which have not been acted on by light remain unaltered, and are converted by subsequent treatment into colouring matters, in the Feer process the colouring matter is produced directly by the action of light, a positive being obtained from a negative. Every diazo-compound is capable of forming a sulphonic acid when treated with sulphite of soda in aqueous solution. If paper be saturated with these sulpho-acids, an amine or phenol being added at the same time, and exposed to light, the sulpho-acids are split up into their constituents, *i.e.*, diazo-compounds and free sulphite of soda, whereupon the diazo-compound set free combines with the amine or phenol present to form the desired azo-colouring matter. Dr. Witt finally stated that the colours thus obtained are perfectly permanent, though a good deal of prejudice prevails on this point, owing to the want of permanence of the original aniline colours. The paper was illustrated by a number of interesting samples by Braun, of Dornach. The thanks of the meeting to Dr. Witt were expressed by long and hearty applause.

Dr. MICHALKE then proceeded to discourse on actinic absorption and actinic sources of light. The least actinic light possible was required for the dark room, as it causes clouding of the plates. These facts were not exactly new. Dr. Michalke, however, then proceeded to give some more interesting information relative to his experiments. He tried a filter of oxalate developer, ·5 cm. thick, one in six, with gas as a source of illumination; result, orange-red light and no fogging. Daylight, however, filtered through the same thickness of oxalate, caused fogging in one second. The ordinary red glass and cherry silk were found to be unreliable. Daylight was found to be seven times more actinic than gaslight, and gaslight one and a half times as actinic as the Hefner or amyl-acetate candle.

VIENNA AMATEUR CLUB.

THE above Club began its winter session at the meeting on October 11.

Baron Nathaniel Rothchild, so lately mentioned in photographic papers here, exhibited pictures of great artistic excellence. Considerable interest was created by pictures by T. Lewitzki, of St. Petersburg, taken by magnesium flash light, representing scenes of Tolstoi's drama, *Czar Boris*.

Mr. EINSLE spoke of his method of partially intensifying and reducing negatives during their development, and Dr. JULIUS HOFMANN referred to the new French developer, "crystallos."

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

"FREE LANCE" AND MR. EVERITT.

To the EDITOR.

SIR,—The knightly instincts of a "Free Lance" to protect the weak prompts me to leave unnoticed Mr. Everitt and his singular effusion of last week; but it will be the truest kindness at once to reply, ere he flounder still more deeply into the bog he has entered. It is to be regretted that I could not give him a chapter to himself, as appears to be his expectation, for on no other grounds could he link Mr. Debenham's affairs with his. Unfortunately, however, the Editor will not allow me to separate my subjects more than by paragraphs. I believed, and so would every one of your readers but Mr. Everitt, that I had paid Mr. Debenham a neat compliment on his acumen; but so deplorable is Mr. Everitt's ignorance of optical matters that he actually imagines I have attacked Mr. Debenham, which is the very opposite of the true state of the case! Mr. Everitt says it is not for him to defend the latter gentleman; very fortunate for Mr. Debenham (if he wants any defending).

Mr. Everitt complains of my referring to others by name, yet the actual state of the case is that I singled out a few names when writing in a laudatory strain, but the illogical remarks of my critic I discussed without appending the name at all; it was the matter, and not the speaker, whose absurdity struck me.

Reference to my letter will show he does not touch the points I raised, he merely deals with a misrepresented version of my arguments. The part of a sentence of mine that he quotes bears as much resemblance to the whole as "bear false witness against thy neighbour" does to the sentence it is taken from. He acts, however, as though this mutilated sentence were a command, and has the audacity to accuse me of false assertion—a statement which is an impertinent fiction.

Of the rest of Mr. Everitt's verbiage I can only guess at the meaning

it seems to me to be to the effect that when you look at a photograph you miss your blind spot, your phosphorescence, your *macula lutea*, and the rest, but that they are all right when you go to nature; or else you miss the blind spot and company when you go to nature, while finding them all right when you look at a photograph. The meaning is very indefinite. However, it does not matter; does it?—I am, yours, &c., FREE LANCE.

PHOTOGRAPHIC MANUFACTURERS' AND DEALERS' ASSOCIATION OF THE UNITED KINGDOM.

To the EDITOR.

SIR,—I have the pleasure to inform those of your readers who are interested in the photographic trade that the above Association is now fully established, and is getting into working order. Offices have been taken at No. 7, Southampton-row, Holborn, W.C., and a permanent Secretary appointed, so that in the course of a very few weeks the Association will probably begin to make its influence for good felt throughout the trade.

Naturally a considerable amount of time has to be spent in arranging minor details, as an undertaking of this description cannot be floated by the "instantaneous process."

To buyers of photographic material, both at home and abroad, the Association will prove of considerable value, as they will know when dealing with a member of the Association that he is a *bonâ fide* manufacturer or dealer, as the case may be.

The Council would esteem it a great favour if any cases of unfair or dishonest trading, with full particulars thereof, be immediately reported to the Association. Such communications will of course be treated as strictly confidential.

All communications should be addressed to the Secretary, Mr F. O. Bynoe, 7, Southampton-row, Holborn, W.C. Thanking you in anticipation for the publication of this notice—I am, yours, &c., BIRT ACRES.

October 28, 1890.

THE PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—After writing to your paper a fortnight ago accusing the Committee of the Photographic Society of Great Britain of unfair treatment, I naturally expected some one in authority would have replied to justify their action in refusing to hang my air "brush pictures" because, as they alleged, they were not coloured by mechanical means, which I challenged them to prove. When I wrote to ask the cause of their rejection, Mr. Cocking told me, in reply, to attentively read the *Rules*, and I should see the clause excluding my pictures very clearly stated, and yet this same gentleman tells Mr. Van der Weyde in a friendly aside, when he met him at a restaurant at luncheon, that he thought there would be no objection to his transgressing one of those very rules, and the gentlemen of the Hanging Committee (who in their anxiety to carry out their rules to the very letter against my work, so far overstepped them as to disqualify pictures which in their prospectus they invited), under the soothing influence of their lunch at the restaurant, also invited Mr. Van der Weyde to exhibit; and when a picture was sent in by him which had a short time before been exhibited in the City, they found it almost too glaring a transgression and sent it back, and as the exhibitor had nothing else he cared to exhibit which came within the rules, he is, to use Mr. Van der Weyde's own words, not only told by Mr. Cocking that he does not think any one would object to the pictures exhibited at the Palace, but actually pressed to send in *something*, notwithstanding he knew it would be against the rules. Now, Sir, I would ask, "Why was a picture that did not come within the rules sent back to Mr. Van der Weyde in order to give him another chance of exhibiting when Mr. Cocking, in his letter to me, told me, on my remonstrating at not being informed of the rejection of my pictures, "*We never send any notice respecting pictures which are not hung*"?

The matter, so far as it concerned the judges, was referred to by Mr. H. P. Robinson in his letter, published in your JOURNAL of October 10, *re* "The Exhibition Awards." And as a seeming justification for their oversight he says, "Among so many pictures in a miscellaneous exhibition like the Crystal Palace it is impossible to remember every *little picture*." This may be, to an extent, very true, but they had among them one gentleman, Mr. Valentine Blanchard, who acted as judge both at the Palace and Pall Mall, and surely no one of these gentlemen can pretend that pictures 24 × 5, of sixteen figures dressed in the costume of 100 years ago, are so common on the walls of exhibitions as to cause confusion or the slightest doubt of their identity. Even you, in your notice, speak of this one particular picture as being of peculiar size. When gentlemen accept a responsible position, it is their duty to act, not only with care, but with justice and impartiality.

The public will know in the future what value to place on the medals awarded by the Photographic Society of Great Britain, and the honour will be with those professionals who do not exhibit rather than with those who by exhibiting help to carry on an exhibition the conduct of which has been this time a disgrace, and can be nothing but a blot on the reputation of the Society characterised by you as being *the most important* in the world.—I am, yours, &c., ANNIE E. BLAKE.

Bedford, October 27, 1890.

CORRECTION.

To the EDITOR.

SIR,—May I point out a sentence which is somewhat misleading in my notes on "Alpha Plates," printed in your last issue?

I wrote in my MS. "I have found that reductions can be made on Alpha plates in——minutes," intending to fill in the blank from result of actual experiments; this I unfortunately omitted to do before dispatching the MS., and your proof-reader filled in the words "a few." It ought to be "about thirty minutes."—I am, yours, &c., JOHN HOWSON.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Beeston Humber tricycle (worth 8*l.*) in exchange for 12×10 camera with one or more dark slides.—R. H. BLYTH, Photographer, Ilfracombe.

Wanted, good portrait lens, half-plate preferred; exchange, optical lantern, four-inch condensers, and mechanical slides.—Address, H. COUCH, 11, Waterloo-crescent, Dover.

A No 1 Ross' portable symmetrical, condition like new, wanted a 8½×6½ wide-angle rectilinear or a No. 4 portable. Difference adjustable.—Address, Lieut.-Colonel GUBBINS, Westward Ho!

Will exchange a Cadett's pneumatic flap shutter for inside the camera (cost 2*l.* 2*s.*) for a reducing camera (whole-plate for lantern slides, Lancaster's or other good make. —J. T. FIELD, Montana, Blackheath, S.E.

Will exchange Coventry Safety, XL, by Calcott Brothers & West, for Underwood's Exhibition half-plate with three double backs, and Wray's or Taylor & Hobson's rectilinear or symmetrical with Iris or wheel diaphragm.—Address, H. VEAL, Wellingborough.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

T. A. Flamons, Tunbridge.—*Three photographs of "Sequah."*

John Inverburgh, Edinburgh.—*Group of seven bishops.*

John Stuart, Glasgow. *Twenty-one prints of the Glasgow municipal buildings and one cabinet photograph of Patrick Boyle Smollett, Esq.*

BICHROMATE.—We shall be glad to receive the article for the ALMANAC. There is still time if you will kindly send it on at once.

W. T. M. D.—As you wish to take up photography as a profession, had you not better apprentice yourself to some one to learn the business?

X. Y. Z.—The lime bath will give the blackest tones, but the negative is the most important factor in the case. It must be a strong and vigorous one.

O. L. B.—Imperfect fixation is the cause of the yellowness in the sky. Made in the way you describe the carbonate of soda ought to work uniformly. Why not give the borax bath a trial?

HYDROGEN asks: "Are there any advantages in using pure hydrogen instead of coal gas for limelight work, a cylinder with regulating valve being used in either case?"—A purer light is claimed to be obtained.

O. LANGWORD.—In a studio only thirteen feet long it will be impossible to take full-length cabinet portraits with good perspective, whatever lens may be used. We cannot recommend that which is impossible.

B. STANLEY.—The *cycle* lens will make a more suitable lantern lens than the longer focus rectilinear, as with it you will get a larger image on the screen. In the length of your drawing room the image with the rectilinear would be very small.

J. JONES (Burton-on-Trent).—If you purchase your nitrate of silver from a respectable house you will find it suitable for emulsion making. To analyse it for impurities would require more chemical knowledge than, judging from your note, you possess.

M. J. W.—Clearly the paper was dried at too high a temperature, and that caused the gelatine to run. With gelatine of a soft and soluble character the paper must be dried at a lower temperature than would be permissible with a more insoluble kind.

PYRO.—Some of the earlier samples of eikonogen deteriorated very quickly, but the more recent ones are more permanent. A new kind has just been put upon the market, which is quite different in appearance from the previous ones, and it is said to be more stable.

W. G. HONEY.—By all means continue your experiments with a view to get strong, pure whites, of which, when attained, kindly apprise us. The effects obtained by you are, however, not those described by us in the JOURNAL; they are transparencies, not positives by reflected light.

STUART COLMAN.—One of the prints is quite good; in the other the reversed action of light is of the most complete type. The cause is evidently over-exposure, but if both received the same exposure, the light being equal in value, we are quite at a loss to account for the phenomena.

W. S.—If your picture is worth criticism it will be noticed in due course. We pay no attention to any notices that may have appeared in newspapers of pictures which have been shown in provincial exhibitions and are now on view at Pall Mall. The cuttings are, of course, consigned to the waste-paper basket.

C. B. VANDELEUR asks: "Does an excess of acetic acid in the iron developer act injuriously on the resulting print?"—No; unless the excess be very great. But the whole of the acid must be washed out of the paper before it is immersed in the fixing bath, otherwise the stability of the picture will be jeopardised.

THOS. SHAW asks if there are any recognised hours during the winter for operators, printers, mounters, and others; also, if the hours for work are the same in London as in the country.—Every establishment makes its own arrangement as to the time of their *employés'* work. There is no set rule either for London or the country.

CRAFTSMAN.—If the quantity of liver of sulphur added to the washings does not throw down all the silver, it is clear that it is a very bad sample. Liver of sulphur (sulphide of potassium) quickly deteriorates if exposed to the air. Perhaps this has been the case in this instance. The salt should always be kept in closely stoppered bottles.

A. LEVY (Asnières, Seine).—To prepare iodide of starch, make a thin solution of starch by boiling. To, say, a drachm add 10 minims of an aqueous solution of iodine, by which a fine blue colour will be developed. This is a fairly delicate test for hyposulphite of soda. If the draining from washing a print discharges the colour, it indicates the presence of hyposulphite.

W. MORRIS.—Those who have adopted the electric light no doubt find that it increases business, inasmuch as it enables it to be carried on at all times, and under all conditions of weather. A single arc light with the usual reflector, which has so frequently been described, is all that is necessary. The light should be of not less than five thousand candle power to obtain the best results.

A. W. BROOK wishes to know if we consider prints made on silver paper and toned with platinum are as permanent as those on the Platinotype Company's paper, and produced according to their method.—We do not; inasmuch as in the platinotype process the image is composed entirely of platinum, whereas in the other it is simply a silver image with a superficial coating of platinum.

R. SMITH writes: "Can you tell me what I ought to put on a bromide print before colouring in oils? I can manage to colour albumenised prints by sizing them, but cannot manage the bromide prints."—We are not aware that anything is necessary, as we have found no difficulty in applying oil colour to bromide pictures. If our correspondent does so, perhaps a wash of very dilute ox-gall will assist him, or possibly, better still, to lightly rub over the surface with an ink eraser.

B. and C. write: "We have a studio with a front top light only six feet high at eaves, about ten feet at the ridge; all the pictures come out flat. Could you suggest how the blinds should be arranged?"—In this case it is difficult to advise, as no dimensions of the studio, length of light, or its shape are given. The present front top light must be arranged as much as possible to be a side light, which, we presume, may be done by placing the sitter so that the light falls sideways, instead of in front.

T. F. E. says he has a negative of a group which he wishes to utilise as a Christmas card, and asks how he can do so.—There are several ways. One is to design an ornamental border with motto on a large scale and make a negative therefrom of the required size; then to print the group with a masked background, and afterwards introduce the border by double printing. Another is, after the design and motto is drawn, to mount the group in the proper position upon it and then make a negative of the whole, and so obtain prints by one printing. Or suitable mounts are articles of commerce upon which the photographs may be mounted, and then the whole thing is complete. There are many other ways in which the thing can be accomplished, but we cannot enunciate them here.

BRIXTON AND CLAPHAM CAMERA CLUB.—On November 6, at eight p.m., Mr. A. R. Dresser will give a lantern lecture in the Gresham Hall, Brixton, on *A Tour in Brittany*. Admission 6*d*.

AGATHOS PAPER AND OPALS.—Mr. W. H. Prestwich, of Tottenham and City-road, has sent samples of matt-surface paper and opal plates, bearing the above name, which he is preparing. These are for printing-out, no development being required; and a peculiarity in their preparation is that no silver chloride in any form is employed, bromide only being used. We find them to print rapidly and tone easily, giving vigorous yet delicate prints.

PHOTOGRAPHIC CLUB.—Wednesday, November 5, Annual general meeting, election of officers, &c. November 19, Annual dinner.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—Subject for November 6, *The Unnatural Character of so-called Naturalistic Focussing*. Second evening. Mr. W. E. Debenham. November 13, Lantern night; judging of competition slides.

THE PRIMULINE PROCESS.—On Monday next, November 3, Messrs. Green, Cross & Bevan will discourse on the primuline process before the London section of the Society of Chemical Industry. The meeting takes place in the rooms of the Chemical Society at Burlington House, Piccadilly, and commences at eight o'clock.

HACKNEY PHOTOGRAPHIC SOCIETY.—November 13, members' lantern night. November 27, *Kallitype Paper*; Dr. Roland Smith. December 11, Exhibition of pictures and lantern slides in competition (Messrs. H. P. Robinson and J. Traill Taylor, Judges) at St. Andrew's Hall, Hackney. Music. Slides will be put through the lantern during the evening.

TUNBRIDGE WELLS AMATEUR PHOTOGRAPHIC ASSOCIATION.—The fourth annual exhibition of the above Association will be held at the Sussex Assembly Rooms on November 26, 27, 28, and 29, 1890. Particulars as to prizes, entrance money, &c., may be obtained from Mr. Joseph Chamberlain, Hon. Secretary, 14, Calverley Park-gardens, Tunbridge Wells.

HOLBORN CAMERA CLUB.—Friday, November 7, Mr. E. Clifton will lecture on *Old Dry Plate Processes*. Tuesday, November 11, Club supper at "Mitre Tavern," 125, Chancery-lane. Tickets now ready, 3*s*. each. Presentation of prizes and social evening to follow. Friday, November 14, An article selected from one of the photographic papers will be read, to be followed by a discussion. Friday, November, 21, Mr. Thompson will lecture and demonstrate on *Gelatino-chloride Emulsion Papers* (*Aristotype and Obernetter*). Friday, November 28, Lantern night.

HOLBORN CAMERA CLUB (100, High Holborn).—The Secretary writes stating that the Club Room is open to members every Friday evening throughout the year. One Friday in each month is devoted to a lantern display of members' work or loaned sets, another to a lecture or demonstration by some well-known exponent of the photographic art; on the other Fridays one of the members contributes a paper on some useful information for the general good. Any lady or gentleman who may wish to join us now will be required to pay only half-year's subscription, and can have any further particulars of J. E. Smith, Hon. Secretary.

EIKONOGEN.—We have received from Messrs. Marion & Co. a sample of a modified preparation of this useful developer. They say that the manufacturers of eikonogen (the Actien Gesellschaft für Anilin Fabrikation, Berlin) have now succeeded in producing this admirable developer so that it is free from any liability to discolour. The changes necessary for obtaining this desirable quality necessitate that the eikonogen be issued in the form of a powder. The manufacturers assert that they have arrived at this result by means of a preservative, and all consumers may confidently rely that this new method will keep the eikonogen perfectly free from discolouration. The old formula remains without any change.

CAMERA CLUB NOTICES.—Monday, November 3, half-past eight p.m., Smoking concert. Thursday, November 6, half-past eight p.m., Mr. J. Gale: *Country Rambles with a Camera, Illustrated*. Thursday, November 13, half-past eight p.m., Demonstration of *The Primuline Process*, by Messrs. Green, Cross, and Bevan. Thursday, November 20, half-past eight p.m., Mr. Andrew Pringle: *On certain Old Processes for Lantern Slides*. Thursday, November 27, half-past eight p.m., Lantern evening. Monday, December 1, half-past eight p.m., Smoking concert. Thursday, December 4, half-past eight p.m., Mr. H. Sturmey: *On Rollable Transparent Films*.

MR. HERKOMER ON PHOTOGRAPHY.—Mr. Herkomer on Monday night forsook his colony of pupils and the new house, which, after all these years, is hardly above the first storey, to lecture in Birmingham on *Portrait Painting*. In the course of his lecture, this most versatile of men made, if not a bull, its cousin-german. Speaking of Frank Holl, who worried himself to death trying to make his portraits artistic, Mr. Herkomer remarked, "I am thankful to say I have a nature which forgets worries after a night's sleep; though they are for ever returning." Photography, Mr. Herkomer thinks, has done great things for mankind, but nothing for art; it has brought a certain kind of reality before us, which is not better art, but only different art. One of the most difficult sitters Mr. Herkomer ever had was Wagner. A whole month the painter was with him, watching him day and night; but the master would not sit. At last Mr. Herkomer got cross, and said, "I'll see what I can do without him." With that determination he painted excitedly for two days simply from what he remembered. At the end of the second day Mr. Herkomer showed this impressionist portrait to Wagner, who at once cried, "Why, you have witchcraft." Then he sat, and as he sat he smiled, and the smile brought his nose down and his chin up, so that, says Mr. Herkomer, "my impressionist version was fifty times a grander Wagner than the thing that sat in front of me." Nothing would persuade the painter to alter one line of it, and the composer concurred.—*Globe*.

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THE BRITISH

JOURNAL OF PHOTOGRAPHY.

No. 1592. Vol. XXXVII.—NOVEMBER 7, 1890.

FUZZINESS.

The amount of commendation from time to time bestowed upon pictures of the pinhole type by some of the lay press critics, and by a certain section of the public, naturally leads one to speculate as to whether this kind of photography is likely to acquire any considerable degree of popularity. It is not our intention to enter into the, just now, vexed question of so-called "naturalistic photography," its merits or demerits, as enough—indeed, too much for the credit of some of the writers, *pro* and *con*, and the cause they espouse—has already appeared in the photographic press. It is, however, an undoubted fact that the general press have usually been in favour of unsharp pictures, provided they possessed a sufficient degree of artistic merit.

All our older readers will remember the eulogies lavished upon the pictures of the late Mrs. Julia Cameron, although they were universally condemned by photographers. It must, however, be borne in mind that the general press may be taken as indicating, to some extent at least, the direction of public taste, and certainly it has been freely commending of late several pictures of the out-of-focus or fuzzy character; also, that pictures of this class have been greatly praised by a considerable proportion of the visitors to the present exhibition.

Artists have always condemned the excessive sharpness of photographs as being opposed to true art. Mrs. Cameron is generally credited nowadays with being the first to advocate out-of-focus pictures, but the first to do so was the late Sir W. J. Newton, an artist and miniature painter, and one of the first Vice-Presidents of the Photographic Society. In the early fifties he recommended that the lens should be put slightly out of focus in order to obviate the excessive sharpness. After all, fuzziness is not a craze of so recent a date as some surmise.

Is there likely to be a reaction in the matter of sharpness in photographs? Taste with regard to photographs has undergone many changes, and that it may undergo many more is undeniable. The colour and surface of prints may be taken as an example of changing taste. In the early days prints of a rich deep brown or black colour on a matt surface were those most in favour. Next came albumenised paper, which, by the way, had little more than a dead surface, and then the tones most in vogue were a rich purple black. Later on, taste changed, and paper with more gloss was demanded, with tones of a warm reddish brown. In fact, the surface then could not be too highly glazed, and this led to an enhanced gloss being obtained by enamelling the prints with gelatine. Then a reaction set in, and the taste of the more refined portion of the public now is in favour of not only a matt surface, but a decidedly rough and coarse one. And for colours, those of engravings, mezzotints, and sepia drawings are preferred. Here we have diametrically the opposite to what was the fashion but a few years back. Who will say that as great a reaction is impossible with reference to excessive sharpness?

There is no question that there has been a great revolution in amateur photography, to which much of this change may be attributed. At one period it was followed exclusively as a scientific pursuit. The chief consideration then, in a good photograph, was that it should be perfectly sharp—microscopically sharp—in all parts, even to the extreme corners. Many lenses that are now considered good, and give satisfaction to their owners, would not for a moment have been tolerated by the majority of the amateurs of old. The photograph had to be clean, and quite free from technical defects; and, moreover, at one period, must have possessed a clear, white sky. These were considered to be the primary qualities of the picture; its artistic merits were but of secondary importance. Then the general press commended this minutiæ, while, it must be confessed, it condemned photography as being lacking in art.

Few amateurs who excel now would have practised photography in those days, as their taste does not run sufficiently in a scientific direction. They would not have devoted the time and patience necessary to acquire the technical knowledge possessed by their *confrères* of old who had to prepare everything for themselves. The taste of the modern amateur is for the pictorial, and not for the scientific. His main object is to make pictures. Now, with many the quality of the photograph is of only secondary importance as compared with the art phase of the work. This is just the reverse of what prevailed some years prior to the introduction of commercial dry plates.

Seeing the extent of this revolution in the art, may it not expand still further, and photography in the future be mainly used for the production of pictures that more closely resemble drawings in monochrome than they do photographs, that is, photographs with no greater definition than is met with in paintings and drawings? Will the sharpness, which to many is one of the chief charms in a photograph, eventually become a thing of the past?

The question is one of no mean interest, seeing that in the present exhibition the judges—all of them old photographers be it borne in mind—awarded two medals to pictures of the extreme out-of-focus or fuzzy type.

DEFECTS IN COLLODION EMULSION.

A few weeks ago we described a collodion emulsion process which can be used for either wet or dry plates for transparency purposes, and we have since had evidence that a large number of our readers are interested in this class of work. But, as was to be expected, collodion emulsion, being to the majority of

amateurs a novel experience, innumerable difficulties have cropped up which it will be our endeavour in the present article to explain.

It is, of course, not possible from a mere examination of a foggy or imperfect plate to say definitely what is the cause of the failure, even though the fullest particulars are at the same time supplied. So many different conditions go to produce the same or very similar faults, that the most we can do is to point out the various directions in which such failures should be sought. The almost universal complaint amongst those who have not succeeded is "fog," more or less pronounced, while one or two, though able to secure cleanness of image, are unable to obtain anything like sufficient density.

The latter fault may be first disposed of, as it may be set down invariably to the employment of an unsuitable make of pyroxyline. This is a matter over which the amateur, especially in out-of-the-way places, has very little control, and even in London and the larger towns the commercial supply of pyroxyline suitable for emulsion purposes is far more precarious than it was a few years back. A supply of a reliable character is, however, generally kept in stock by Rouch & Co., and Hopkin & Williams; Atkinson, of Liverpool, formerly kept Pary's and Anthony's, both American samples, which were very well suited for all emulsion purposes.

It is, we fear, very little help to the average amateur to recommend him to make his own pyroxyline, the task being a difficult and unpleasant one, even in the hands of a practised chemist. We therefore refrain from giving any formulæ here, though plenty may be found scattered through past volumes of the JOURNAL and ALMANAC. It may be remarked, however, that a sample of pyroxyline which, when newly dissolved, fails to give density, will frequently, if not invariably, improve if kept for a few weeks dissolved in the form of bromised collodion. Under such conditions the bromide appears to enter into some sort of combination with the cotton, or to set up some decomposition which favours density, just as in the case of wet collodion a better result is obtained from a collodion that has been iodised a few days than when it is quite new. The difference is far greater, however, when emulsion is in question; so if any reader happens to have a stock of bromised collodion that has so far not proved quite satisfactory, let him not despair of being able to utilise it.

There is one defect arising from an unsuitable pyroxyline which may be noted in passing, though it comes neither under the head of fog nor of want of density. We allude to the appearance of an opalescent, or "matt" effect, only visible after drying the plate. This arises from the too rotten or pulverulent character of the cotton, and is, of course, very objectionable, destroying, as it does, the transparency of the lights so essential on a lantern slide. The defect disappears in the majority of cases if the plate is varnished, but this involves an additional operation, which many lantern workers consider unnecessary, if not worse. Such "rotten" samples of gun-cotton are frequently otherwise very suitable for emulsion purposes, hence we have known them to be employed in spite of their objectionable feature, a suitable varnish being used to overcome it.

But there is another way in which an unsuitable pyroxyline may affect an emulsion, namely, in the production of decided fog, either of a grey or other colour.

It was well known to old wet collodion workers that some collodions were far more prone to fog and stain than others, owing to the peculiarly organic character of their films, arising from the temperature of the acids employed in the manufacture of the pyroxyline, or other circumstances. With a collodion of a similar nature, in the case of an emulsion, an almost identical result is produced from the formation apparently of an extremely unstable compound between the silver and the more organic portions of the collodion. This result is, of course, correspondingly greater where an emulsion containing free silver is concerned, or even in one in which the silver has been allowed in excess for only a short period. It seldom occurs when the bromide has been in excess throughout. Fog or veil arising from this cause will often gain in intensity, as pointed out by one of our correspondents after fixing and washing, but this latter result must not be confused with the darkening that occurs from imperfect washing.

A prolific source of failure is free silver, whether intentionally or inadvertently present. When intentionally employed, the excess of silver must be accompanied by a suitable and ample proportion of free acid to restrain it from passing the emulsion into what is known as the "fogging" stage. Even under those circumstances it is by no means certain that from some unexplained reason the emulsion will not go wrong. An actual excess of silver may be added to the emulsion in sensitising without any restraining acid, and still a clean and good image be produced; but in order to achieve this the emulsion or the plate must be washed before the silver and bromide have had time to fully combine—before, in fact, there is an actual excess of silver in solution.

But an excess of silver may frequently exist unsuspected, hence the advantage of a rough test applied immediately after sensitising. The accident may arise from sheer carelessness in weighing, from miscalculation of the equivalents, or even from improper condition of the materials. It is almost incredible how far some operators succeed in going wrong over so simple an operation as weighing a few grains of silver, in following out strictly the quantities of a written formula. It is equally surprising to find others who, in altering the total quantities of a formula, undertake to recalculate the quantities with an utter disregard for the correct combining equivalents. Thus it is a by no means uncommon error, in calculating the quantity required of bromide of cadmium, to consider that salt as anhydrous, but to actually use the ordinary crystals, which contain four equivalents of water, an error which involves the use of an excess of silver amounting to about four grains to every fourteen of bromide. Lastly, the bromides, especially bromide of ammonium, are peculiariy liable to absorb moisture from the atmosphere, which silver nitrate is not. Consequently, while the latter remains a tolerably stable item, the bromides may, if not carefully attended to, be gradually losing strength by the absorption of moisture, and so tend to the presence of an unexpected excess of silver.

Special care should therefore be devoted to the bromides, but even this must be applied intelligently. In the case of bromide of ammonium, it should as soon as purchased be spread on a plate and exposed for some time to a moderate heat in an ordinary oven, in order to drive off any accidental moisture. If the heat be too intense the salt will be volatilised; this, however, does not interfere with the combining equivalent, but simply means a loss of material, what remains having still the same combining value. In drying the crystals of bromide of cadmium, however, the case is different. The salt itself is not so readily volatisable, at least as bromide of ammonium, but it rapidly loses its water of crystallisation, and so its combining value is constantly changing. It is necessary, therefore, to

proceed with this salt in a systematic manner. If it be exposed for some hours to a very moderate temperature, it will be found to lose a definite proportion—one-half—of its water of crystallisation, and the residue that remains will be found, with tolerable certainty, to be composed of $CdBr_2 + 2H_2O$. If a higher temperature be adopted, the salt fuses into a dark liquid and gradually gives off the remainder of its water; and, if the heat be continued long enough, the residue, which on cooling has the form of a tough cake, will be anhydrous bromide of cadmium.

It will be gathered, therefore, that in drying this last-named salt there is ample room for the introduction of serious uncertainties unless due care be exercised. The method we have recommended for many years past is to form a double salt of ammonium and cadmium, which forms a more reliable compound than the constituents singly, besides being more convenient to use from its ready solubility in alcohol. We are assuming that these two salts are to be used, which, from the comparative insolubility of the ammonium salt and the thickening action upon the collodion of the cadmium alone, is almost a necessity. In making the double salt, weigh out the separate bromides in equivalent proportions, bearing in mind that though the equivalent of crystallised cadmium bromide is 344, it requires two equivalents or 340 of silver to combine with it, and its actual combining power is only 172. The proportion may therefore be 98 of bromide of ammonium to 172 bromide of cadmium, the former being fast dried.

If the two salts be introduced into a mortar and worked together with the pestle, a rather curious result ensues. The originally perfectly dry crystals first become moist and sticky, assume a pasty form, and eventually become perfectly liquid, in consequence of the water given off by the cadmium salt in its combination with the bromide of ammonium. If this pasty mass be transferred to a saucer or other suitable vessel and placed in the oven until dry, not applying too great a heat, an anhydrous and non-deliquescent salt is the result, which is more easily preserved than either of its components, and is soluble to almost any extent in alcohol. The mean of the combining equivalents of the separate parts may be taken as the equivalent of the compound, or an actual trial may be made with silver nitrate.

There is still another, and perhaps the most prolific, cause of failure still to be described. It has become too much the custom to state that "any good sample" of methylated spirit will answer for emulsion purposes if it does not contain too much water. What may represent a "good" sample of spirit at the oil shops for burning or similar purposes is not necessarily a good sample for emulsion, and it is to be regretted that the general quality has greatly deteriorated of late years at the same time that the price has gone down. From this cause alone—bad alcohol—we are convinced that the great majority of failures spring. Let any one try the following experiment, or rather take notice while sensitising an ordinary emulsion:—Let the silver be dissolved in the few drops of water necessary, and let the requisite quantity of methylated spirit be then added cautiously, so as not to throw down the silver. Then let the mixture be raised to the boiling point, when the degree of impurity present will be evident. The purest—unmethylated—alcohol will not stand the boiling test unless specially prepared for it, but the horribly filthy mess that some samples of methylated produce is sufficient to account for a vast deal of the fog that many operators complain of.

For this reason we have often recommended the addition of a drop of nitric acid to the silver solution, in order to keep the impure silver compounds soluble, in which case there is a chance of their being washed out of the emulsion at a subsequent stage. But if allowed to take the form of a black deposit, a certain amount of inevitable fog is added ready made to the emulsion in sensitising.

Several methods of purifying the alcohol have been recommended from time to time, such as distilling from Castile soap and similar processes. But the distillation of alcohol is neither a convenient nor a legal operation for the ordinary amateur photographer, so we hesitate to advise its adoption. The method we ourselves use is to add to a "winchester" of methylated spirit a few grains—say ten to fifteen—of dried carbonate of potash, or, better still, of caustic potash, and, when dissolved, about the same quantity of nitrate of silver dissolved in a drop or two of water. Shake up the bottle and place it out in daylight until wanted. The combined action of light, alkali, and silver will thoroughly free it from the impurities that act upon the silver, and when it has settled, clear any excess of silver and alkali that may be neutralised, and the alcohol will be in perfect condition for use.

We should scarcely have deemed it necessary to call attention to the importance of avoiding "finish" for emulsion purposes had not a case very recently come to our notice in which this was supplied in lieu of "spirit," with the result that it was almost impossible to develop an image after any length of exposure. We simply record the result in case any other reader may have had a similar experience.

THE ILLUSTRATED PRESS AND PHOTOGRAPHY.

Newspaper artists and writers have long entertained photographers with their methods of handling photographic subjects. Those methods are commonly replete with originality, and are seldom devoid of humour and instruction—two qualities not always found in association. The pencils of the one class have times out of number gloried in depicting photographers doing things of which, it is safe to affirm, the photographers themselves have no conception at all; while the pens of the other have presented theoretical and practical photography to the reading public in aspects that are simply inscrutable to all but the writers. We have not by any means changed all that yet, but we can congratulate ourselves that matters seem inclined to improve.

Such curious pieces of photographic cabinet ware as the artists were formerly pleased to draw for us never had any actual existence outside the confines of their own imaginations. The stands for landscape work were always of the tripod form, it is true; but they usually looked capable of successfully defying the collective ingenuity of both maker and owner to fold them. It was the same with regard to the cameras, which rarely suggested to us that they were anything but ugly, plain, wooden boxes. And it was not merely in hasty and incomplete sketches that these unpardonable crudities appeared, but in finished drawings, which, as a rule, would not otherwise be deficient in detail and accuracy. Some artists seemed to think that the picture was photographed from the screen end of the camera, and in representing the moment of exposure, have carefully covered the lens with the focussing cloth, which others have occasionally omitted altogether.

The abolition of the focussing cloth has often been mooted and discussed in these pages, but it has not yet come to pass—except among artists. Numerous other bulls will no doubt be recalled by students of the illustrated press, the artistic staff of

which have, or rather had, quite a mania for representing amateur photographers as taking pictures that, according to the topographic particulars indicated by the illustrations, could not have been secured without the aid of an optical combination not yet found in commerce.

Still, as we have said, matters are inclined to improve. We have observed in recent newspaper and magazine illustrations of the camera in the field an increasing fidelity to the form and construction of photographic apparatus, and many distinct evidences that the artists have come into possession of some kind of practical acquaintance with photography itself, so that there has not been, as heretofore, such a proneness to depict the improbable and the impracticable. We may cite, as an instance of this welcome progression towards accuracy and intelligence, a two-page picture which appears in a recent issue of one of the largest illustrated weekly newspapers. A lady is photographing a group in the Court of Lions of the Alhambra. The apparatus she is using looks quite practicable, and is faithfully drawn. The presence of two leather cases forcibly reminds us either that the artist knows something of operative outdoor photography, or that he has sketched his subject from nature. The camera is a large one, and is doubtless carried in one of the cases, the other holding the slides. This is a common arrangement where a large-sized camera is employed out of doors. The lady who is taking the picture has presumably just finished focussing, for with one hand on the screen she is extending the other towards her sitters, as if enjoining them to remain still, while a friend, also a lady, kneels at one of the leather cases, as if about to take therefrom the dark slide containing the sensitive plates.

But, in addition to its photographic verisimilitude, the illustration conveys an amusing story in a crisp and pointed style. The ladies, arrayed in *outré* tourist garbs, are, we may conjecture, mother and daughter. The group posed among the celebrated lions round the fountain comprises the head of the family, who passes well for a transatlantic pork king "doing" Europe for the first time, two juvenile daughters, and the perfumed and gilded heir to all the dollars. The background is formed of the well-known Moorish arcade, and a few figures in the picturesque national garb are cleverly introduced into the picture, thus heightening the contrast between the old civilisation and the new.

Vanity is a defect of human nature which comes into view on the smallest provocation, and photographers, or rather photography, frequently acts as a powerful magnet to it. It is easy to guess that the *nouveau riche* of the picture has seized the opportunity of being photographed in the famous Court of Lions, so that in after years he can not only boast of his travels, but produce indisputable testimony of them in the shape of photographs of the scenes he has visited, with himself and family included in the views. This practice is getting common with globe-trotters and tourists, and, so far as things go, it is a harmless weakness, although the results obtained generally have a large infusion of the ridiculous and little or nothing of the sublime or even the picturesque. Pot hats, masher collars, dress improvers, and "husband beaters," placed in front of some glorious old specimen of ancient architecture, or in the foreground of a celebrated view, infallibly jar on the æsthetic sensibility of everybody but those who appear in these incongruous photographs.

Some weeks ago we wrote of the prevalence in several studios of unsuitable accessories, among which we are disposed to rank many of those which are designed to lend distance and enchantment to the picture and to invest sitters with surroundings of an "effective" description. Imposing columns of no recognisable order of architecture, ideal lakes dotted with fairy-like yachts, free transcripts of actual scenes and buildings, improvised "ruins" and such like, serve, in a reduced degree, much the same kind of purpose as the artist permits the Court of Lions to serve in his pictorial satire. Not only has the photographer to idealise his sitter, but to do the same for his surroundings, and it is conceivable that to this singular *penchant* we may trace the developed eagerness which the tourist betrays for having himself photographed against the "show" objects which he encounters in his travels. Vanity is unpardonable when it is vulgar, and the artist seems to have caught the truth of the saying, for he has not only succeeded in producing a picture which is a skilful comment on the temerity of modern amateur photographers, but has illustrated with considerable acumen the deep *bourgeois* craving to be pictorially associated, at the risk of outraging the eternal fitness of things, with the picturesque and the monumental, under circumstances that rarely fail to provoke as much pity as amusement in those to whom this class of picture is shown.

It is not often that an artist, when he introduces the camera into his picture, is fully successful in being intelligible to the non-photographic public; but in the case of the illustration under notice, there are probably few persons who would not be interested and amused, and at the same time would fail to seize the wit and point of the episode. Perhaps amateur photographers as a body might protest at being called modern Goths, but by all means let us have many such pictures, even though they may prick a few susceptibilities here and there. They are not only amusing, but they teach more than one useful moral lesson to photographers and sitters alike.

THE primuline processes were discussed at a meeting of the Society of Chemical Industry on Monday night, when Mr. Green read a paper on the subject of the process due to himself in conjunction with Messrs. Cross & Bevan. A report of the meeting will be found on page 716 of our present issue. Testing the permanency of pigment or other prints under prolonged exposure to light was referred to on this occasion, and we may here point out that an ordinary printing frame is not suitable for exposing the partly masked prints, as if placed on a house-top, wet will penetrate. A clear glass dish, with the masked print fastened inside against the bottom, is more satisfactory, as when the dish is turned upside down the edges shoot off the rain water. A pigment print which shows signs of fading in so short a time as six months is obviously not fast enough even for the shop window or showcase; but a print worthy to be called permanent should stand a much more severe test.

AT the meeting of the Royal Microscopical Society, held on the 15th ult., some interesting remarks upon the relative value of sunlight and oxyhydrogen light were made, the former being considered preferable. When the artificial light is employed, the results are apt to be marred by a sort of cloudiness, which has its origin in the illuminating surface of the lime, which is not uniformly incandescent, an intensely brilliant central spot where the jet impinges being surrounded by more or less strongly luminous spots or patches of incandescence. With the sun the whole field of illumination is even and regular. Messrs. Mayall & Combes (whose simple heliostat has been so much admired) were of one opinion on this point. With regard to the latter gentleman's suggestion about mirrors for the heliostat, a modification in the direction of economy was pro-

posed in the form of a reflecting prism in lieu of one of speculum metal, which is always costly and difficult to obtain.

Mr. Mayall at the same time referred to the unpleasant phase of the discussions in regard to the apochromatic objective presented to the Society, which, it may be remembered, did not work to focus, although when returned to Jena and then sent back it was perfect. His playful suggestion that "the transit of the objective from London to Jena had, somehow, got rid of the chemical focus," had, unhappily, been misconstrued into a reflection on the good faith of Dr. Czapski, or upon Dr. Abbé, or upon the firm of Zeiss. This explanation conveyed to these gentlemen was completely satisfactory to them, and the singular incident may be considered ended. A very simple explanation of the irregularity was suggested—that the existence of a chemical focus was possibly due to a slight difference of the adjustment of the front lens, the mounting of which was partially unscrewed from the body of the objective when it first reached his hands.

Referring to electric light for dark rooms, Mr. S. Bottone, replying to a correspondent, writes to a contemporary:—"Reckoning an ordinary (gas) burner consuming five cubic feet per hour at about thirteen candle power, we will suppose that we procure a 16 c.p. lamp of 48 v., taking 1 ampère of current. To work this we shall need twenty-four cells of the Fuller type, charged with chromic acid solution in the carbon compartments, and dilute sulphuric acid in the zinc compartments. These batteries must be replenished every day, the zincs cleaned and amalgamated, and the carbon connexions carefully looked to," &c. It is obvious that an amount of labour is herein involved that would deter any one but an enthusiast in electric matters from using the light for the purpose.

A very interesting extract from a recently published work upon "Judicial Photography" is given (by permission of the author) in last week's *Nature*. This gentleman, M. Alphonse Bertillon, has, it is stated, demonstrated the futility of the photograph as a means of judicial identification on any extended scale, when a mere mass of photographs is accumulated with no scientific scheme to aid them; yet he has done more than any one else to develop and demonstrate the proper subordinate use of the photograph as an agent of the law. At the outset he describes the sharp distinction between ordinary photography and judicial photography. It is important, he further lays down, that portraits should be taken with uniformity, questions of full-face or profile, full-length or bust, &c., being decided beforehand, and a fixed scale adopted. Singularly enough he points out that at the Prefecture the profile views are generally taken showing the right side only, owing to their being produced early in the day (so as not to interfere with the magistrates, who begin their duties at twelve o'clock), while if the left side were attempted the sun would be awkwardly situated. It is thus evident that the studio must be single-ended, and point is given to our recent remarks recommending such a construction as shall allow the sitter to be placed at either end. Great stress is laid upon the desirability of obtaining good representations of the ear as being an important means of identification.

It is very singular that so many studios have been constructed with the cardinal defect that the sitter can be illuminated from one side and one end only, thus necessitating the so-called "Rembrandt effect" whenever, from the presence of marks, moles, &c., objected to, or from some special irregularities of feature, the shadowed side is chosen for portrayal. It may be taken as an accepted fact that more than fifty per cent.—at any rate, of men's faces—are better taken from one side than the other, and that the side of the face nearest the spectator is better taken in light than shadow in quite ninety per cent. of cases; hence it follows that when in any studio the light can only be arranged to come in one particular direction, a very large proportion of the portraits suffer. This is a point of such importance that we do not hesitate again to call attention to it.

Admiral Monchez recently brought before the Paris Academy of Science a photograph of the nebula in the constellation the Lyre, which exhibits it in a manner quite different from that shown in former sketches done by hand, and an engraving of the nebula appears in *La Nature* of last week. The photograph was taken in Algiers by MM. Trepeid & Rabourdin last August with an exposure of six hours, three hours on one night and three on another, the size being eight-tenths of a millimetre in the largest direction. So sharp was the negative that it was capable of being enlarged sixty-four diameters, this being the dimensions of the engraving we speak of. Admiral Monchez states that this is certainly the largest image yet obtained of this nebula.

THE PHOTOGRAPHIC SOCIETY'S EXHIBITION.—V.

A. Buchan Hepburn (No. 82), *Sunset in Essex*.—This is but a small picture, but it shows some thought in its selection of materials, being only a field with trees in the distance. A little more attention on the manipulative side would have assisted the result.

W. P. Glaisby (No. 85), *The Archbishop of York*.—This is a well-studied portrait, which, although small, is very effective and easy in position; and there is none of that exaggeration of facial shadows so prevalent at this time. We instinctively feel that here we have reality and not romance.

Arnold Spiller (No. 99), *View in Winter from Pitz Langard*.—This is an enlargement from a negative of some of the snowy Alpine mountains, and although these scenes are very much like each other in their general formation and photographic rendering, yet this particular one has been taken at a time when the shadows of some of the peaks have been very pronounced, the result being that we can estimate and better realise the construction of these mountainous districts with much more certainty; at the same time, this desirable condition might have been considerably enhanced by a foreground permitting a comparative estimation of space and distance.

The Autotype Company (No. 104), *General Sir Frederick Roberts, K.C.B.*—This is an enlargement which appears to be full of all those high qualities which have characterised the productions of this Company. The gradations of the original negative appear to have been carefully reproduced, and hence a work which satisfies the most exacting. No. 105, *Bathing Ghat on the Hooghly*.—Another small enlargement from the original, showing a busy scene, but full of good detail. No. 243, *The Tay Mahal, Agra*.—This is a really large enlargement, and reflects high praise both on the negative by Bourne & Shepherd and the Autotype Company for the architectural detail so carefully reproduced.

G. West & Son (No. 114), *Yacht*, and two other frames of sailing vessels.—Here are three photographs of yachts sailing, similar to those hitherto shown by this exhibitor. As pictures, we do not think they are quite equal to some previous studies; we allude to the choice of position. They are not so pictorial as some others which have always demanded a large amount of public interest. There is the same skill shown in their production which long usage must have brought to a certainty in producing good negatives, but our present purpose is to look upon them from the pictorial point of view, and we miss those very charming combinations of outline which in moving vessels so often assume the picturesque and beautiful.

Mrs. Wrigley (No. 153), *Arab Girl and Boy*.—This exhibitor shows a capacity for various studies, including figures, architecture, and flowers; the figures show the tendency to produce good work in that direction. The title we quote includes two small photographs, which as studies evince a capacity for figure subjects, where white draperies have been very carefully executed, somewhat at the expense of the flesh tints, which are certainly too deep in tone. No. 318.—Also two small photographs of church interiors, which have been very fairly manipulated for extreme dark and light portions.

H. Symonds (No. 142), *Yacht-racing Scenes*.—These constitute nine photographs in one frame, which are very nicely executed, although in some the size of the vessels shown is almost too much for the dimensions of the space they occupy; also, the outlines of the sails are not quite so picturesque as others we have seen from this exhibitor. This is one of the penalties which have to be paid for any slight departure from former most excellent work.

W. Wainwright (Nos. 223–228), *Landscapes*.—Two near bits of comparatively close scenery. In one picture there are cows, whose

powerful reflections in the water disturb the repose which should be the keynote of the design; in the other are some sheep. These photographs show the usual good work of this exhibitor, but there is a slight want of harmony in the composition which, to some extent, disturbs the effect.

W. Atkinson (No. 237), *Cray Common.*—This is a very good photograph of a straight line of picturesque trees on the common. All the necessities of the technical have been carefully attended to, the result being a good specimen of careful manipulation.

Enrica Resta (No. 258), *Portraits of Children.*—These have been exceedingly well arranged for position, not at all artificial, but possible, natural positions, arranged artistically, the result being some very good photographs, with the addition of very pleasing expressions.

Fred T. Palmer (No. 309), *The Twins.*—This is an autotype enlargement, where the two interesting, very young damsels have been taken in almost the identical same position, which is both natural, and at the same time establishes their identity. Pictures like this will in after years become invaluable for their record of interesting family relationships.

Thomas Prothero (Nos. 311, 312), *Portraits.*—Bromide enlargements. One of these portraits is that of J. L. Toole. They are quite life-size vignettes, and although the likenesses evidently are very good, yet we have here again some uncomfortable, dark, and gloomy portions of the face which make them lose their rotundity, and not only so; but these dark, flat-looking parts are not true to nature where, upon round objects, the outline is not the darkest part of the face. It is the non-perception of this well-known study which artists always attend to which makes many of these large photographs to be coldly looked upon.

J. Milman Brown (No. 404), *A Cottage Home.*—This is a picture which hardly does justice to the good work hitherto shown by this exhibitor. In this work the manipulation is good, the print is good, and yet the result is wanting in that power which commands attention. We think this arises from the foliage at the back being too dark for the foliage in the front, and the right harmony has thereby been disturbed; and we cannot but think that the point of selection was influenced by some local colour, which, although very charming to look at, yet, when translated into black and white, immediately assumes a different aspect.

R. Faulkner (No. 408), *Children.*—In these portraits of children there is a slight departure from the very high-class work which has always been looked for in similar exhibits, and this, we think, arises from a certain mode of treatment in the actual moment of time chosen for the ultimate portrait to be photographed; or does it arise from any slackening of that persistent attention to small matters which go far to constitute inviduality?

Mrs. G. Young (Nos. 466, 467).—Six photographs of studies at home, containing some well-considered objects, all being lady models with light dresses, which have been managed exceedingly well for detail without disturbing the flesh tones. It is much to be commended that this year we are indebted to so many lady exhibitors, who have overcome many difficulties in their pictures.

J. S. Hodson (Nos. 581, 582).—Small pictures containing bits of Epping Forest, where trees without foliage constitute the study, and it is astonishing how much they will aid in assisting the making of a picture; they demand the most careful study that can be given. In these photographs a larger space beyond the subject matter would have helped them much.

Henry Sturmey (No. 607, and two other frames).—All small pictures of Norwegian scenery, where, possibly from some local colouring which resists photographic action some distant portions appear just as close as the near objects, half tone would appear difficult to get. This remark also applies to some other exhibits also from Norway.

F. Whaley (No. 578), *A Tale of the World.*—This is a carefully executed photograph. A naval officer sitting in a chair is showing a little boy sitting on a table a small globe. The arrangement is suggestive of two portraits taken outside the beaten track, and so far is to be commended.

Ernest Beck (No. 610, and two other small photographs of Haddon Hall).—These promise well for future work, as they have been carefully manipulated.

H. S. Schultess Young (No. 622), *The Mill, Iffley.*—This is a small bromide enlargement, where the subject matter is not of much account; but there is one thing that must be noticed, the tops of the trees have been cut off by the picture being a long instead of an upright one. The sky of this picture is, we learn, quite untouched.

Dr. Lindsay Johnson (No. 634), *A Street in Caprile.*—This is an enlargement, and an exceedingly good negative it must have been to result in such good detail; but, upon more closely investigating the picture, we find the colour is so warm in tone that it hardly looks like a photographic production. It is a pity that the size of the original negative is not given, as the value of its reproduction to so large a size could then receive its due reward.

John C. Douglas (No. 640), *An Evening Idyll.*—This is a picture which has received some care in its production, but there has been a certain want of care in associating the background of trees with the figures, which consist of two young people—a farm labourer and his lady love. This photograph, we find, comes from Munich, where we should have thought that the production of a picture would have received the most careful attention.

W. Woodhouse Fry (No. 653), *Young Naturalist.*—A bromide enlargement, exceedingly good in detail, and somewhat effective as a picture, which has been somewhat lessened by the two boys, who, by their presence, disturb the suggested quietude.

H. Bedford Lemere (No. 652), *Interiors* of some Grosvenor-square mansions, showing some of the best work of this exhibitor, where perspective, detail, and a careful arrangement of light and dark portions have resulted in some very perfect representations of interiors, and also being most satisfactory specimens of one of the great powers of photography—its capacity for unlimited minute detail.

Concerning the apparatus, while it is all of good manufacture, there is but little of a decidedly novel class or of a nature not already known, by description, to our readers to warrant any special notice. Hence the mere enumeration of them must suffice at present.

E. Platt has a case of brass fittings; Morley & Cooper, a camera, a stand, and two shutters; G. Renwick, a dark slide; John Lewis & Co., automatic plate rocker and adjustable stand holder; W. Rooke, print washer; Swinden & Earp, detective or hand camera; Pearson & Denham, reducing camera; John J. Griffin & Sons, Dine's patent hand or detective camera. Marion & Co. are the largest exhibitors, and show Buttrum's pedestal camera stand, Bain's patent crown shutter, Slingsby's apparatus for flash-light photography, Kershaw's new time and instantaneous shutter, Krugener's "Simplex" hand camera for films, Cloakley's "Simplex" up and down shutter, and a variety of mounts, frames, and other appliances; Mawson & Swan, three "Reflex" cameras by Loman, of Amsterdam, and Hume's cantilever enlarging apparatus; A. Watkins, two exposure meters; Fry & Co., Dresser's copying table for lantern-slide making; Sands & Hunter, camera stand; T. Samuels, four cameras of different make, and Willesden paper for camera, and stand; Holmes & Watson, two cameras, stereoscopic and quarter-plate; J. R. Gotz, patent camera with aluminium fittings and folding stand; J. F. Shew & Co., several "Eclipse" cameras, automatic shutter, and walking-stick stand; Sir David Salomons, a developing rocker; Henry Crouch, a "Presto" hand camera; and W. H. Humphries & Co., a hand camera.

As we have said, much of the above is already well known to our readers, either through special notices or the report of last meeting of the Society.

LUCKHART ON ENGLISH WORK.

The November number of the *Photographische Correspondenz* contains a report of a speech made by Professor Luckhart, at the Vienna Photographic Society's meeting, likely to interest our English photographers, as they are spoken of in the most complimentary manner in consequence of their expected participation in the forthcoming Vienna International Photographic Exhibition.

"A photographic exhibition, like that planned by the Club of Amateur Photographers of Vienna, cannot but help to instruct and incite our companions of the craft. The Exhibition Committee of that Club has expressed its intention of calling together a jury,

consisting of eminent artists, who would muster all exhibits as to their artistic merit and reject the worthless. Pictures may be sent in anonymously, so that at worst the exhibitor is spared the painful feeling of public rejection. In England men, such as Robinson and others, have consented to take part, and I, for my part, can assert that I have not only had enjoyment from those gentlemen's pictures, but have studied them and learnt from them. I am convinced that many of my brother photographers will agree with me in this respect. It can therefore, gentlemen, only be of advantage to you to exhibit at such an exhibition to be represented there. In the exhibitions of this Society we have often convinced ourselves what you are able to accomplish, and I know that you possess the capability, even though not of surpassing England's beautiful productions, yet of successfully competing with them."

THE UNNATURALNESS OF "NATURALISTIC" FOCUSSING.

[A Communication to the London and Provincial Photographic Association.]

THE question of whether fine definition, generally called "sharpness," should exist throughout a photograph, or whether in the whole, or in great part, this definition should be replaced by blurring to a greater or less extent, is one that may be conveniently considered as divided into two parts.

The first division, suggested by the appropriation of the word "naturalistic" by the modern advocates of out-of-focus effects, consists of the inquiry as to whether this blurring represents more truly what the spectator sees than does a clearly defined photograph; and the second division includes the question as to whether it is, either generally or occasionally, desirable to introduce blurring, whether such introduction yields a truer representation of nature than a defined photograph or not. It is the first question that will be considered in the present paper.

I have used the expression "fine definition" in place of "sharpness," because, although photographers accept these as synonymous terms, the word "sharpness" has often been used in another sense by painters and draughtsmen; and, therefore, in their sayings, may sometimes be found complaint of two great sharpness, which may naturally cause the photographer to yield to what he supposes to be condemnation from an authority which he recognises as artistically superior. The word "sharp" is often used, out of photography, to mean having strongly defined edges, and a photograph that is not sharp, in the photographic sense—of having fine definition—may be condemned artistically as excessively sharp if, from under-exposure, too great intensity, deficiency of the connecting half tones, or any other cause, the edges of prominent objects have a raw, crude, or harsh appearance.

The so-called "naturalistic" defence of blurred definition in all but one plane of the picture I understand to proceed as follows:—The eye can only focus for one distance at a time, and if we look at any principal object, the more distant and nearer ones not being rendered distinctly on the retina should be rendered with equal indistinctness in the picture, in order to convey to the mind the effect produced by the scene at the moment when we fix our gaze upon that which is considered to be the principal object, that alone remaining distinctly visible, whilst if more or less distant objects be now focussed the principal one is out of focus.

To this argument it has been naturally replied that in looking at a scene that gratifies us, the eyes linger upon it, focussing, when required, objects in the different planes, and that if we would have a picture over which we may delight to linger too, we should be able at leisure to note the details as we would in the original scene. Beyond remarking that in this respect the work of painters generally will be found to support rather the advocates of fine definition than those of the blurring school, we will, for the moment, waive this argument, and come to the consideration of the question as to what is the sort of definition, as given by a lens, that will represent out-of-focus planes with the same amount of indistinctness that they have to the eye, when some particular object is focussed by it.

To fully understand this question, it is necessary that a fact should be grasped which is well known in scientific optics, but which I have found photographers slow to admit. That fact is, that the definition of out-of-focus planes is not dependent upon the proportion of the diaphragm or aperture to the focus of the lens, but upon the absolute size of the diaphragm itself, independent of the focal length. The argument against the naturalistic contention to be deduced from this fact has been applied to the case by Mr. W. K. Burton and Mr. J. Dennis Taylor. The latter writer has, in an article in the *Photographic Quarterly*, which has come to my notice since undertaking the present paper, given a mathematical demonstration of the optical fact referred to. It is to be regretted that Mr. Dennis Taylor's paper is not accessible in a more popular form than that of the comparatively new magazine in which it appears. As the demonstration which I have prepared is different from that of Mr. Dennis Taylor, I offer it to the meeting, that hearers may be convinced of the reality of the proposition. By equality of indistinctness it is meant that the blurring of any given point in the original shall extend to the same adjacent point in the cases to be compared.



AB, aperture of lenses; F^1, focal plane for distant objects, of lens of six-inch focus; C^1, focus with same lens for object at distance of 150 inches; F^2, focal plane for distant objects, of lens of 25-inch focus; C^2, focus with same lens for object at distance of 150 inches.

Let A B represent an aperture of one inch used with lenses of 6-inch and 25-inch focus respectively, which focal distances are marked by lines at F^1 and F^2, and suppose an object to be focussed that is far distant—a church spire or mast of a ship two or three miles off, for instance—so that its focus shall lie as closely as can be discovered at F^1 for the 6-inch lens and F^2 for the 25-inch lens. Now suppose an object at a distance of 150 inches from the lens. This will be at a distance of 5 + 1 foci from the 25-inch lens, and the conjugate focus of the object will therefore be 1 + ⅕ of 25 = 30 inches. As the plate is fixed at 25 inches, the image of the near object will be out of focus by a distance of 5 inches, or one-sixth of its focus. Each point, therefore, which would come to focus at C^2 will be represented on the plane F^2 by a circle of one-sixth of an inch in diameter. The distance from the plate to the lens being one-sixth of that from the lens to the object, the image will be on a scale of one to six, and points on lines—say interlacing twigs—one inch apart in the object will be represented by circles just touching each other on the screen or plate.

With the lens of six-inch focus, the conjugate focus of the object at 150 inches distance will be 6¼ inches. The plate placed, as in the other case, at the focus of a distant object will be at F^1, one-quarter of an inch nearer to the lens than the focus for the near object, and the points of the image in the near object being one-twenty-fifth of their conjugate focus nearer to the lens, will be represented by circles of one-twenty-fifth of an inch. The distance—six inches from the plate to the lens—being one-twenty-fifth of that from the lens to the object, the image will be on a scale of one to twenty-five, and points in the object one inch apart will be represented by circles of one-twenty-fifth of an inch, that is to say, they will just touch one another, as in the case of the longer focussed lens.

The law, an example of which has just been demonstrated, may be proved to be true in relation to any other distances, and with lenses of any other focal lengths. Lenses of six and twenty-five inches focus have been selected as examples, because it happens that, with these proportions and the distance specified, the proof may be given without encumbering it with elaborate fractions. For the same reason, in order that the fact may be readily grasped, the proof has been submitted in a concrete form rather than in the abstract, where the mathematical arguments would have required more sustained attention on the part of the hearers.

The recognition of the optical law that the definition of the out-of-focus planes depends upon the absolute size of the diaphragm, independent of the length of focus of the lens, should be useful to photographers in other ways than that of exposing the fallacy of the "naturalistic" contention. It is generally understood that greater depth of focus can be obtained with a shorter focus lens, the aperture being of given proportion or speed, than is to be had with a longer focussed lens stopped only to the same rapidity. I have scarcely found any, however, who are prepared to admit that the difference is so great as it really is, and that the absolute size of the diaphragm, and not its proportion to the focal length, is the one factor to take into account. I have heard the question put thus: "If I take a full-length figure on a quarter-plate with, say, a seven-inch focus lens, I can get the accessories and background defined to an extent that is sufficient. Why, then, if I use a lens of double the length of focus, and a stop of the same proportion or rapidity, can I not get the same amount of general focus as in the former case?" To get this equal amount of definition, the law referred to shows us that a diaphragm of equal diameter—not proportionate to the focal length—is required, involving an exposure four times as long as in the other case.

The way in which the law of absolute size of aperture affects the "naturalists'" claim is this. If we admit their contention that we ought to make no allowance for the adjustability of the focus of the eye, but must represent the scene as it appears whilst the eye focusses some particular object, and that the lens ought to have the same, and no greater, power of defining out-of-focus objects than the eye possesses when deprived of the privilege of adjustment, we shall find ourselves bound to the use of diaphragms of the same diameter as the aperture of the iris. This aperture, in a good light, is considered to average the one-eighth of an inch, and this, therefore, is the size of diaphragm which the naturalistic contention would indicate. Now, is that the kind of aperture used or directed to be used by the supporters of differential focussing?

It is very difficult, in a general way, to get them to fix upon any definite size or proportion so as to have a solid basis for argument, but there is no doubt that their dicta and productions point to the use of apertures much larger than those adopted by those not belonging to their sect; and, indeed, for views including no nearer objects than thirty feet or thereabouts, a diaphrgam of one-eighth of an inch will give a picture in which all planes may be considered as thoroughly well defined.

If the eye is directed to an object distant only a few feet or inches, and a more distant object is in such close proximity to the axis of the eye that it can be seen distinctly without other movement than that of altering the focus, there will be a distinct change of focus required for examining the one and the other object. This fact, no doubt, it is that has led to the supposition that, to represent objects as seen by the eye, the lens must have such a large aperture as to show planes in the picture in different focus. The argument would hold good—always supposing the power of adjustment be denied—if we are photographing objects at the same distances as those in the experimental test with the eye. This is not, however, at all commonly the case. About thirty feet is considered to be near enough for a foreground object in any general view, and if we look at any object at this distance, we shall see those beyond it to be all so well defined as not to require re-focussing of the eye to see them distinctly. To make the test, it is necessary that the nearer and distant objects should lie very near together, close to the axis of the eye. If they are at all wide apart, the removal of the axial line of the eye will be apt to lead to a confusion in the mind of the observer as to the change, if any, due to re-focussing.

Mr. T. R. Dallmeyer, in using the language of optical science to defend the "naturalistic" contention, adduces the case of a one-eyed gentleman who is stated to have the power of discriminating focussing up to a distance of sixty yards. If this is not a mistake, power to be able to discriminate between degrees of definition so minute indicates such a high separating or defining power in the eye that we should have to use the utmost defining power of our lenses to be able to represent it on our plates. Whatever the amount of out-of-focus want of definition discernible by the eye, however, it cannot exceed that of a lens having an aperture of the same size as the opening of the iris. Starting from the asserted power of focal discrimination possessed by the gentleman referred to, Mr. Dallmeyer has calculated sizes for openings, which he calls sight stops, for lenses of various focal lengths to give the out-of-focus effect desired, and adds* that he hopes to arrive at an equation that shall give to other than the chief plane, at a given distance, a proportional out-of-focus effect. When the law of absolute size of diaphragm that has been demonstrated is recognised, it is seen that the equation required is exceedingly simple. It is merely necessary to take the size of the aperture of the human eye for lenses of all foci, and any elaborate calculation of different sizes for different lengths of focus is not only superfluous, but, if leading to any result inconsistent with the optical law mentioned, must be incorrect.

A great deal that is quite beside the question has been introduced into arguments in favour of blurring. Dr. Emerson introduces the question of the dispersion, spherical aberration, astigmatism, turbidity, fluorescence, and the blind spot, to which Mr. Dallmeyer adds diffused light, which he alleges to exist in much greater abundance in the human eye than in the photographic camera. I cannot do better than quote Mr. Dennis Taylor's reply to these charges brought against the most perfect and admirable of the organs of our senses. "As a matter of fact," he says, "the brain gains its impression of a photograph through the same imperfect, astigmatic, turbid, and blundering instrument of vision which it must perforce rely upon for an impression of the actual scene which the photograph represents. If the eye is astigmatic, then it will view the photograph in its own astigmatic fashion; if it is turbid, it will view it in its own turbid fashion, and so on. Allowing, too, that the photographic lens can define more minutely, and, as it were, see more than the eye can, does it, therefore, follow that the presence of microscopic details in the photograph implies that the eye must be conscious of them at the proper viewing distance? Certainly not, any more than that the eye will perceive all the veins in the leaves of a tree one hundred yards away because they all happen to be there."

The last resource of those who support the naturalness of naturalistic focussing is to say that we view things with two eyes, and that to represent the separate placings of the image on the retina, we ought to introduce the blurred outline of an out-of-focus lens into our pictures. How the effect of two images, taken from different points, each defined by being seen with a small aperture, should be truly represented by an image taken with a large aperture—large not only horizontally in the direction of the separation of the eyes, but vertically also—is not made clear; and, indeed, the attempt to represent binocular vision on the flat surface of a picture can only result in failure. There seem to be very strange misconceptions as to the facts of binocular vision. One writer, who now makes the fact that we see with two eyes his chief ground of defence for blurred definition, says that if images taken stereoscopically are put into a pair of lanterns and projected upon a screen, the images will coincide. The answer to this statement is very simple—they will not coincide upon the screen.

If the effect of binocular vision is really represented by the blurred image claimed to be necessary, whilst the argument in favour of a small aperture deduced from the law of equal aperture is allowed to hold good with regard to a representation of single-eyed vision, we ought to see something like the jump from the "naturalistic" blurring to the fine definition of a lens with small aperture when, after looking at the scene with both eyes, we close one of them. As a matter of fact, do we feel such an improvement, or are we sensible of seeing a scene more distinctly at all when looking at it with a single eye than when using both eyes?

A further objection to throwing part of the picture decidedly out of focus is, that the representation is in some points thereby made altogether different from the reality. It has, doubtless, happened to most of us to photograph a group out of doors in front of a background of trees and shrubs in which there are bright points of light from small interstices in the foliage. We have not intentionally placed this background out of focus, but have simply been unable, for fear of movement—especially in the collodion days—to employ a sufficiently small diaphragm to secure definition in the background. What has been the result? That the small angular points of light have come out as large and hideous circles of light. This sort of definition cannot truly be called natural.

Whatever may be argued on æsthetic principles in favour of blurring, or even on scientific principles, if such principles are put forward as means to an end, whether natural or not, that may be desired, there is nothing to be said in favour of clothing unsound propositions in the language of optical science. Such a proceeding can only induce confusion in the minds of the many who are only too much disinclined to undertake the labour of thoroughly examining a scientific problem.

W. E. Debenham.

* *Camera Club Journal*, May, 1890, p. 135.

DENSITY OF NEGATIVES.

[A Communication to the Camera Club, and published in its Journal.]

A certain thrill of satisfaction came over me which, I may say, was speedily quenched, when I was asked by our indefatigable and talented Secretary to open the session with a paper on any subject I liked, as it gave an opening to ventilate any heterodox subject I chose. When one has been attempting to climb in Switzerland for a couple of months, and thoughts scientific have been put on one side with one's office clothes, one feels that one has not much to say on photography, more particularly when the last scientific work done at home was in connexion with colour blindness, and not with that art whose duty and pleasure it is that this Club should foster. I accepted the painful duty, and here I am, without much to offer to your minds, I am afraid. The only thing I can hope to do is to raise a discussion of some sort, and thus fill up the allotted time which my paper, I am sure, cannot fill. (In reading over these preliminary remarks, they remind me of an after-dinner speech. Well, as it is after dinner, I suppose I shall be excused.)

A good many of my audience will be aware that lately there has been a controversy between myself and Messrs. Hurter & Driffield regarding the instruments employed by us respectively in measuring the density of negatives. I do not think that I have much to complain of in the outcome. There are a few points which remain yet to be answered satisfactorily before I can accept the conclusions they have drawn from their measurements, and to-night I should like to

show to you, in as practical a way as I can, on what my objections are founded, and also to show you a plan of measurement, regarding which I think there can be no dispute. Messrs. Hurter & Driffield's apparatus is a grease-spot apparatus, but of very small dimensions. It consists of a long box pierced at each end by an aperture a quarter of an inch square, behind each of which is the flat flame of a lamp quite filling the aperture. Within this long box is another moveable one, two inches cube, the ends being pierced by similar apertures, and in its centre is a grease-spot which can be viewed from each side by mirrors inclined at an angle to the plane of the paper. Let me here say that for naked sources of light this arrangement is most ingenious, and gives very accurate results. But my experiments make it otherwise when the density of a negative, or rather when the transparency of the negative, has to be measured. Let me show you, practically, that this is so. I have here a camera pierced with a hole where the lens usually is, and behind it is a light. You will see that the light throws a bright spot on the focussing screen surrounded by blackness. Let me place a piece of a negative in front of the hole, and instead of a black background on which the bright spot lies, we have a background which is distinctly lighted up. We can show the same thing on the screen with the lime-light. [This was shown.] Now, this is exactly the condition of things when the grease-spot photometer is used with a negative interposed between the light and the screen. The measures made are those of the brightness of the direct light, together with some portion of this scattered light. If it were possible (as it is, as I shall show you) to condense all this scattered light into the same area as the bright spot, the grease-spot would measure the total light transmitted.

A very plausible objection to the experiment I have shown you is that when I have been dealing with the scattered light I have only been dealing with a small area of bright light on a screen, and not with a large angle of light, which is the case in the grease-spot photometer under review. Suppose the flame of the lamp were absolutely in the aperture (which it is not), and that the negative would stand the heat of the flame, the two sources of light would still be the same viz., the flame, and the negative which scatters the light. Scattered light is more intense, not in the direction in which the light travels, but nearer the direction at right angles to the scattering plane. Any one can see this practically if he send a beam of light through an aperture on to a screen and hold a piece of ground glass in front of it at various angles. It will be seen that the scattered light is not most intense in the line of the aperture and the source of light. Now the aperture used with the grease-spot photometer we may take as made up of an infinite number of small apertures, and the light as made up of an infinite number of small areas. Take one central point of light and the central point of the aperture: the direct light will pass on to the screen in the usual manner, and the scattered light will be strongest at the same point. Now, if we take a point of light eccentric and a portion of aperture also eccentric, we shall have light deviating on the screen from the central position. The scattered light will be most intense in a position inclining towards the perpendicular to the negative. Carrying this further, it is easy to see that there is a heaping up, as it were, of the scattered light towards the line joining the centre of the flame and the centre of the aperture, in which line the grease-spot is placed. Thus, when measurements are taken, the average illumination of the direct light is taken together with an excess of the average of scattered light.

In some measures I made, and which I have given in detail in the *Journal of Chemical Industry*, where Messrs. Hurter & Driffield's paper appeared previously, I have shown that the light transmitted by the negative may be measured in such a way—viz., by altering the distance of the grease-spot screen from the aperture—that the measurements of illumination may vary as much as 100 per cent. I should here remark that these gentlemen ingeniously close the aperture behind which is the comparison lamp by what is practically a wedge, and are thus not always obliged to move the inner chamber. Well, it depends, I say, much on which of the two plans of altering the illumination on the grease-spot that is adopted as to what reading is registered. The reading also depends on the size of the grease-spot, which they subsequently told us had to be about one millimetre. The spot I employed was one and a half millimetres, so I was not far wrong. Having told my objections, I was last week informed that I must have used for my measures the method of noting the point at which the grease-spot vanished from view from one side, instead of equalising the illumination of the grease-spot as seen on each side of it by the mirrors. Now, as a matter of fact, I employed both methods, but the vanishing method was more easy. Any one who has used a grease-spot photometer will know that correct results may be obtained by either plan when the illumination of the grease-spot is caused by naked lights, and this I proved anew for the purpose I had in view. At all events, it proved that the error was not 100 per cent., nor five per cent., but considerably less. Now, if the vanishing method be correct for naked lights, and if the scattered light from a negative be negligible, which the authors say it is, it ought to make no difference which plan is adopted, but the authors say it does. Then, my reply is that there is something wrong in the method of illuminating the grease-spot when the negative is in position; and if correct results can only be attained by using the "equality-of-illumination-of-grease-spot" method there is something which requires explanation. You will have seen for yourselves that the scattered light is very considerable, and, I say, can be by no means neglected. If it is only five per cent. out, then it is such that any theory founded on it must be received with great caution. I am not going to touch upon the theory. The formula they give is one which differs but little from one I myself tried in the first instance, but found that it did not apply; so I tried something else, which I have already given. I must now refer to my own photometer, which has, to use a vulgar phrase, been blown upon by Messrs. Hurter & Driffield. They have informed the Society of Chemical Industry that it is practically and theoretically incorrect. I am as sure as I am of the law of gravity that theoretically it is correct, and also practically, so far at least as any instrument made by human hands can be. I have in the paper I alluded to given a description of experiments made which show its correctness—viz., by using two steady sources of light and equalising the illumination of the shadows cast by each, and in front of one source interposing the rotating sectors set at various angles, from ninety degrees to two degrees, and then equalising the shadows by moving the other light, it was found that the inverse squares of the distances measured gave the illuminating value of the lights reaching the screen, supposing the photometer accurate. These are experiments of the simplest kind, which any one can repeat, and which up to now have not been gainsaid, except by the authors stating that their convictions were unchanged. Now, how about the scattering of light as used with this photometer? It still exists. But in the old method adopted, and which I have described, the instrument remained unchanged in position; therefore, any errors there were ran throughout the whole of the measurements, and were practically cancelled. It was some time ago that I found out the scattering of light by negatives, and it was my intention to have described how it could be got over, probably at a meeting of the Photographic Conference of the Camera Club, as I had read previous papers on the subject before it. There was no necessity to hurry, as whatever was the defect of the measurements with negatives, the same did not apply to platinum prints of different gradations, as with them there is no scattering of transmitted light; and the same law which applied to the negatives applied to the platinum prints taken in the sensitometer. With the grease-spot photometer, as described, it may be recognised the measurement of the darkness of reflected light is impracticable, and therefore I claim for my method, on this ground alone, a distinct score.

Let me now introduce to your notice the method for the measurement of negatives, which I believe to be theoretically and practically correct.

Suppose we pierce a small square aperture in a thin plate—say ferrotype—and cover all one side with white paper, and over this place a mask of black paper cut out to a double square, one-half being placed over the paper covering the hole, and the other a space of equal size of the white paper which is on the ferrotype plate. Then a light placed behind will illuminate the paper covering the aperture, and a light placed in front will illuminate both the white paper which covers the hole and also that pasted on the ferrotype plate. If a rod casts a shadow of sufficient size to cover the hole on the white square, there will be two illuminations of the white oblong—one-half by the transmitted light, and the other by the direct light. These two lights can be equalised by placing the rotating sectors in front of one of the lights—by preference that of the light falling on the opaque half. If we equalise the illumination given by the naked lights, and then place a negative behind and *in contact with the aperture*, the light coming through it will illuminate the open square and the chink before the opaque square, and the two brightnesses can again be equalised by the rotating sectors. Now, in this case *all the light* coming through the negative will go to illuminate the paper covering the aperture, and thus we shall get a correct measurement of the light transmitted through it. This plan is the result of much thought and experiment, and, I am convinced, gives as accurate results as fallible observers can obtain, and I commend it to your notice. The rotating sectors are not necessary for it. Identical results can be obtained by shifting the direct light from the screen and measuring the distance, and then applying the law of inverse squares. The light transmitted from a negative of any

density can be measured by this plan, and many difficulties are avoided.

Now to come to part of my subject which is at present not under personal controversy. The question is often asked whether exposure is equivalent to intensity of light. I have here two negatives, which I have had carefully prepared, one with true exposures of 3, 6, 12, 18, 24, 36, 48, 72, 96, 144, and 192 seconds, so that the last exposure is sixty-four times that of the first. A negative was also taken with Spurge's sensitometer, which was developed in the same bath and cut from the same plate. It will be recollected that in this sensitometer every third bigger hole doubles the light admitted to the plate, the intervening holes giving $\sqrt[3]{2}$ greater intensity than the next smallest.

This being the case, if the transparency of each be measured, then the transparency of the 1st, 2nd, 3rd, 5th, 7th, 9th, and 11th exposures, each being double of the previous one, of the first-named negatives ought to lie on the curve of transparency of the sensitometer negative. The measures were made by the newest process of measurement, which I have just discussed with you, and, as luck would have it, the transparency of the three seconds' exposure almost exactly coincided with the transparency of the 22nd hole of the sensitometer negative. The other doubled exposures also coincided with the 19th, 16th, 13th, 10th, and 7th holes. The transparency of the 22nd hole being ·72 and of the 7th 6·5; of the three seconds' exposure it was 71·5, and of the 192 seconds 6·3. Other similar experiments have confirmed this result most abundantly, and we may take it that for exposures lasting seconds, increased exposure is equivalent to increased intensity.

But how about the interchangeability between time and intensity when the exposures are short? The proof as to whether the law holds good or not is at present unsatisfactory. We must recollect that the atoms of the molecules—as, indeed, the molecules themselves—are vibrating in the ether, in which light waves are generated; and if the ether has only an infinitesimal resistance, then the law of interchangeability cannot hold good. A clock pendulum, we know, will not be started by mere well-timed impulses, if these impulses be too small, any more than a railway carriage will move when the force applied is not sufficient to overcome the friction. So, in the same way, an atom will take longer to move to its full extent of swing if the vibratory energy of light be small, if there be any resistance whatever, than it would if there were none. If, therefore, the ether have the smallest resistance—viscosity, we may call it—and the amplitude of the light waves, which is the same thing as saying their intensity, is very small, the full swing of the atoms necessary to separate an atom from the molecule of the sensitive salt will take longer to reach than if there be no resistance. Astronomers have imagined that there is a certain amount of resistance in the ether, from a consideration of the light from the stars, it being believed that, even if infinitesimal, it would be sufficient to prevent part of the light coming from distant space. If there be a resistance at all, it would tend to shorten the orbits of our earth and planets round the sun, but the shortening would be inconsiderable to that which might be due to other more potent causes than do exist. When the intensity of light is very feeble—indeed, so feeble that it would be almost, if not quite, invisible to the eye—then it is possible that the energy it exerts on the molecules of the sensitive salt may be so small that the exposure necessary to effect decomposition would have to be a good deal prolonged beyond that which the law that seemingly holds good when the intensities of light are more pronounced would require. That this prolongation is not felt in the ordinary exposures would be due to the fact that the energy necessary to overcome the effects of resistance is so vastly smaller than the energy required to effect the necessary increased swing of the atoms for its decomposition to take place. It seems to me that one of the most direct methods of ascertaining if there be any resistance in the ether would be by a study on this point. At any rate, that time and intensity are interchangeable for fairly short and long exposures may be taken as a fact.

I leave this for your discussion.

Capt. W. de W. Abney, C.B., R.E., D.C.L., F.R.S.

A PHOTOGRAPHERS' DINNER PARTY.

On Thursday, October 30, a party of professional photographers from various parts of the kingdom met at dinner at the Victoria Hotel, Leeds, on the invitation of Mr. J. J. Sadler (Holmes, Sadler, & Holmes, Manchester). This little reunion was commenced five years ago, when half a dozen photographers met at Chesterfield, on the invitation of Mr. Seaman, and has become an annual institution, each year seeing a slightly larger party gathered. The objects of the meeting were purely private and social, but as this year's friendly meeting has seen the formation of what promises to be a powerful association, the proceedings may be considered of public interest. The dinner was served in the Victoria Hotel, Leeds, and the guests were well catered for. Mr. J. J. Sadler took the chair, with Mr. D. McIver (Leeds) as his Vice-Chairman.

After the dinner and the toast of "The Queen" (which was incidentally introduced by Mr. Sadler), Mr. J. J. Sadler expressed his regret at the number of expected guests who were unable to be present. There were only twenty-three at the table out of some forty whom he had hoped would have been there. Letters and telegrams of regret were read from Mr. J. Traill Taylor (The British Journal of Photography), Mr. Harman (Britannia Works Company), Mr. F. A. Bridge, and other well-known gentlemen. Mr. Sadler then briefly explained for the benefit of some of the guests how these friendly "Conventions" originated, made sundry pithy and pointed observations on the subject of photography as a business, and proposed the toast of "Photography," which, of course, was received with acclamation.

The toast was replied to by Mr. Crosby (Rotherham) and Mr. F. M. Sutcliffe (Whitby).

The Vice-President (Mr. D. McIver) then proposed the toast of "The Premier County," and coupled with it the supplementary toast of "Our host, Mr. Sadler." This was received with full musical honours, and after a brief acknowledgment from Mr. Sadler, Mr. G. T. Y. Dickinson (Sheffield) and Mr. Glaisby (York) responded on behalf of the premier county.

Mr. R. Broadhead (Leeds) proposed "Our Visitors," which was replied to by Mr. Slingsby (Lincoln) and M. C. P. Richards (Barrow-in-Furness).

The last toast was "The Press," with which was coupled the name of Mr. H. Snowden Ward (of the *Practical Photographer*), who responded.

After this the meeting became informal, and, as was almost natural, the conversation turned to the subject of photographers' grievances and the advantages that might be gained by united action. Mr. Crosby (of Rotherham) made a stirring speech, in which he suggested that there was no time like the time present; that if anything practical was to be done *somebody* must take the initiative, and proposed that the gentlemen present should form themselves into a Provisional Committee to call a meeting of photographers all over the kingdom for the purpose of forming a Trade Protection Association. Almost all the gentlemen present spoke to the resolution, and finally the Provisional Committee was formed, with the following officers (*pro tem.*):—

Chairman—Mr. Slingsby (Lincoln); *Treasurer*—Mr. Crosby (Rotherham); *Secretary*—Mr. C. P. Richards (Barrow-in-Furness); *Committee*—Messrs. Elliott (Elliott & Fry), London; W. Barry, Hull; F. M. Sutcliffe, Whitby; D. Bordley, Stafford; J. E. Eddison, Barnsley and Sheffield; W. P. Glaisby, York; W. Roxby, R. Broadhead, H. Graham Glen, and Donald McIver, Leeds; T. C. Bridges, Bradford; G. T. Y. Dickinson, G. V. Yates, and E. Yates, Sheffield; R. P. Gregson, Blackburn; A. Seaman, Chesterfield.

It was decided to postpone the definite consideration of the steps to be taken until next day, and the remainder of the evening was spent in a truly sociable manner.

Trade Protection Association.

On Friday, October 31, the gentlemen above mentioned assembled at the Victoria Hotel, Leeds, where the visitors from a distance had stayed overnight, and proceeded in a brake to Roundhay Park, where they assembled for deliberation in one of the rooms of the mansion. Speeches were made in support of the decision arrived at on the previous evening. It was decided that no steps could be taken until a general meeting of the photographers of the whole kingdom had been called in some conveniently central town. A form of circular was drawn up, of which it was proposed to print and post about 4000 to all professional photographers whose names were known. Besides this, it was decided that a report should be sent to the photographic press, with a request that the Editors should direct the attention of their readers to the matter.

A substantial cash levy was made from those present to defray preliminary expenses, and Mr. J. J. Sadler was deputed to arrange for a public room at the Grand Hotel, Aytoun-street, Manchester, in which could be held a general meeting on Thursday, November 27, at three p.m. To this meeting all professional photographers are cordially invited. Any further particulars will be given by the Secretary *pro tem.*, Mr. C. P. Richards, Barrow-in-Furness.

Foreign Notes and News.

Dr. Stolze recommends a method of intensifying depending upon a method of handling chrome-gelatine recently described by Vallot. He immerses the unhardened negative for a minute in four per cent. bichromate of potash solution and then dries it. After exposing to light for some length of time from the back of the plate, it is thoroughly washed and then dried. If the negative be then immersed in a solution of Indian ink, the ink penetrates into the soluble portions of the film and intensifies them.

As regards the treatment of the plates with Indian ink, Dr. Stolze further states that if they are coated unevenly they must not be kept in the

chromate solution for longer than one minute, as otherwise the effect is irregular. On drying, too, the solution must be run off evenly, and not permitted to remain adhering in drops.

Liesegang remarks about this process that it is very suitable for slight intensifications, but that gelatine does not swell enough to enable the intensification to be carried very far. In that case he recommends an additional coating of chrome-gelatine, which method, however, would, as he admits, be much more cumbersome.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,189.—"Improvements in connexion with Flexible Films for Photographic and other Purposes, and in the Manufacture, and in Apparatus used in the Manufacture of the same." J. E. Thornton.—*Dated October* 28, 1890.

No. 17,160.—"Improvements in Photographic Cameras." E. L. Dutton.—*Dated October* 28, 1890.

No. 17,264.—"Improvements in the Construction of Photographic Plate-washing Racks, applicable also to other Articles." E. A. Boissaye.—*Dated October* 28, 1890.

No. 17,339.—"Improvements in and appertaining to Cameras and Sensitive Plates for Photographic Purposes." R. Fowler.—*Dated October* 30, 1890.

No. 17,445.—"Improvements in Portable Photographic Apparatus adapted to take Views." W. F. Stanley.—*Dated October* 31, 1890.

PATENTS COMPLETED.

Improvements in Photographic Camera Shutters.

No. 13,167. William James Lancaster, Colmore Row, Birmingham.—*October* 4, 1890.

This invention relates to camera shutters, or means for obtaining instantaneous or extended exposure, whereby light is allowed to pass momentarily or otherwise through the lens or exposure aperture at the will of the operator; and which said invention, designated by me the "Chronolux" time shutter, is an improvement upon application for letters patent made by me on the 29th day of January, 1890, and numbered 1543.

The apparatus consists—

1st. Of two circular pierced shutter plates sliding in reverse directions to and fro upon each other, in manner that the pierced and unpierced parts respectively overlap each other, and thereby either form an opening or close one.

2ndly. In means for working the shutter plates.

3rdly. In a pneumatic operator and releaser.

4thly. In the combination of the time mechanism, described in my cited patent, with the operating means and circular pierced shutter plates, as aforesaid.

In carrying out one form of my present invention I employ a rectangular box-shaped frame, with a circular exposure aperture through its middle, and working within the inside of this frame I arrange two sliding and circular pierced shutter plates, of which the piercings are of the same diameter as the exposure aperture, and are so arranged that the unpierced part of the one plate comes in front of the pierced part of the other plate respectively, so that the upper boundary edge of the piercing of one plate is approximate to the lower part of the boundary edge of the other plate, and on the plates moving in opposite directions the piercings overlap each other to an extent of the throw of the plates, until the piercings become coincident with each other and with the exposure aperture.

The overlapping of the piercings by the moving of the plates in opposite directions forms a constant recedance to and from a common centre, which is the exact middle of the exposure aperture in the carrying frame.

The shutter plates are worked by studs upon them, taking into slots at the outer ends of a centrally pivoted rocking lever, which, when turned from an oblique to a horizontal position, causes the shutter plates to be moved in opposite directions, and an aperture made thereby consequent upon the overlapping of the piercings.

The studs are directed in parallel slots to insure the direct sliding of the plates.

To limit the movement of a rocking lever I arrange swinging and fixed stops, which, when placed in varying positions, determine the throw of the plates and size of open required, and, further, the lever is brought back to its normal and closing position by a spring.

I work the operating lever by means of a pneumatic pusher and releaser, consisting of a bag or bellows carried by a bracket fitted at the end of a flexible tube with a pressure ball at its end, so that by pressing the said ball the bellows are distended, the lever upon which it impinges turned upon its centre, and the shutter plates opened.

On relaxing pressure upon the ball the pneumatic appliance resumes its normal condition, with the rocking lever pulled into its closest position by the spring, which was distended by the pressure exerted upon the lever in opening.

I wish it to be observed that the plates in making the complete throw for instantaneous exposure, first open and then close by the continuous traversing of the piercings.

In another form of my invention I arrange in a time shutter that the lever, as aforesaid, shall be retained after the fully-opening of the plates, and then subsequently released or released, after a chronometric unit of time, which then automatically close.

In connexion with the said shutters I prefer to employ the "Chronolux" time mechanism, as described and represented in the aforesaid cited patent; so that for extended or time exposure the shutter plates are opened, then after a period of time, by the running down of the mechanism, they are automatically closed.

In further carrying out my invention I take a shutter, as described in the aforesaid patent, and pierce the primary and secondary shutter with overlapping piercings, which come coincident with the exposure aperture when the said piercings come together in part or in whole.

Thus, the exposure aperture being closed, the pneumatic releaser is then pressed, when the spring which operates the shutters, slides the shutters and the shutter apertures past each other, and when extended or time exposure is required the said shutters are retained for a determined period and then released by the running down of mechanism which operates an arm which, in coming in contact with a catch, liberates it and allows the shutter plates to close.

Improvements in or relating to the "Dusting-on" Process of Producing Pictures by Photography.

No. 13,191. George William Wood, 3, Askew-road, Gateshead-on-Tyne, Durham.—*October* 11, 1890.

My invention refers to improvements in or relating to the "dusting-on" process of producing pictures by photography.

In the production of positive pictures by what in photography is known as the "dusting-on" process, the support, which is generally a plate of glass or opal glass, is coated with a deliquescent organic matter intermixed with bichromate of potassium or ammonium.

These mixtures are sometimes termed "photogenes," and as such will hereinafter be referred to.

After drying, the support is placed under a diapositive, and exposed to the action of daylight, and after exposure the image is developed by dusting on some suitable black or dark-coloured matter in the shape of a fine powder, the result being a reproduction of the image of the diapositive employed.

It will thus be seen that if it be desired by this process to make a positive from any given negative, it is necessary in the first place to make by some other process a diapositive or transparent positive from it (the negative).

The object of my invention is to provide a "dusting-on" method or process for producing positive images or pictures direct from the negative, and I effect this as follows:—

A support, generally a sheet or plate of any suitable black or dark-coloured material, such as ebonite or vulcanite, or ferrotype plate or glass coated with black or dark-coloured varnish or enamel, is, after being well cleansed, coated with a "photogene," such as the following:—

Gum arabic	30 grains.
White loaf sugar	30 ,,
Ammonium bichromate	20 ,,
Distilled water	1 ounce.

This formula works very well, although any of the other well-known "photogenes" will answer the same purpose.

After drying, the support is placed under a negative and exposed to daylight for a time dependent on the density of the negative and the strength of the light, generally from five to twenty minutes, but an actinometer should be used, as in carbon printing.

The image is next developed by "dusting on" some suitable lustrous substance, such as the white, gold, or other light-coloured bronze powders obtainable commercially, or aluminium, magnesium, zinc, tin, silver, or other suitable metal or alloy reduced to powder may be used.

It is obvious also that any suitable light-coloured, or white, or nearly white substance, such as ivory dust, white marble, or sulphate of barium, may be employed; but substances possessing a metallic lustre on account of the superior brilliancy of the images produced therewith are preferred.

Good results may be obtained by reducing salts of silver to the metallic state by precipitation with a suitable reducing agent, *e.g.*, a fifty-grain solution of silver nitrate is precipitated by adding to it a solution of ferrous nitrate and ferrous oxalate intermixed, and slightly acidified.

The standard developer employed in the "ferrotype" or collodion positive process answers well.

The precipitate, after being well washed, is dried, passed through a fine-lawn sieve, and may then be used as above set forth.

After "dusting-on" is complete, the plate or support is coated as usual with collodion, well washed, and finally varnished, as a protection against oxidation or other injury.

The above procedure may, if desired, be varied by taking as the support a sheet of plain glass or other transparent medium, coating with photogene, drying, exposing, developing, and finally "backing up" the support with black varnish or printers' ink on paper as in the collodion positive process on glass.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—1. The use of a light-coloured or white, or nearly white, substance for "dusting on" a dark-coloured or black, or nearly black, support prepared and applied in the manner and for the purposes substantially as herein described. 2. The improved process of producing positive images or pictures direct from the negative, substantially as and for the purposes herein described.

Photographic Society of Great Britain, Tuesday, November 11, at eight p.m., at the Exhibition, 5a, Pall Mall East, when the medals awarded will be presented, reports made of the Society's new premises and the proposed Photographic Institute, and a paper will be read on *Density Ratios as Affected by Development*, by Mr. Chapman Jones, F.I.C., F.C.S.

A Lantern Night at the Pall Mall Exhibition.—On Friday, the 7th (to-night) there is to be a choice exhibition of lantern slides on the screen in aid of the funds of the Photographers' Benevolent Association, tickets for which, at sixpence each, may be had from members of Committee, or on payment at the door. It is hoped that all who can attend will do so in order to lend a helping hand to this Association, who are ever ready to help those brethren who are in distress.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 10 ...	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 11 ...	Great Britain	5A, Pall Mall East.
,, 11 ...	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 11 ...	Derby	Society's Rooms, Derwent-bldings.
,, 11 ...	Bradford	50, Godwin-street.
,, 11 ...	Manchester Amateur	Manchester Athenæum.
,, 11 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 12 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 13 ...	Birkenhead	Hamilton Rooms, Birkenhead.
,, 13 ...	Cheltenham	
,, 13 ...	Manchester Photo. Society	36, George-street.
,, 13 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 14 ...	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

OCTOBER 30,—Mr. A. Haddon in the chair.

Mr. Aldham showed some photographs of scenes of native life in India.

Mr. W. E. DEBENHAM read a paper on *The Unnaturalness of "Naturalistic" Focussing* [see p. 711], illustrated by a diagram.

At the conclusion of the paper, Mr. P. EVERITT said that he quite admitted the correctness of Mr. Debenham's statement as to the absolute size of the diaphragm, but that Mr. Debenham had treated the subject entirely from the optical point of view, and that such a method of approaching the subject would inevitably lead to error. He did not think the same effect was obtained on the retina as on the screen in the camera. Mr. Debenham had said that a diaphragm of one-eighth of an inch should be used, but he (Mr. Everitt) maintained that a very different picture was obtained from that which the eye sees. The function of the iris was not, he thought, to improve definition by limiting the aperture, but to regulate the amount of light. We did not see less distinctly by night than by day. If the pupil of the eye were diminished he would not be able to see more distinctly than with the full aperture. Mr. Everitt here produced a plate of ebonite, in which a pinhole aperture had been punctured, and said that looking through the diaphragm thus formed, he could not see things at different distances any better in focus. That, he thought, disposed of Mr. Debenham's argument that we ought to use an aperture of the same diameter as that of the pupil of the eye. He thought that we should not strive to obtain a counterpart of what the object is in fact, but of the effect which it produces on our imagination. Artists make the principal subject of the most importance in the picture; they do it by position, light, and distinctness of drawing. When you fill in greater detail you lose breadth and truth.

Mr. DEBENHAM said that Mr. Everitt's experience with the pinhole aperture applied to the eye was unique.

The CHAIRMAN requested Mr. Everitt to look at an object at an inch or two distance with the pinhole and without it, on doing which he admitted that for close objects the pinhole increased the depth of focus, but for objects twenty or more feet away he could not find any difference in that respect.

Mr. DEBENHAM said that the reasoning from Mr. Everitt's last observation was entirely against the contention for differential focussing. If at distances of twenty feet and beyond there was no power in the eye to distinguish differences beyond what could be found when looking through the pinhole, when there certainly was no difference of focus, the argument based on the unequal focussing of objects at different distances was entirely disposed of, at least when there was nothing nearer than twenty feet introduced into the picture.

Mr. COOKE thought that Mr. Debenham and Mr. Everitt were arguing from two different points of view, and he was with Mr. Everitt.

Mr. A. COLLIN then read a paper on *Pictorial Definition* [this will appear subsequently], dealing particularly with the arguments recently brought forward by Mr. Everitt in his paper on the same subject. The reading of this paper was followed by unusual applause.

Mr. T. BOLAS said that there was a danger of confounding obtrusive, coarse definition with fine definition, things which were perfectly distinct.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING held October 29,—Mr. W. Bedford chairman.

Two appeals for assistance granted.

Messrs. Ganley, Tayler, Hovenden, and Pask, elected as subscribers.

Votes of thanks were passed to Mr. F. A. Bridge for conducting concert on October 24, also to the ladies and gentlemen who gave their services, Mr. Freshwater, the Proprietors of Anderton's Hotel, and the Photographic Club.

HOLBORN CAMERA CLUB.

OCTOBER 31.—Mr. Schölzig sent prints on paper of his sensitising printed under green glass. It was suggested that for purposes of comparison four prints from each negative should be sent, viz., one each matt and albumenised, printed with and without green glass, also stating toning formula and time in toning bath in each case.

CAMERA CLUB.

ON Thursday, October 30, an exhibition of lantern slides was held at the Camera Club, members and friends bringing up over 200 slides for the occasion. A very varied exhibition was the result, several classes of work being illustrated.

Mr. Williams contributed landscape scenes; Mr. White and Mr. Lardeur microscopic subjects; Mr. Griffiths some very effective subjects taken in East Anglia; Mr. Howlett pictures, including an excellent view of the Houses of Parliament; and Mr. Chang hand-camera views. Other slides were contributed by Messrs. Laurie, Greene, Sands, and Wellington.

The subject on Thursday, November 13, will be a demonstration of *The Primuline Process* by Messrs. Green, Cross, and Bevan. Meeting at half-past eight p.m.

THE LANTERN SOCIETY.

AT the second meeting of this Society, held on October 27, Mr. LOUIS FAGAN gave a lecture on *Wood-Engraving*. Speaking of its history, he said it was known in very early times in the East, and was probably first practised by the Chinese. The epoch of its introduction into Europe was unknown, but it was probably introduced by the Saracens. One of the earliest uses to which it was put was in the manufacture of playing cards, and there were shown on the screen slides of some remarkable cards which were cut by a French artist, and which were discovered in Peterborough Cathedral. Several slides were then shown of early specimens of wood-engraving, amongst them being one of St. Christopher carrying the Infant Jesus across an arm of the sea, by a German artist, dated 1483, and a most superb specimen of the celebrated Psalter of Faustus, which was printed from blocks on vellum, and of which only seven copies are known. The lecturer then proceeded to explain the method of "cross-hatching," showing a magnificent example from the frontispiece of a book published in Mentz in 1486. Slides of *chiaroscuro* drawings were next shown, and the method of printing from different blocks to obtain the finished result explained. Speaking of Albert Dürer, Mr. Fagan observed that he transformed the art of wood-engraving, and several very fine specimens of his work were shown on the screen. Two very remarkable slides were shown of the frontispiece of the "Great Bible," printed by order of Henry VIII. The first of these has on it two coats of arms, one of them being that of Cromwell; in the second the arms of Cromwell have been removed, leaving a white patch on the picture, he having been charged with treason during the interval between the publishing of the first and second blocks. Mr. Fagan concluded by showing examples of the work of Holbein, including some beautiful slides of the "Dance of Death," the finest work of art of its period.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

OCTOBER 21,—Mr. J. Traill Taylor (President) in the chair.

The ordinary business of the Society having been concluded, and officers and Council nominated for the ensuing year, the President called upon Mr. FRIESE GREENE to give his demonstration in *Printing on Opal Cards*. That gentleman then exhibited two cameras which he had constructed, capable of taking four hundred stereoscopic pictures per minute simply by turning a handle. One of these was also made to serve as a lantern, and Mr. Greene stated that by means of an electric light behind the pictures, and reversing the action of the lever handle, the figures could be thrown upon a screen, and would appear with a stereoscopic effect, as if coming out of the screen towards you. He then handed round some film negatives taken with the camera, one of these being twenty-five yards long. These cameras and pictures excited great admiration, the mechanism of them, with their roll holders, being simply perfection. Mr. Greene then handed round a beautiful negative, which he afterwards proceeded to print as a vignette by gaslight, with an exposure of a few seconds, upon one of his opal cards, and then developed with the iron developer; a beautifully soft picture was the result. These cards are doubtless a great acquisition to the ordinary printing processes, as they save all trouble of mounting, &c., and are very simple in manipulation. Mr. Greene stated that they are prepared in white, pink, and green colours, and that he is prepared to change all spoilt cards.

Many questions were asked by the members as to the preparation of the cards, all of which were most courteously answered by the lecturer, who stated the cards were rendered waterproof by a thin coating of emulsified indiarubber and gelatine, and that any spots could be washed off the cards whilst they were wet after development.

The PRESIDENT said no doubt these cards would be permanent, because it was a well-known fact that developed prints were more stable than those printed out.

Mr. Greene showed many beautiful specimens upon his cards, both direct prints and also enlargements, and when framed it was certainly hard to distinguish them from opals. A doubt having been expressed as to the suitability of the cards for colouring, Mr. Greene stated that no surface could be better both for water colour and oil, and the President took one of the prints to experiment upon by next meeting, expressing an opinion that the surface was an admirable one to paint upon in oil if the colours were mixed with a proper medium.

Mr. Dunmore passed round a specimen of retouching done before lead pencils were in use.

Mr. GREENE also showed a specimen of the new diazotype process, and expressed an opinion that there was a great future before this process.

A hearty vote of thanks to the lecturer concluded a most pleasant and instructive evening.

SOCIETY OF CHEMICAL INDUSTRY.

THE PRIMULINE PROCESSES.

ON Monday last, the 3rd inst., Mr. Green gave an interesting account and demonstration of *The Primuline Process*, which we dealt with in detail in our issue of October 17. He introduced the matter by stating at some length the circumstance that the colouring matters are formed inside the texture, and thence are probably extra fast; and he appeared to look on the molecules as enlarging and building up in such a way as to jam themselves tightly in the interstices. After having demonstrated the working of the process, he explained that the diazo derivative of primuline is scarcely sensitive to light unless in an organic matrix, such as a textile material or gelatine. An inter-

esting experiment was then shown, to prove that during the action of light on the diazo body nitrogen is liberated; and the red rays are nearly as active as the violet, the maximum being in or near the green. Homologues of primuline can be prepared, and may be used in the process. Another experiment was the reconversion of the fully developed image back to primuline, this being effected by leaving for a short time in a solution of hydrosulphate of soda. The primuline image may now be diazotised, and again developed with any one of the various developers.

A discussion now took place, in the course of which the older primuline process of Feer was brought under consideration, a process which we specially described in our issue of last week (page 702). Feer's process gives a positive from a negative, while the methods of Green, Cross, and Bevan may be regarded in a certain sense as a reversal of it, as a positive is obtained from a positive. Feer's process is now being worked by Messrs. Braun & Co., of Dernach, and gives white, or nearly white grounds. As other and bodies than diazo primulines can be used the method in question may, perhaps, be spoken of generally as an "azo" process, the term primuline process being more especially applicable to that of Messrs. Green, Cross, and Bevan. In Feer's process the cloth is charged with a sulphonic salt of a diazo compound, this salt being in some cases formed in situ by treating diazotised cloth say, cloth dyed with primuline and acted on by the nitrite of soda and hydrochloric acid bath) with the acid sulphate of an alkali. The cloth being now saturated with any of the primuline developers, is exposed to light under the negative, and as the sulphonic compound of the diazo derivative is decomposed by light, the diazo compound reacts with the developer, and the image results. Hot water removes the developer and thus fixes the image.

Dr. Wright referred to the shortness of our supply of light, and said that if the processes now under discussion were to come into general use for decorating textiles, it would be very desirable to find some agent to take the place of light. He also asked Mr. Green whether there was danger of explosion from the sudden decomposition of the azo compound.

Mr. Green said that in printing on a large scale the electric light would be used, as it is conveniently constant, and he did not think that there was any danger of explosion.

Mr. J. Spiller said he thought primuline printing would compete successfully with the true processes for engineers' drawings, and if the results were really permanent, the method would prove valuable.

Mr. Fiedler Greene said he had found it an advantage to diazotise in a bath of nitrite of silver made acid by acetic acid, the sensitiveness being greater when this is done.

Mr. Bevan described the usual method of testing the permanency of pigment prints by partial masking and exposure on the top of a building for six or twelve months, and he said that all the primuline prints he had made and tested showed signs of fading in the lighter tints, when thus exposed for a few days.

Mr. Green said that he had not yet made exhaustive experiments as regards permanency, but unless the washing and other reactions were complete, there might be a want of fastness to light.

BRIGHTON PHOTOGRAPHIC SOCIETY.

October 29.—Mr. W. Jago, F.C.S., in the chair.

Mr. C. M. Smith of the Eastman Photographic Materials Company attended, and gave a largely attended demonstration of *Developing with Bromide Paper*, using an Eastman enlarging lantern for that purpose. The demonstration was followed with much interest, and numerous questions were asked.

Several fine enlargements were on view during the evening.

OXFORD PHOTOGRAPHIC SOCIETY.

October 2.—Annual Meeting.—The President (Mr. E. A. Ryman Hall) in the chair.

The Secretary (Mr. Davis) read the report of the Committee. Sixteen members were elected during the year.

The Treasurer (Mr. J. Mann) read the balance-sheet, which showed a substantial balance in favour of the Society.

The rules were then revised, and the officers and Committee elected. Mr. E. A. Ryman Hall was unanimously elected President again. *Vice-Presidents*: Messrs. C. C. Coles, G. French, A. E. Kerry, and J. H. Salter.—*Committee*: Messrs. E. J. Fenner, W. King, W. H. Payne, H. M. Phillipps, Rev. W. H. Price, A. Robinson, and G. Smith.—*Hon. Treasurer*: J. Mann. *Hon. Secretaries*: W. Davis, 77, Banbury-road, and F. A. Bellamy, 4, St. John's-road.

The President then gave an address, in which he reviewed the work of the Society and Photography for the past year.

BATH PHOTOGRAPHIC SOCIETY.

October 29.—Mr. W. Pumphrey (President) in the chair.

Mr. F. J. Saunders was elected a member of the Society, and the election by Committee of Miss Pearsey and Mr. A. Heaton Jones was confirmed.

Mr. Fiedler Greene then read a paper on the subject of a new machine for rapidly printing by means of photography. Referring to the possibilities of his new machine camera, he said:—A well-known person's photograph, with his letter, could be engraved by photography and put to print much more quickly than you could set the type up for the letter, leave alone a block, which would take days for the labourer and then not as perfect as it would come out being printed by light alone, for you could not equal the texture and detail by the block process as you could by the other. Then, as regards the letter, you could have a facsimile of the letter without setting up any type, and read each individual's own handwriting. I find at this age of speed it is no good to have them if you don't put them into practice so this machine, which is the invention of myself and Mr. Varley, was undertaken, and it has taken eight months before the first hand was printed. It seems ridiculous when you look at the machine that it should have taken so long. Well, I cannot explain it more than it has taken the time and I could not finish it before. The most important feature of the machine is that the moment the exposure is given the paper must be still and pressed to the negative. The results which you see before you are printed by gaslight, but of course electric light will be used in the future. I have also brought you a band where 100 pictures are upon it taken at the rate of three to four a second. I have brought the camera which I took them by for you to see, and you will notice the movements are the same as in the printing machine, so with the two combined I could take a string of pictures in Milsom-street one day and have them in a paper the next.

The machine and the work done by it were examined with great interest.

Mr. Fiedler Greene also exhibited two novel forms of flash lamps in which successive charges of magnesium were fired with ease and certainty. Whilst Mr. Greene was speaking a member photographed the audience during one of the flashes.

The Secretary (Mr. W. Middleton Ashman) asked the lecturer the speed value of the films and the light used in producing the pictures shown. He also wished to know how primuline compared in sensitiveness to the silver haloids prepared for a high degree of sensitiveness to light.

Mr. Greene used gaslight for printing the band, and the sensitive surface was most rapid. Primuline was vastly less sensitive; perhaps what he obtained with silver bromide in a fifth of a second would with primuline require thirty seconds or more.

Mr. C. H. Talbot showed some early specimens of his father's work previous to despatching same to the Edinburgh Society. He also presented a copy of Fox Talbot's *Photogenic Drawing* to the Society.

Messrs. J. Dugdale and Davis then showed by means of the oxyethyl lime-light a large number of transparencies by Mr. H. P. R. Wells and Mr. Dugdale.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

October 29.—Mr. A. M. Dresser (Vice-President) in the chair.

Messrs. A. Carter and J. Taylor were elected members.

Mr. Dresser then read a paper, and gave a practical demonstration on *Lantern Slide Making (Dry Plate Process)*. His reducing apparatus, embodying all the requirements of a skilful worker, was much admired.

The next meeting will be held at Station Hotel, Sidcup, November 12. *Bromide Printing and Enlarging*, with demonstration.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

October 30.—Mr. Paul Lange presided.

Messrs. R. Thomson, A. Sinclair, A. Quayle, and the Rev. W. Smith were elected members, making in all forty-six new members this year.

The President announced the names of the gentlemen who have kindly promised to act as adjudicators at the annual meeting in November, viz., J. Finnie, G. E. Thompson, and E. J. Sayce for prints and enlargements, and G. E. Thompson, W. D. Mead, and J. Knott for lantern slides. The President drew attention to the great success of the first two practical demonstrations held this winter, and which he trusted would continue to prove beneficial to members.

A new hand camera, styled "Adelphi," was exhibited by Mr. Miller, of Salford. Col. Ellison exhibited a novel bamboo tripod; Mr. W. Tomkinson an Aptus lantern copying camera; Mr. J. A. Sinclair some results the Investigative Committee had made of "direct printing with Thula paper;" and Rev. T. B. Binner some stereoscopic slides and prints, the work of thirty years ago.

Mr. John Howson, commercial manager of the Britannia Works Co., Ilford, London, then read a paper on *The Working of Alpha Paper*, in which he treated on the following points:—Objections to developing papers disproved, choice of colours and choice of surfaces of papers, necessity for care in exposures, permanency, latitude, manipulation, to produce best results from certain negatives, hints on toning, and concluded with a demonstration in which a number of beautiful pictures were made from negatives of *Fishing-boats on Tune*, *Yachts at Rest*, Robinson & Thompson's portrait of *Signor Celli*, *Magdalen Chapel* (Durham Cathedral), and to show the latitude of the paper, three prints of *Red Riding Hood* in which three-quarters of a minute, one minute, and one and a quarter minutes were given to each exposure with almost similar results obtained. Mr. Howson stated that many people said that half tones were lost with this paper, but the productions that evening had shown (work of eminent professionals and amateurs) and proved that this was not so. The emulsion on paper and plates was the same, and any colour could be obtained in the toning, which was with the ordinary Alpha paper toning bath. Exposure should be made by scale and not by guesswork. The burner used was an Argand two-light, at a distance of ten inches. After developing, the prints were placed in an acid bath without previous washing, then thoroughly washed and toned and fixed in the combined bath, such as used for Artistotype papers.

The proceedings closed with the exhibition of the new Boston (U.S.A) Camera Club's set of slides, entitled *A Ramble in and about Columbus* (Ohio), the lecture being given by Mr. J. A. Sinclair.

A set of slides taken on Alpha plates were thrown on the screen, and Mr. Paul Lange's *Channel Fleet* studies ended the show.

EDINBURGH PHOTOGRAPHIC SOCIETY.

October 1.—The President in the chair.

Messrs. Penman, Peebles, Hardie, and Major Rodon were elected members.

The President intimated the progress made with the arrangements for the exhibition. These were well forward, and the exhibition promises to be a successful one; and the Right Hon. the Lord Provost had kindly consented to perform the opening ceremony on Friday, November 14.

The Secretary read a paper, entitled *A New Departure in Development of Dry Plates*, by Mr. W. Harding Warner.

Remarks on the subject of the paper were invited; and Mr. W. B. Mitchell said that it was new to him to learn that the gelatine film was in several layers. The red spots spoken of by Mr. Warner might perhaps be caused by damp getting on to the plate while in the printing frame.

Mr. H. Brebner thought Mr. Warner was correct in saying that the gelatine films were in layers, and that this was caused by means of electrical action.

Dr. T. W. Drinkwater, in speaking of these red spots, said that he had found one plate this season which had red spots upon it, and he accounted for this by supposing he had packed it away in a slightly damp state.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA.

October 1, 1890,—the President (Mr. John G. Bullock) in the chair.

On behalf of the Joint Exhibition Committee, the Secretary reported that the Council had recently considered the advisability of continuing the existing arrangement for joint exhibitions. They had concluded, in view of the difficulty in arranging rules which would be entirely satisfactory to all of the societies, that it would be better to make each exhibition entirely independent, simply arranging that they should be held annually in rotation in each of the three cities, as before. By this means the best work of each year will be concentrated in one exhibition, but under the exclusive control of the society holding the same.

The following resolution, which had been drawn up for presentation to the three societies, was then read and duly adopted:—"Resolved, That the agreement heretofore existing between the Society of Amateur Photographers of New York, the Boston Camera Club, and the Photographic Society of Philadelphia to hold Annual Joint Exhibitions of Photographs, be hereby cancelled, and in place thereof it is agreed that each organization will hold a public exhibition of photographs, open to all photographers of the world, every third year. These exhibitions are to be held annually in rotation in each of the three cities, as before, but each exhibition will be under the entire control and management of the society holding the same, and under such rules as it may adopt. Each society further agrees that it will not hold any public and open competitive exhibition except in its regular turn, as above, without the consent of the other two societies. Neither organization assumes any responsibility in regard to any exhibition except its own."

Mr. Stirling, for the Executive Committee, reported the receipt of a fine collection of photographs, the work of Mr. H. P. Robinson, the celebrated photographer of Tunbridge Wells, England. The pictures had been kindly loaned to the Society through the courtesy of the Boston Camera Club, and had been hung on the walls of the meeting-room, where they would remain on exhibition to members and their friends throughout the month of October. During the last week of the month arrangements would be made for the room to be kept open each afternoon from two to six p.m., during which time admission would be by tickets, which members could obtain for distribution among their friends from the Secretary. It was also stated that negotiations were pending by which it was hoped that the Society could obtain a collection representing the work of another celebrated English photographer for exhibition later in the season. Mr. Stirling also suggested, and thought it entirely possible, that "one man" exhibitions representing some of the members of our own Society should be arranged for.

Mr. Carbutt, in response to a request, gave a brief account of his recent trip in Europe. He had given most of his attention to sight-seeing. In London he had noticed that the tendency in cameras seemed to be towards hand cameras rather than the stand cameras. He had seen several cameras to hold plates in magazines in London and several on the Continent. He had brought two or three home, and would show them at some future meeting. In Scotland, the work he saw by professionals in Glasgow and Edinburgh was remarkably fine. A great deal of attention was being given to the production of pictures in platinum. In Edinburgh the pictures by Lafayette were among the very best in photographic and artistic excellence. The pictures were no doubt worked up with India ink, but there was a softness, yet force, about them rarely seen in photographic prints. In London he did not see much in the way of improvements in pictures. Platinum was being used there to a considerable extent. The technical quality of the work did not come up to the best class of work in America. The pictures in Paris, Geneva, Vienna, and Berlin portrayed a great deal of artistic feeling in the drapery and models. Many, in producing this, do not give the same care to the technical parts of their pictures as Americans. On the journey from Paris to Munich he had encountered rain all the way. At Lucerne he made an exposure in the rain while his son held an umbrella over him. He went up the Righi and made one or two exposures of the shivering mortals who were there waiting for the sun to rise. In Vienna he made a few exposures among the markets. The amateur photographers in Vienna have a very large, flourishing society, and were doing a great deal of investigation work. They meet once a month for regular work, and have a social meeting every Saturday night.

BERLIN PRACTICAL PHOTOGRAPHERS.

October 22,—Herr Carl Suck in the chair.

Herr Gaedicke described his new "Blitz-pulver," and gave some practical demonstrations with it. He pointed out that the original Gaedicke-Mieth powder did not succeed in neutralising itself in the studio on account of the great volume of smoke produced, and the difficulty involved in getting two sources of light to ignite exactly at the same moment. The new powder produces vastly less smoke, and contains about double the amount of magnesium. In addition it is quite incapable of exploding, as shown by the speaker stirring some of the moisture about with a glowing match without causing it to ignite. It is set alight by means of a piece of collodion-cotton which is brought into contact with the powder. The cotton is set on fire by means of pneumatic igniters in two different lanterns, which are connected by an indiarubber tube, causing the two flashes to take place perfectly simultaneously. An exposure was then made with the new powder, showing that the two flashes went off with perfect simultaneousness, and were of extraordinary brilliancy and rapidity. The amount of smoke produced was so small that no traces of it remained after four flashes.

Herr Firl, of Görlitz, then introduced a new flash-lamp, the invention of a Herr Habel. In this lamp the magnesium is burned in a stream of benzine gas, which produces a great surface of flame. The tube from the indiarubber ball passes into a reservoir containing cotton wool saturated with benzine. The benzinated air, together with the magnesium powder, is then blown through a spirit flame giving a very large and intense flame. The construction of the lamp permitted some twelve flashes to be made in rapid succession.

Dr. Miethe expressed the opinion that this lamp must succeed in utilising the magnesium very thoroughly, and must consequently be very economical. He thought, however, that the flash was of too long duration to permit of sharp portraits being taken with it.

Herr Kandler pointed out that when using Schering's somewhat similar arrangement the use of an instantaneous shutter was unavoidable.

Herr Firl replied that thirty-six views of a fancy ball had been taken by means of this lamp, and of the thirty-six thirty-five were completely successful.

Herr Ludewig remarked that in employing his own flash-lamp he found a great deal to depend upon the rapidity with which the magnesium was projected through the flame. Using too much pressure caused the powder to pass through the flame unburnt, the result being that much less light was obtained.

Dr. Miethe then spoke concerning the primuline and Feer processes, his remarks being illustrated by a number of samples lent by Dr. Witt. His opinion appeared to be that the latter process (Feer) had much more of a future before it than the former.

Dr. Hesekiel then exhibited his new platinum-silver paper and a number of excellent prints thereon.

Dr. Miethe expressed satisfaction with the paper on the whole, remarking, however, that small white spots frequently appeared, which he attributed to imperfections or difficulties in the manufacture which would doubtless ultimately be overcome.

Dr. Hesekiel, in reply, maintained that the spots were not due to the paper, but to dirt in the toning dish, an insinuation which Herr Schaarwaechter repelled. Finally, Dr. Hesekiel pointed out that the length of time employed in washing had considerable effect upon the time required for toning and upon the quality of the tone.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

PHOTOGRAPHING TOMBSTONES.

To the Editor.

Sir,—Referring to a discussion which recently took place in your columns with reference to the photographing of tombstones, I send by same post a print of one which gave me a little trouble. In this case the letters were simply cut in the stone, not coloured in any way, and a first attempt under ordinary conditions gave a very shadowy impression on the negative. The stone was new and tenderly cared for, and I should not have dared to suggest colouring the letters, even with the promise of removing the colour, so, after viewing the stone under different conditions of light, I took it in strong sunlight, the rays, as you will perceive, falling parallel with the length of the stone. The result gave great satisfaction, and secured a good order for repeat copies. This treatment is available in all cases where the letters are to appear dark on a light ground, and is, I think, preferable to the dodges recommended.—I am, yours, &c.,

Clare, Suffolk, October 29, 1890. T. Stokoe.

[In the print sent the lettering is very plain.—Ed.]

TRADE MARKS ON PAPER.

To the Editor.

Sir,—Your correspondent, Otto Schölzig, in his friendly animadversions on my remarks in reference to the offensive *embossed* trade marks on paper, may be quite right in his desire to insure that none but perfect samples leave his establishment, but surely that can be done in a less objectionable way than that I called attention to. In the instances spoken of, the embossing stamp was not less than three-quarters by five-eighths of an inch, and oval in form. This, it must be admitted, is rather too much of a good thing on every half-plate piece of paper. On a full sheet this would not matter, as it could be cut off, but that is hardly possible, occurring as I have described. Would not an oblong printed (not in aniline ink) slip, or line on the back on the lower edge do quite as well without the embossing, which serves no useful purpose whatever? All that is wanted is to give the buyer a guarantee, and this would do that without causing any damage. The marks in question were on the right-hand lower corner of the sheet, but for obvious reasons the maker's name was not given. It *was not* Mr. Schölzig's.

W. H. Davies.

"FREE LANCE" AND MR. EVERITT.

To the Editor.

Sir,—"Free Lance's" reply is very ingenious, but lacks one merit, accuracy. I did not suppose he intended to attack Mr. Debenham, or to do other than pay him a compliment. I pointed out that the words called glib platitudes were used by Mr. Debenham, not by me. See report in this Journal, page 587. "Free Lance" states he did not "append" my name. Would he raise a quibble over the meaning of the word "append?" By his own admission he devoted a paragraph to me, regretting it was not a chapter; therein he named me, and led your readers to infer mine was the responsibility for what he criticised.

As to my comments on his remarks concerning Dr. Emerson's rule for focussing, he charges me with suppressing the essential part of his sentence. In point of fact there are two distinct sentences. The first, "It

is obvious that a photograph never can give more sharpness than actually exists in the original." The second, suggested by the first, "When the eyes look at a photograph—say of the one allowed sharp part of a photograph—they see more than they do of the original, which, taking a proper standpoint for observing from, is of course untrue." Does the second sentence mend matters? When looking at a photograph of the one allowed sharp part of a photograph, who would expect to see more than they do of the original, whatever the standpoint of observation? Presumably "Free Lance" means, although he does not say it, that if you look at a photograph from a standpoint at a distance equal to the focal length of the lens, you will not see more than you did of the objects themselves.

Well, my paper was on *Pictorial Definiton*, and I reply, that although the focal distance, when convenient, gives the best standpoint from which to look at a photograph, an artist would not, as a photographer of the "sharp all over" type, make it depend upon the observer how much of what was on the canvas constituted the picture. He gives prominence to the principal object by subordinating the surroundings, fills in detail in such degree as will best answer his purpose, and by all legitimate devices endeavours to make you see what he sees, and feel what he feels. The following quotation from Burnet aptly illustrates this. He says, speaking of Rembrandt:—"Rembrandt seems always to have taken up a leading feature in his works, and never to have lost sight of it. The varieties in his prints are but corroborations of this: as in his anxiety for its preservation we trace him destroying every impediment, either by covering down or burying whole groups in shadow, or by leaving in unfinished state other groups, with a mere outline to define them."

The last paragraph in "Free Lance's" reply is very funny reading. Probably it is based upon your reporter's words—"The defects of sight must be taken into account, and similar defects reproduced in the photograph." This is capable of very absurd construction and was not said by me.

In conclusion, I would again remind "Free Lance" that vituperation is not argument, and that it ill becomes his assumed name. For the future I shall leave his comments unnoticed, if they do not conform to the courtesies of debate.—I am, yours, &c., PHILIP EVERITT.

London, November, 3, 1890.

PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—May I claim space for a few lines in answer to Mrs. Blake? The rule excluding pictures previously exhibited in London was made many years ago by the Council of the Photographic Society of Great Britain to prevent the sending in of pictures that had been offered for sale at all the leading printsellers, and from which therefore all charm of novelty had been removed.

Now, lynch law is of necessity practised at the Photographic Exhibition. *The pictures are hung first and judged afterwards.* As one of the judges, I could only exercise my function on those that *were hung*, and when I saw Mr. Van der Weyde's *Invitation to Supper*, I recognised the work of no mean artist, and thought it a picture that would do honour to any exhibition, photographic or otherwise, and when I voted, did not pause to think whether Sydenham, twelve miles away, really was London or not. —I am, yours, &c., VALENTINE BLANCHARD.

A PROPOSED CAMERA CLUB FOR SOUTH LONDON.

To the EDITOR.

SIR,—For some time past the North Surrey Photographic Society has been making efforts to establish a camera club in South London.

A scheme has now been formulated which promises to be an entire success, provided we can obtain a fair amount of support and co-operation from amateurs residing in the neighbourhood. It is proposed to take premises which shall include a large meeting-room, commodious dark rooms, library, enlarging rooms, &c., with arrangements for the supply of refreshments and eatables.

A club founded on these lines, while offering all the advantages of a social club, would also provide for the carrying on of photographic work by members who wished to take advantage of it, while its promoters believe, from very careful estimates, that the whole expenses will be met by a guinea subscription.

The districts included in the scheme would be Norwood, Dulwich, Brixton, Herne Hill, Streatham, Sydenham, &c., the site of the premises to be as central as possible.

May I request any gentleman willing to co-operate in such a scheme to communicate with me, so that a meeting may be called to set the matter in motion?—I am, yours, &c., HAROLD SENIER,

Hon. Secretary, North Surrey Photographic Society.

88, *Norwood-road, S.E.*

NEW WHITE DEVELOPER.—Mr. G. W. Seretan has sent us a sample of a developer bearing this name. It develops with cleanness and vigour, giving a good tone.

HACKNEY PHOTOGRAPHIC SOCIETY.—Programme for November and December, [illegible] November 13, Members' Lantern Evening. November 27, Demonstration, Keratype Paper, Dr. Russell Smith. December 11, Exhibition of competition pictures at St. Andrew's Hall, Wells-street corner of St. Thomas's [illegible]. The admission will be by ticket, price sixpence. Musical and [illegible] evening also. Light refreshments provided.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Wanted, artistic backgrounds in exchange for etchings, photogravures, and autotypes.—Address, R. W. HOWES, East Dereham.

Wanted, a whole-plate camera in exchange for Cox's whole-plate portrait lens.—Address, LONGSTAFF, Photographer, Spennymoor.

Will exchange Vevers' fifteen-inch burnisher (new) for case for whole-plate camera and three slides or background.—Address, C. BROOKHOUSE, Pool Dole, Fenton, Staffordshire.

Will exchange first-class optical lantern with oil and limelight fittings, Newton's four-wick lamp (extra short-focus lens, if required) for a 12×10 camera.—Address, J. H. ALLCOTT, 31, Coltman-street, Hull.

Gas bars, fourteen feet, with patent lock taps, best quality and new, with iron-bound pressure boards; exchange for lantern slides by York or Woodbury, or offers.—Address, JOHN SCHOFIELD, Heaton Mersey, Manchester.

Will exchange any of the following:—Quarter-plate portrait camera, lens, and slide, patent plated air gun and darts, pair of spirit lamps and stand, large printing frame, ditto bath dishes, and other things, for good medical battery or microscope.—Address, TIDEY, 35, Richmond-road, Dalston.

I will exchange two backgrounds, interior and exterior, size, eight feet by seven feet, for a clouded or graduated ditto; also boat, oar, and waterpiece, and forty-five 2s. parts of Virtue's *Imperial Shakespeare*, for studio accessories. Photographs exchanged. Address, F. C. D. HUED, Photographer, Shepton Mallet.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

G. F. GRILL (Cobar).—Received with thanks.

THE WARDER.—See answer to H. W. Nichols.

W. G. HONEY.—The specimens last received show an advance.

CARL ULRICH.—Thanks for reports, which are much appreciated.

C. TURNER.—We have seen the picture alluded to. It is a very good portrait, but a very bad picture.

F. GUTEKUNST (Philadelphia).—Full directions for stripping plates will be found in an article in the forthcoming ALMANAC.

W. R.—Registration would be of no use in the case of an instantaneous shutter. It must be protected by a patent, if protected at all.

W. A. J. is rightly informed. A license is required for a still, even if it is used only for distilling water. The cost of the license is ten shillings a-year.

INQUIRER (Dover).—More than one article on the subject will appear in the forthcoming ALMANAC. Better wait for them. The space available in this column is too limited to give working details of processes.

C. GREY.—A wide-angle lens of the rectilinear type is a very good one for copying, though it is scarcely so good as some other forms. However, the one you have ought to answer very well for the size copy you require.

S. Y. A.—Magnesium powder, by itself, is not dangerous to keep. But if it be mixed with other substances to increase its rapidity of combustion the case may be different. Serious accidents have occurred with such admixtures.

DEVON.—By lengthening the studio five or six feet the difficulty would be overcome. A longer focus lens could be used and better perspective obtained. A lens with too short a focus is the cause of the unpleasant appearance in the portrait.

C. DREW.—There is no occasion to use pure alcohol for the manufacture of enamelling collodion. Methylated will do quite well, but it must be strong, not less than s.g. ·825. It is illegal to purify methylated spirit, or to manipulate in any way to remove its smell, or to increase its strength. Absolute methylated spirit was at one time allowed to be sold, but now it is not.

W. A. writes: "I have some negatives I value over portions of which a yellow colour has appeared, and makes them useless for printing. I should be glad to know cause, and how to remove effect.—The cause is the formation of sulphide of silver through a fault in fixing. A partial cure is to immerse the plate in a solution of bichloride of mercury, watching it closely all the time.

A LANTERN TYRO.—1. The majority of commercial lantern slides are by the wet collodion process, but if you are not familiar with its working you will probably obtain better results with the plates sold specially for lantern slides. 2. Any of the old works on photography give working details of the collodion process, with formulæ for the different solutions. 3. A four-inch condenser.

F. J. Q. writes: "In order to get perfectly equal illumination over a half-plate I bought a so-called 10×8 lens by a well-know maker, between twelve and thirteen inches focus, but find when working full aperture that the centre of picture comes up rather before edges, and on completion the density is not equal all over. I am therefore unwillingly obliged to use a stop. Ought this to be? Can it be remedied?"—In reply: There are no means of equalising the light but by a stop, which asserts a more powerful influence on the axial than on the oblique rays.

"FUZZYTYPES."—Writing on this subject, a correspondent says: "It would be rather amusing if all contributors to the Society's Exhibition next year were to send in examples of "Fuzzytype." It might be such a striking novelty and so amusing that possibly crowds might be drawn to the exhibition, and so fill the coffers of the Society, that they might be able at once to begin building a room of their own, of which they so much stand in need."

T. A. IRONSIDES inquires: "Why is it that prints mounted on glass, such as ivorines, fade quicker than those mounted on cards in the ordinary way? It is generally said that fading is caused by exposure to the air, and these prints are perfectly protected from it."—The fading in many instances is brought about by the mountant, which is generally gelatine, which contains an acid. Most foreign gelatines are strongly acid, and these are usually employed on account of their whiteness.

SALTING AND SENSITISING says:. "I shall feel much obliged if you will give me a formula for salting and sensitising a rough-surface paper as per enclosed. This was done by a formula which appeared in your JOURNAL two weeks ago, but as you perceive it is not at all satisfactory."—The formula is all right, but this, as given, is for a thin and soft paper. But that used is just the reverse—very thick and hard. All that is necessary in this case is to leave the paper longer in contact with the solution, so that it can penetrate into the surface.

H. W. NICHOLS says he is using a brand of paper that yields excellent results, so far as printing and toning are concerned, but as soon as the washing is commenced the prints blister terribly, notwithstanding he has tried all the remedies usually suggested in such cases. He asks advice.—We suggest that he should try Mr. John Stuart's plan, namely, after the prints are printed, and before commencing to wash them, to pass them through a bath of methylated spirit. Then wash, tone, and fix as usual. The prints are taken direct from the spirit and put into the water. If this does not get over the trouble, those who supply the paper should be communicated with.

P. FAGAN says: "I was told that by making a solution of gelatine containing half spirit and half water I could mount my prints on plate paper without its cockling. But I could not make the solution, although I did as I was told, which was this:—Dissolve the gelatine in the water, and then add the spirit with continual stirring. Upon adding the spirit the whole went into one thick clot, which no amount of stirring would cause to dissolve. Can you explain the reason? The gelatine was Coignet's best gold label."—This kind of gelatine is not suitable for the purpose. One of a weaker and more soluble sort should be used, such as Nelson's soup gelatine. With a moderately weak solution of this a large proportion of alcohol can be introduced. The more insoluble the gelatine, and the stronger the solution, the less the spirit that can be used.

T. G. S. writes: "A friend of mine sent one dozen 10×8 negatives to E. to be printed from and mounted opaline. The negatives were returned minus the glass; they had all been lifted without a failure from the glass. Can you, in "Replies," give me an idea how it was done? The gelatine film was thick, flexible, and pliable. This would be something worth knowing. They had been cut, after they were dry, about three-eighths of an inch all round."—There are several methods of stripping negatives from glass, but they are all based upon Plener's plan of loosening the film with hydrofluoric acid. About the best and simplest method is that given by Mr. Pumphrey in the ALMANAC for 1889, page 495. It is this: A sheet of thin gelatine, such as that used by lithographers and by bonbon makers, is softened in *very* dilute hydrofluoric acid, and then squeegeed on to the negative. Full working details are given in Mr. Pumphrey's article.

J. R. JONES writes: "I should esteem it a favour if you will inform me whether the platinum paper may be used with safety in the same yellow light used in the silver process. Also, is there really a safe light for gelatine plates giving greater illumination than the ruby windows do? Occasionally one reads that this or that is strongly recommended by So-and-So, but I do not know of any authoritative declaration that a safe substitute for ruby has been found. If your experience in the matter points you to other views, I shall be much obliged to learn of them. One other question I should like to ask, and that is, which is the best lining for a trough, lead or zinc?"—It is advisable to employ rather less light for platinum printing than is permissible with silver. Canary medium is tolerably safe if the plate is not manipulated too near it. With regard to ruby glass, much depends on its non-actinic qualities. It is not always that which obstructs most light that is the safest. It is a good plan to use ruby light when changing the plates and in the first stages of development, and then to substitute for it a good yellow. For lining the trough, lead will be preferable to zinc.

W. C. asks: "Would you kindly favour me with the following information? Last year I accepted a situation as operator and retoucher with a firm, also signed stipulations to the effect that I may not open business or work for another firm within a radius of twenty-five miles. This I had to sign before going to the firm. I was then in somewhat bad health, and rather than miss such a suitable berth I signed without any protest. I did not, however, give satisfaction, and had to leave, having been nearly three months in their employ. My health again compels me to seek a place in the same county, and being offered a place within the twenty-five miles, I wrote to ask if they still considered the stipulation binding. In reply they say it is still binding, but in consideration of my health, they will allow me to take the situation offered. Would you kindly give me your advice in the matter? You have probably known similar cases, and can assure me if I am bound to keep the stipulations, seeing I did not give satisfaction nor remain with them."—Without knowing the exact wording of the agreement we cannot offer an opinion; but it would seem that the agreement was not an equitable one if the employer had the option of discharging the operator at any time within the twelve months, and for this it would be invalid. Again, a twenty-five-mile radius would be considered in a court of law, we imagine, an undue restriction of trade, and this would invalidate the agreement. Our correspondent had better consult a respectable solicitor if he wishes an authoritative opinion.

W. D. H. writes: "During some of my photographic work I accidentally splashed some hypo solution on the zinc bath tub. This has made a number of black spots, which resist all polishing powders. Can you, in the next number of the JOURNAL, tell me how the spots may be removed? The tub is solid zinc, not plated."—A little silver sand rubbed on the spots will remove them, so will a little dilute sulphuric acid.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, November 12, *The Advantages and Disadvantages of Toning and Fixing in One Operation.* November 19, Annual Dinner.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.—The next monthly meeting will be held in the Mosley-street Café, Newcastle, on Tuesday, the 11th inst., at half-past seven p.m.

KALLITYPE.—Messrs. Lewis & Co., Birmingham, have sent us some of the later outcomes of the Kallitype process of printing. They are certainly very excellent, showing rich, platinotype-like blacks, good gradation, and pure whites.

SHEFFIELD CAMERA CLUB.—A lecture on Norway was given under the auspices of this Society on October 29, in the rooms of the Club, by Mr. W. Lamond Howie, F.C.S., of London. The subject was entitled, *Ten Days on the Hardanger.* The lecture was illustrated with a splendid series of views photographed by Mr. Howie, and exhibited by oxyhydrogen light.

LIVERPOOL PHOTOGRAPHIC EXHIBITION.—The arrangements for the important triennial exhibition are, we understand, making good progress. As many of our readers are doubtless aware, the exhibition will be held in the Walker Art Gallery, the use of which has been granted by the Liverpool Corporation, the same suite of five rooms—so admirably adapted for exhibition purposes—as was used in 1888, having been secured. The opening is fixed for Friday, March 6, 1891. Full particulars will appear in our advertisement pages. In the conditions—clause seven—a special reference was made to the important matter of judges, and certainly in the names we now publish, the Liverpool Society may well feel proud in having secured a jury—well, the names speak for themselves: Captain Abney, J. Gale, H. P. Robinson, A. W. Pringle, J. P. Gibson, and G. Watmough Webster.

HOW P. O'BRIEN, M.P., KODAKED THE WITNESS.—On Monday, while the "Conspiracy" prosecutions were about to be continued at Tipperary, and the cross-examination of Mr. Power, Sub-Sheriff, was being resumed, Mr. P. O'Brien, M.P., was apparently explaining the mysteries of his Kodak to Mr. Sheehy when Mr. Ronan suddenly jumped up and asked the magistrates whether they would permit the photographing of a witness in Court.—Mr. Shannon: Certainly not.—Mr. Redmond said Mr. O'Brien had no intention of photographing the witness.—Mr. Ronan: That machine has no business there; put it down.—Mr. Shannon: That is a matter for the magistrates.—Mr. Irwin: Mr. Redmond has stated that the instrument is not to be used; that is sufficient.—Mr. O'Brien: I state it. I think that is sufficient.—Mr. Shannon: Certainly. When Mr. P. O'Brien came to cross-examine the witness he asked him whether he had any objection to be photographed. The witness replied, "Not the least." Mr. O'Brien, with startling rapidity, caught up his Kodak, directed it towards the witness, there was a sharp click, and Mr. O'Brien exclaimed, "Then you are taken," and sat down. The incident caused much surprise and some amusement and commotion in court. Mr. Shannon pointed out that a distinct pledge was given that Mr. O'Brien would not take a photograph of the witness. Mr. O'Brien rejoined that the witness said he had no objection. Mr. O'Brien placed the Kodak in its case, and the police were, by direction of the magistrates, about to take it forcibly from him, when Mr. Redmond obtained it from him and took it out of court. After a brief consultation, Mr. Irwin (addressing Mr. O'Brien) said: Considering the undertaking given by Mr. Redmond, acquiesced in by you, and considering that the Court distinctly expressed the opinion that there should be no photographs taken in court, and that, notwithstanding the direction of the Court, you have taken a photograph of the witness in direct opposition to our ruling, we consider that you have been guilty of gross contempt of court.—Mr. Redmond: If Mr. O'Brien takes my advice he will have no hesitation about expressing regret for what has occurred.—Mr. O'Brien: I do not honestly feel regret. Mr. Shannon asked me not to photograph the witnesses as they were objecting, and I never afterwards used the Kodak while a witness was examined. I asked this witness's permission, and he gave it.—Mr. Irwin, addressing Mr. O'Brien, said: Mr. Patrick O'Brien, we regret the incident that has occurred. You have abused the privileges of the cross-examination by taking the photograph of a witness whom you were at the time engaged in cross-examining. You have done so in violation of a pledge which you had given a short time previously. You have still further aggravated the offence by declining to express regret for the contempt of court of which you have been guilty. Under those circumstances we have no alternative but to endeavour to uphold the dignity and respect of a court of justice so far as lies in our power. We adjudge that you have been guilty of gross contempt of court, and we sentence you to be imprisoned in the gaol of Clonmel for seven days from this date. Mr. P. O'Brien was conveyed to Clonmel Gaol in the evening.

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THE BRITISH
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REDUCING OVER-PRINTED PROOFS.

Perhaps nothing worries the amateur printer more than the difficulty he experiences in securing uniformity in the depth of tone of his prints. It is so easy to misjudge the strength of the untoned image and the degree of reduction that will take place in the course of the subsequent operations, and even though the necessary experience be gained with any particular sample of paper there are the variations in others to be taken into account. The error of judgment may result in either under or over-printing, but carelessness, forgetfulness, or sudden variation in the light add very largely to the latter danger, which fortunately is the more easily remediable fault of the two.

For very many years a really satisfactory method of dealing with over printed proofs has been sought for, but in connexion at any rate with albumenised paper it cannot be said that the search has been successful. Innumerable plans have been recommended, but they one and all have had the objectionable feature that while reducing the depth of the print they have altered, perhaps utterly ruined, its tone. The colour compound forming the image in an albumen silver print is of so delicate and subtle a nature, and the image itself of so superficial a character, that it is not to be wondered at if such treatment as proves efficacious in bringing down the superfluous force or reducing the depth of the metallic deposit should also produce an alteration in its colour. So far then as albumenised paper is concerned it seems likely that the want of a suitable reducing process will remain.

But it may be said that cases frequently arise, when it is desirable to save a print at any cost, whether it be perfect in tone or not. It may happen for instance that a negative is broken in the printing frame, and the only print or prints that have been got off are over-done. In such a case it is "Hobson's choice" between a not quite perfect print and none at all. The best method to adopt under such circumstances is that first recommended some years ago by Mr. William England, consisting of immersing the proofs in a very weak solution of cyanide of potassium until the requisite reduction has been effected. By this plan, given a satisfactory tone to start with, it suffers very little under the treatment, the change being a scarcely perceptible lowering of the richness of a purple tone, black or brown tones being scarcely affected.

Another plan, much resorted to in slight cases of over-printing, in which it may perhaps be considered legitimate, is to leave the prints in the fixing bath until the desired change is brought about; but in serious cases, where a long immersion would be necessary, the prolonged action of the hypo on the delicate image could scarcely be regarded as favourable to its permanency. Under any circumstances, we should hesitate to employ for this purpose a fixing bath that had been used for any considerable number of prints, for the silver salts therein contained, while adding to the danger already referred to, would suffice, in conjunction with the hypo, to set up a separate toning action which might or might not be desirable. In the case of a print already fully toned, any supplementary action must necessarily be detrimental, though under the reverse conditions an under-toned print might be improved. This brings to mind a suggestion made some years back on this very subject. The prints to be reduced instead of being toned in the ordinary way were to be left to the last, and after the remainder of the day's work had been toned and fixed, the over-printed ones were introduced into the fixing bath and left to tone, fix, and reduce in one operation. How far the permanency and tone of such pictures could be considered satisfactory may be a moot question, but we scarcely think they would give general satisfaction at the present day.

In the earlier days of photography the matter of deterioration of tone was not so serious as it became later. It was not until the introduction of the *carte-de-visite* and purple tones that the public, as well as photographers themselves, became so critical in their tastes. Now, perhaps, that albumen prints, if not actually going out of favour, have at least lost their monopoly, it is possible that the colour question may have decreased in importance; and it may be said in addition that the newer processes in vogue and the newer tones lend themselves more readily to the reducing process than was formerly the case. For instance, the black and grey tones now so fashionable, whether produced by development or otherwise, may be treated with comparative impunity, since, in the absence of those delicate *nuances* which form the beauty of purple tones produced by means of gold, they are less liable to any material change. The alteration, for instance, of a grey-black to a slightly lighter shade would be less startling than the conversion of a purple into a brown tone.

A series of experiments has been made recently with a view of ascertaining the best method of reducing over-printed proofs on various kinds of paper in modern use, and indirectly to test the possibility of securing absolute uniformity in depth and tone by systematic over-printing and subsequent reduction in much the same manner as proposed ten or twelve years ago for securing uniformity in the printing value of negatives. The papers experimented with had, without exception, gelatine as a basis, and consisted of gelatino-chloride and gelatino-bromide papers of various makers; the only distinction that need be made, however, is that between developed and printed-out images. The former may be considered in all cases to exhibit

black or grey tones, as those which by modified development produce warm tones will be dealt with by the side of gold-toned images. The essential difference between the two kinds of pictures is just this, that whereas the developed image consists of silver alone, the toned image is formed partly of silver and partly of gold—a sufficient distinction to account for some difference of behaviour. In fact, it may be assumed that a solvent of silver alone would be insufficient to wholly remove a gold-toned image, although it might completely destroy a developed one. In practice, however, the application of various reducing solutions presents some anomalies.

We shall proceed to deal with developed images first. These were treated with various solutions similar in character to those employed as "clearing solutions" or for reducing negatives. These included dilute hydrochloric acid alone as well as in combination with alum, chloride of iron, and other similar substances; these were applied alone, and also followed by immersion in hypo. The application of any of these solutions produces a change in the character of the print proportionate to the duration of the immersion, but it is plain that the change is only due to the formation of chloride or other combination of silver which remains in the print, unless means be adopted to remove it. Such methods are therefore in the highest degree dangerous. If the first application be followed by treatment with hypo, the newly formed silver salt is at once removed; but here an additional objection is to be raised, namely, that the double operation is one of uncertainty, since it is impossible to judge of the final result until the immersion of the print in the hypo, though the first solution is the active one in bringing about the reduction. This is, of course, fatal to the chance of securing uniformity of action, and the objection, of course, applies to any method in which separate solutions are used.

Turning to single solutions capable of dissolving and removing the excess of silver forming the image, cyanide of potassium was first tried, but it failed to act at all satisfactorily, whether dilute or concentrated. With the addition of a few grains of iodine its action was more marked, but even in a very dilute state was difficult to control, and exhibited a tendency to attack the details of the print with greater energy than the shadows, with the result that harsh contrasts were produced.

Persulphate of iron, a well-known solvent of silver, was next tried, though with but little hope of success, as previous acquaintance with its action upon negatives was unsatisfactory. As we had anticipated, it injured the tone of the image as well as producing yellowness in the whites.

With scarcely less hope, the combination of hypo and ferridcyanide of potassium was tried, and we were agreeably disappointed to find that it answered the purpose most admirably. Contrary to expectation, in a large number of trials it showed not the least tendency to the production of the yellow stain so frequently met with when applying it to a negative film, though every circumstance seems in favour of its producing a greater effect on paper.

The method of applying it was to add to a fresh solution of hypo, of the strength of two ounces to the pint of water, sufficient of a solution of the ferridcyanide to faintly tinge the liquid, and to immerse the prints after fixing in the ordinary way. As the action proceeds, the solution is decolourised, and as this occurs a few more drops of the solution are to be added to keep up the action. This is preferable to adding a larger quantity at once, as the action is more under control, and most probably the immunity from stains is to be traced to the same cause. The reducing action may be prolonged to the extent of totally removing the image, or practically so, for there always remains a perceptible impression having rather the character of a stain; with the small quantity of ferridcyanide present at once, however, as described, the total destruction of the image is a very protracted operation.

The only effect this treatment has upon a black or grey image is to slightly lower it, without introducing any suspicion of green, blue, brown, or yellow shades; indeed, as already stated, if the tone be right to start with, it is not deteriorated in the least. The behaviour of this solution appears to be identical with every kind of developed image, whether produced by pyro, iron, hydroquinone, or eikonogen, and without any reference to the source from whence the paper comes. We repeat, that provided the image is of the character described, it is uniformly and easily reduced without change of colour.

It is, of course, necessary to bear in mind that prints treated in this manner, or, indeed, with any solution that has a solvent action on the silver image, require as thorough and perfect washing afterwards as after fixing, not only to arrest the further action of the solution itself, but also to remove every trace of the dissolved silver, which, it is needless to say, if allowed to remain in the film and paper would eventually cause its discolouration. With this precaution there is not the slightest difficulty or danger in the operation.

Turning to gold-toned images, under which head we class gelatino-chloride "printing-out" papers, as well as those of the "Alpha" type, in which a red image is produced by development, the action of the various solutions depends upon the tone. If the colour of the print be pure black, there is no perceptible alteration of colour, but if the tone be purple or brown in imitation of albumen paper, the tendency is in all cases to a colder or greyer tint, the reduction proceeding in precisely the same manner as with the developed images. Developed images in which the tone is obtained without the use of gold are exceptions to this rule, as they assume a browner tone with a tendency to yellow.

It is worthy of remark that whereas none of the other solutions tried seem capable of completely removing a gold-toned image, the ferridcyanide solution possesses that power, the strongest impression it is possible to produce disappearing gradually so long as the solution is kept in an active state. This points to the formation of ferridcyanide of gold by the action of the potassium salt and its subsequent solution in the hypo.

BACKGROUNDS: HOW TO HANG THEM.

So far we have discussed the conveniences of, and a special mode of constructing, backgrounds moveable about the studio by means of castors, particular stress having been laid by us upon the advantages of a ready mode of placing them at any required angle to the light, so as to be in a position to produce dark and medium effects with one surface only. With regard to this power, we may point out that it is further governed by the distance between these screens and the sitters, and also by the mode of illumination adopted. When hand shades or small portable light intercepters are employed, and the main blinds are not much made use of in producing effects, full advantage can be taken of the power available by the angular mode of placing we describe; but if the sitter be several feet away, and the whole skylight overhead covered with opaque blinds, less variety is available, unless there be so much space that a narrow light immediately over the background can be used

without too strongly illuminating the sitter's head. We dwell a little on this aspect of the case from a knowledge that it is less fully understood than it might be. Though a studio is provided with one, or it may be two, of these moveable backgrounds, giving (with one on each side) two or four changes, it may be said that there is not variety enough, and that too much space would be occupied by several of them set up in the studio at once. There is, however, a further and less cumbrous mode of having them multiplied, which consists simply in providing extra frames—covered and "paste-boarded," if we may coin the expression, in the manner we have described—and having them suspended from the top of one of the rolling backgrounds by means of hooks or clips. One of these suspended frames can hang on each side of the rolling frame and not at all deprive it of ready portability, and then in a small space six backgrounds can be stowed away, any one being ready for immediate use by simply lifting one or other away, turning it round, and re-hanging, or by temporarily removing a frame altogether, so as to use the ground under it —that is, the one on the original frame on castors. These subsidiary frames, in the case we saw, were provided with plain japanned iron handles for easy lifting without soiling the painted surface by placing the hand upon it. Obviously the moveable screens can be made of any size—large, so as to allow of the whole figure being included; or small, for busts or half-lengths. Any carpenter can make one; or they can be purchased ready made, and packed taken to pieces, from the fine arts colourmen in the shape of "wedged frames," such as are used for oil paintings. They are set up again without glue or nails. In either case, however, it is desirable that the inner stretchers, used to impart stability, should be planed down about a quarter of an inch on each broad surface, so that they may not press against the canvas. The ready-made stretchers are only planed down on one side. The larger sizes kept usually in stock are "Bishop's half-length," "whole-length," and "Bishop's whole-length," which are 56 by 44, 94 by 58, and 106 by 70 inches, respectively, the first-named being comparatively inexpensive.

When backgrounds representing interiors are used on frames in the manner we are describing, they are capable of an adjustment of a very valuable character.

In the case of half or three-quarter-length portraits (more frequently than with full-lengths, now less commonly used than formerly) it generally happens that the camera has to be tilted to get the subject rightly arranged upon the plate, with the common result of disarranging all perpendiculars in a very inartistic fashion. In such cases there is no remedy with an immoveably vertically placed scene; but with a "framed" one all that is necessary is to "unhook" it, and bring the base forward till the whole is just parallel to the camera back, all is then correct. Of course, the swing-back could be utilised; but those who know its value in portrait work use it exclusively for assisting in focussing the sitter, thus necessarily leaving the background to "take care of itself." Except in the studio where we saw the backgrounds that form the subject of these articles, we never met with this ingenious mode of getting rid of a commonly occurring defect and obtaining true perpendiculars. We now conclude with just one further hint. If, as so many photographers like to do, it be desired to paint the backgrounds at home, the breadths of paper should not be laid on in the usual paper-hangers' way; each breadth should be carefully trimmed and laid side by side instead of overlapping—jump jointing, we believe the proper method is termed. If this be not done, a series of raised lines will be visible on the finished surface.

Are photographs utilised as Christmas and New Year's cards to the extent they might be? Undoubtedly they are not. At one time the reason assigned for this was that suitable mounts were not to be had. This is not the case now however, as they are regular articles of commerce, and are, moreover, of very chaste designs, and with most appropriate mottoes. Yet their employment is but limited, compared with what it ought to be. What is a more appropriate picture to send with seasonable greetings than the latest portrait of the sender? There is little question if professional portraitists were to make a speciality of this class of work, at this season, they would find it remunerative. Those who intend doing so must lose no time in putting the matter in hand.

When photographic views are employed as Christmas and New Year's cards, whether they be on paper or opal glass, they usually depict the scene as a summer picture taken in bright sunshine, whereas the usual chromo-lithographed pictures are principally of winter scenes, and these are certainly more appropriate to the season than sunny landscapes with the trees in full foliage.

Photographers have but limited opportunities of securing snow and frost effects, and this may possibly be the reason why winter subjects are so seldom seen in the class of pictures referred to. However, such pictures are very desirable, and they should be forthcoming. One reason, perhaps, why they are not is that the negatives would generally have to be taken a year or so before they could be utilised, for it is seldom that there is much frost and snow before the time the pictures are required. The negatives must be secured a year in advance, and the opportunities for obtaining them are frequently few and far between.

The recent calamitous fire in the City, by which eight lives were sacrificed, ought to serve as a warning to every one working with highly inflammable materials. It is almost inconceivable that large quantities of such dangerous substances as naphtha, and indiarubber dissolved in it, should be consumed daily, and its inflammable nature either not heeded or not understood. We have, however, seen quite as much carelessness or ignorance displayed by photographers in the practice of the wet collodion process. Many did not fully realise the danger of the vapours given off when the plate was coated, which we have sometimes seen done but a short distance from a naked gas flame. Some years ago we witnessed what might have resulted in serious consequences. An amateur was coating a plate by the light of a candle, the vapour of the ether took fire, and the flame spread over the plate and fired the collodion in the bottle, both of which were dropped on to the floor all ablaze. Fortunately, as the bottle was small, no further injury resulted than one or two burnt fingers and a damaged rug used in subduing the flames.

Collodion is not so much used by photographers at the present time as it formerly was. Still, it is used pretty extensively for enamelling and for stripping gelatine films; so also is a solution of indiarubber in benzole for the latter purpose, and its vapour is equally as inflammable as that of ether. The dangerous nature of both these bodies is but little understood by many amateurs who use them. Quite recently we saw a gentleman coating tolerably large plates with each of these materials in close proximity to his dark-room lamp, being quite unaware that he was incurring any risk whatever. Whenever collodion has to be manipulated by artificial light, the electric light excepted, the operations should always be performed below the flame, as the vapour of ether is heavier than air. Ether may be decanted tolerably close under a flame, but at a much greater distance above it would instantly inflame. All who use either rubber solution or

collodion should be made aware of the highly inflammable nature of their vapours.

The Government printers (Messrs. Eyre & Spottiswoode), we are informed, are at present at work within the precincts of the House of Lords photographing the "annexed" copy of the Book of Common Prayer, which was originally joined to the Act of Uniformity. The work, it is said, is to be dedicated to Her Majesty. Mechanical photography is of inestimable value to the paleologist in the reproduction of old works, even some of the oldest manuscripts on papyrus have been rendered with the greatest fidelity by photo-mechanical processes.

The lantern season has now fairly commenced, and not a few find, when their pictures are projected on the screen, that the lenses used in their production have not been equal to the work expected therefrom. We refer more particularly to detective camera pictures. With lenses for this class of work, angular aperture appears to have been a greater consideration than covering power. No lens of the type now used on detective cameras working at *f*-6 can be expected to define sharply beyond a very limited area. Some lenses with this aperture, and of but four and a half or five inches focus, are very frequently employed for quarter-plate pictures, but when they are thrown upon the screen it is evident, from the ill-defined margins, that they are not equal to covering even the lantern-size plate. Opticians cannot do impossibilities.

Without knowing the precise amount, it may be mentioned that, in round figures, the Photographers' Benevolent Association was benefited to the extent of 10*l.* by the lantern and musical entertainment recently given under the auspices of the Photographic Club. If every photographic society or club would devote an evening a year to this deserving institution, even if the sum realised was but a pound or two, its annual income would be more than doubled. It behoves every photographer, whether amateur or professional, to support this worthy institution, particularly when it can be done in such an agreeable way as that indicated. In all societies a lantern and musical entertainment, wherever given, always proves enjoyable to members and their friends.

Metallic silver has fallen still lower in price. It has been quoted at 47*d.* per ounce, the lowest figure it has reached for several months past. The market still remains, however, in a very unsteady condition.

The Board of Trade has recently had occasion to reject a number of applicants for masters' and mates' certificates, owing to their inability to distinguish colours. Green, it appears, is the colour with which most of the candidates failed, some confusing it with red and blue, and even with pink and white. Red, again, was by some described as green and yellow, the latter colour being sometimes described as red. The tests submitted, however, are not considered altogether satisfactory, and a Committee of the Royal Society is now investigating the subject of colour vision and the best methods of examination. Many persons are partially colour blind without their being in the slightest way cognisant of the fact. Some photographers we know cannot distinguish certain colours, though they would be highly indignant at even the suggestion of colour blindness.

ON THINGS IN GENERAL.

The last technical meeting of the Photographic Society of Great Britain was at once interesting and disappointing, for since public attention has been so much drawn to the new Hartnack lenses one might have hoped for some information regarding them of a slightly more definite nature than the mere expression of an undecided opinion that they were inferior in flatness of field to English symmetricals. However, we are all indebted to Dr. Lindsay Johnson for bringing forward his specimen lens, and it is to be hoped that before similar ones are likely to be on sale in the ordinary manner an opportunity will be afforded for a thorough examination. That the air is full of presages of an entire change in the lenses of the day most photographers feel conscious; but so many factors go to the making of a good lens that it is not at all a probable thing that, even were the Jena glasses all that the most ardent or the most ignorant believed them to be, new lenses made from them would be quickly produced. Every one knows the difficulties that attended the first use of extra dense flint years ago, and as to the Jena glasses, I am able to state that I had shown to me some years since by a leading English optician a magnificent lens made with their aid. The definition was extremely fine, and astigmatism scarcely perceptible; although the field was almost absolutely flat. Yet this lens has not been, and will not be, put on the market, and this for reasons entirely creditable to the makers.

Mr. G. W. Atkins' paper, read at the London and Provincial Photographic Association, upon *Stereoscopic Photography*, was very interesting, and like the vast majority of those familiar with the subject, he could not find any grounds for hope that its attractions were beginning once more to be felt. It is indeed difficult to give a logical reason for the complete disregard it so rapidly fell into. I believe that as good an explanation as any is that when the flush of novelty wore off people were too lazy to take the trouble of putting the views in and out of the instrument, and that had the magazine stereoscopes (or revolving stereoscopes, as they were then termed) been the only possible form, and producible at a cheap rate, stereoscopic pictures might still have been in vogue at the present day. The one hope for its revival is that there now exists a whole generation who have never seen a stereoscope, do not know what it is, and have, most of them, never heard of it. The very word stereoscopic, as applied to solidity of appearance, was coined, and has vanished. As to its ever-pleasing character, I may refer to the exhibition now going round the country of sets of stereoscopic views—admission threepence only—which is most popular. Of course, the "scenes" are not called "stereoscopic views," but such they are. You enter a room, and see a polygonal wood structure, about eight or ten feet, and half as wide again, with, I think, twenty-five double peepholes all round it. A stool is provided at each pair of peepholes, and when they are all, or most of them, occupied by the audience, the lights are turned on, and you see a good stereoscopic view, fairly well coloured, before you, and its title shown in a little slit overhead. Click! and away goes the view, and another takes its place for a certain number of seconds; and so on till all have revolved, when the show is over, and the public outside are again invited to "walk up, walk up." I went inside the show on one occasion, and I must confess that the innocent criticisms I heard were of the most laudatory character, and to the bulk of the audience a stereoscopic view was clearly a decided novelty. This affair must have paid well; it was "made in Germany," and very likely will be copied in this country ere long.

I was pleased to see the manly way in which the writer of the paper on the stereoscope wrote to explain how he had reconsidered his view on the subject of round surfaces being represented as oval when using lenses wide apart. The explanation of the whole appearance lies in a nutshell. With lenses wide apart the effect produced is that of a small model being viewed instead of the full size of nature being indicated; and the further apart the lenses are when taking the view, the smaller the scale of the model appears.

Mr. Fred. H. Evans, who writes on October 17 regarding peculiarities of vision, will have many sympathisers; for, as a matter of fact, there are few people living whose eyes are alike in all optical directions, and Mr. Steward's offer to test the properties of his eyes should be taken advantage of by Mr. Evans. Meanwhile, I may tell him that the defect, as we may term it, or the want of similarity in the power of his eyes (the human frame is bilaterally unsymmetrical in regard to most of its organs), may be ascribed to either or both of two causes. The shortsightedness of the one eye may arise from either the lens of the eye being of shorter focus than the other, or from the eyeball itself being longer than the other. It is evident that, apart from psychological causes (which have as much to do with the result as those purely physical-optical), the sizes of the images of the two eyes will bear different relations to one another according as the want of symmetry arises from one or the other of these two

causes. And this also may be complicated by the short sight being stronger in one meridian than another. Only a qualified optician, after fully ascertaining the power of each eye, is capable of suggesting the best glasses to employ.

Mr. Philip Everitt is not unwise in intimating the probability of his saying no more regarding my comments upon his utterances, for the simple reason that they are unanswerable except in his peculiar method — deviation from the truth, misrepresentation, and gross garbling of quotations. Courtesies of debate he calls them. In view of his pinhole fiasco at the last meeting of the London and Provincial Photographic Association, I may dismiss Mr. Philip Everitt after a brief examination of a few of the opening statements in his last letter. Statement 1. "'Free Lance's' reply . . . lacks . . . accuracy." My reply was strictly accurate.

Statement 2. "I did not suppose he" (*i.e.*, "Free Lance") "intended to attack Mr. Debenham, or to do other than pay him a compliment." The veracity of Mr. Philip Everitt may be estimated when, besides this, I give a quotation from his first letter. In it he says, "It is not for me to defend Mr. Debenham against 'Free Lance's' criticism *re* planes of focus." This does not indicate a belief in a hearty compliment having been paid Mr. Debenham!

Statement 3. "I pointed out that the words called glib platitudes were used by Mr. Debenham and not by me." Mr. Philip Everitt did not so point out.

In regard to the second paragraph in that gentleman's last letter, I put it to any of my readers (if there be any) who have cared to wade through the correspondence whether it is not a conspicuously mental representation of another man's words, and probably explicable on the grounds of his having a incorrect blind spot? FREE LANCE.

STEREOSCOPIC WORK FOR AMATEURS.

IV.

UNDOUBTEDLY the most attractive form of printing from stereoscopic negatives is that of transparencies, and no amateur need shirk such work once a little consideration is given to the subject. Provided my readers have followed me in the previous articles, they will remember that my remarks have dealt with the production of negatives on half-plates, and this being so, it now falls for me to refer to the method of printing transparencies from such. For many years it was generally understood that to print glass positives from stereoscopic negatives it was necessary to employ a binocular copying camera, so as to permit of the different portions of the negative being transposed; but such is not now generally employed, a much simpler way for amateurs being the employment of a special printing frame, whereby the different portions of the negative can be printed by contact instead of through the camera. To enable a beginner to understand the *modus operandi*, it will be necessary that I describe this printing frame somewhat particularly, and then explain, in as clear a manner as possible, how I work the same, and in doing so I shall first treat of the printing of glass positives of the same size as the negative, and afterwards deal with the printing of smaller-sized stereoscopic transparencies from larger negatives.

The printing frame necessary for such work is a box frame, outside dimensions 12½ × 6½, the inside or box opening being exactly 10½ × 4½. This inside or box is best lined with black velvet or stained black. Exactly in the centre of this box is an aperture 4½ × 3, thus leaving a margin at each side of three and three-quarter inches, and at top and bottom of one-eighth of an inch. This frame is supplied with a plain back without hinges, which fits loosely into the box, and is held in position by an ordinary brass spring, which for convenience is best held in position, when exposures are being made, by a piano catch. This enables the spring to be fastened in the dark room with much ease, without any undue strain on the negative and sensitive plate. An item of importance in the making of this frame is the placing on one of the inside edges of the interior of the frame of two gauges of a distinct colour to the rest of the frame: if the box is painted black, then these two guiding points had better be distinctly white, so as an operator, when working in the dark, may with ease register exactly the proper position in which to place the sensitive plate on the negative. So much for the description of the printing frame. Chadwick, in Manchester, will supply these to any one desirous of having one, only it will be necessary to mention what size of negatives they are to print. The size I have given is for half-plates, and by a system of masks, to be afterwards explained, this frame can be made to print smaller-sized pictures from half-plate negatives by contact. The guides in question are placed as nearly as possible five-eighths of an inch from the ends of the frame, and on the under side of the interior of the box. When such are white, in contrast to a black ground, there is no difficulty whatever in slipping the sensitive plate on to the face of the negative without any scratching or moving of the plate over the face of the negative. Armed with such, a beginner may at once set about printing with very little fear of making failures, provided he exercises due thought about what he is doing, so as to print the left side of the negative on the right side of the sensitive plate, and right to left.

Before proceeding to describe the actual method of printing, some little consideration must be given to what are the most suitable plates to employ for such, and in this respect I have no hesitation in at once saying that far away and beyond any other form of plate for a beginner to use is a half-plate coated with some of the various lantern plate emulsions. Plates of such a class are regularly made by Mawson & Swan, and no doubt by other makers also; but should a beginner find any difficulty in procuring a supply of these excellent plates, he need not hesitate to use any good maker's slow bromide plate. I have got some most excellent results on Wratten's and Ilford's; but, when possible, use half-plates coated with lantern plate emulsion.

In undertaking the printing of stereoscopic transparencies by contact, perhaps there is no more important adjunct in the requirements for such work than a suitable lamp in the dark room. I can speak from experience of the ease and pleasure one derives when they have a good lamp which will give white light at pleasure; not that a gas jet may not be employed, but to get both portions of the negative printed by an even exposure it is of the first importance that a beginner adopts some means whereby his light is always of the same intensity, and likewise so placed as to permit of the printing frame being placed always in exactly the same position and distance from the illuminating lamp. In practice I use a large paraffin lamp, having an inner sheet of ground glass, over which hinges a door carrying a sheet of ruby glass; this is so placed upon a table as to be always in the same position between two fixed bars nailed to the table. When so placed, the door carrying the ruby glass may be opened instantaneously without any movement of the lamp, and closed as rapidly. Six inches in front of the lamp on the table I have a similar bar nailed, against which the face of the printing frame is placed flush up. By this means I make certain that I always expose the plate at exactly the same distance from the source of light; and, further, when using these lantern emulsion plates a considerable amount of ruby light may be employed. When I am working, I have as much light coming through the ruby glass as enables me to read with the utmost ease the printed matter in an ordinary newspaper; in fact, the room is quite flooded with ruby light. I never experience fog. Make sure, however, the ruby glass is of the proper quality. Such preparations made, a worker had better squat comfortably on a chair in such a position as to be enabled to watch the progress of his plate during development. This latter advice is not an idle remark, because it must be borne in mind that the worker is about to develop two pictures, each with an independent exposure of its own, upon one plate, and one of the primary factors in importance is the doing so in such a manner as will yield two pictures of as nearly as possible the same degree of density. When comfortably seated in front of the developing tray, and a plentiful supply of safe light is at command, I hardly know of any more attractive phase of photography than the watching of the latent image coming into view. But little practice will be required to enable a beginner to judge the moment one portion of the picture is sufficiently printed up, so as to employ a suitable method of stopping development in some particular place or portion of the picture until such time as the remaining parts come along and yield harmonious results. When treating of development, I hope to refer to the method I employ in bringing about this desirable state of matters. Before, however, treating of the development, it will be necessary that I refer somewhat in detail to the manipulation of the negative and sensitive plate in the printing frame. Having arranged all matters necessary for development, and provided with a bright ruby light, let the beginner sit down in front of the lamp and proceed to place in front of himself on the table his printing frame, doing so in such a manner as to permit of the guide I referred to being on the side of the frame next to him. Next let him take the negative he is desirous of printing from and place it glass side down in the box of the printing frame, proper sides up and down. This done, let him proceed to open his ruby door and get a supply of white light. This is to enable him to so register the negative over the cut-out aperture of the frame as will permit of his getting a picture printed which will show less subject on the left-hand

side of the left-hand picture when finished than will be eventually found on the left-hand side of the right-hand picture. The reason for this is, that the effect, when viewing the picture eventually through the stereoscope, is much heightened by the picture appearing as if placed behind a frame or aperture, such as a tunnel or other similar appearance.

Having placed the negative in the frame as stated, let him proceed to take the frame in both hands and view the negative by means of holding same in such a position in front of the lamp as will enable him to see exactly what portions of the negative lie across the aperture in the frame. With the thumb of each hand he will, with care, be able to slide the negative into the exact position. Bearing in mind that the negative is now film side up, and which is to come in contact with the film side of the sensitive plate, it will be at once obvious to a careful observer that to transpose or print the right-hand picture of the negative on to the right-hand portion of the plate when the same is viewed finally face up again, the left-hand portion of the negative must be slid along the recess of the printing frame until the right-hand portion is over the aperture, and in such position that more subject is shown on the left-hand side of this portion than will be the case when printing the other portion of the negative. When the negative has been placed in this position in the frame, let the operator lay the frame and negative quietly down on the table, so as not to move the negative from its position, and proceed to shut off the white light for the ruby. This done, let him take his sensitive plate and carefully adjust the right-hand side of it, when it is placed or held film downwards until it just comes to the end of the little guide on the right-hand of the printing frame. Provided proper attention has been given to these guides, and they are placed exactly in their true positions, there need be no fear about the negative being printed on the proper position of the sensitive plate. This done, insert the back of printing frame, spring it up, proceed to open the lamp for white light, place the frame at the six inches mark on the table, and expose for the necessary time. In my practice, when printing from a negative of ordinary density, and using a Mawson and Swan plate coated with lantern emulsion, I find my exposures run to about one and a half minutes, but of course on this point no definite statement can be made. Every worker must at first feel his own way. What I have stated, however, may be a guide. Having exposed the right-hand portion of his negative when same is film up in the frame, let him close his lamp and turn on the ruby light, open his frame, *and lift out his sensitive plate in such a manner as always to place the exposed portion edge downwards.* It is important to get into this little rule of working, because it will prevent any one from making the annoying mistake of exposing the same portion of his plate twice. The plate being placed exposed side edge downwards, the ruby light must be maintained so long as such is out and liable to be fogged by white light. The left-hand portion of the negative is then brought over the aperture, and so placed as to permit of less of the left-hand portion of the finished picture being shown. *This will mean* sliding the negative just so much as the right-hand portion of the left-hand negative is just beyond the aperture. The plate is then taken, and the top portion (unexposed part) placed over the negative until the end of it just comes up to the guide on the left hand of the frame. The back is then inserted and springs adjusted, and exactly the same exposure given as previously. This done, the plate is ready for development; and if these instructions are carefully followed out, a transparency will be the result which will have the rights and lefts in their proper positions by a simple method of transposing by the printing frame.

In my next I hope to offer some remarks *re* development, and refer to the printing of smaller-sized transparencies by means of the same frame from half-plate negatives.

T. N. Armstrong.

PICTORIAL DEFINITION.

[A Communication to the London and Provincial Photographic Association.]

I feel, somehow, drawn to this subject, in spite of the hesitation one feels in constantly making oneself heard at these meetings. It is difficult, no doubt, to stick to the title of the paper.* I thought so when the reader of it held up a book and challenged another member to read the title on the back. Were we not pretty close on telescopic definition instead of pictorial?

Whatever may be the outcome of this discussion, it will end, no doubt, in each of us having our own ideas of what definition ought to be, and quite right too; is it not entirely a matter of taste whether we make this, that, or the other the sharpest bit in our photograph, guided by one's common sense, just as much as choosing the point of view? We all agree, I suppose, that many good pictures can be made of a good subject from different points of view—in fact, you will seldom find two painters agree which is the best point of view. In that respect I have little or nothing to say about it. It is when others—if only a few, fortunately—differ widely from our own preconceived notions of definition that we seek to know the reasons, and if not good and sufficient, reject them. I do not myself care for extreme sharpness, and detest hardness as much as the most enthusiastic pinhole photographer going. It is the other extreme—describe it as you will—and the pretensions of the pinhole, naturalistic, or fantastic school that I intend having a tilt at, and that from an artistic point of view only. One feels tempted here to ask the question: What constitutes a school? The schoolmaster and another!

These naturalistic photographers would have us believe they are for nature; nature before anything, and hang conventionality. Just as if, by *only* going to nature, you can avoid it. Where, may I ask, can you find a better example of conventional treatment than Emerson's *Hay Cart* from nature? And as to their idea of impression of what nature is can only be properly rendered through a pinhole or lens out of focus—of the two, I would rather have the pinhole definition than the "judicious use of the stop" as shown by Emerson. We have here a wandering of the focus with a vengeance. Mr. Everett, the other night, thought these prints were entitled to be considered pictures or works of art, because they recalled scenes with which he was familiar. Now, this is a mistake. If he seeks for no higher quality in art than this, his standard must be a very low one indeed. The artists on the pavement will produce something which will recall scenes, &c.; but perhaps Mr. Everitt considers these pictures and works of art. The roughest blot or slightest sketch will do this and more; your imagination is at once called upon to fill up what is wanting in the sketch. No one will contend that the sketch is a picture or work of art because you feel a certain charm in exercising your imagination. Therein lies the charm; it is not in the sketch, and certainly is not in these prints. The charm to a painter is what he feels he could do with the subject; it is suggestive because it has lost the hardness one usually finds in photographs. But fuzziness, or whatever term you may use to describe want of definition, is not in itself artistic, or yet a quality in art, any more than smoothness or softness, &c.

The impressionists tell us, Mr. Everitt told us the other night, what was Emerson's theory; if you are painting the middle distance, and only conscious of the foreground, why paint it? Quite so; if the foreground is of no importance, why paint it, even as you are only conscious of it? But no, the foreground is too important to be left out, and, as no one but impressionists understand these things, they get over the difficulty easily enough by painting it as they are only conscious of it.

Now, I contend that if you look at the foreground as you do the middle distance, you ought in common honesty—there is such a thing as honesty in art—I say in common honesty you ought to render the one in relation to the other as you see it. To say you are only conscious of what you ought to study and endeavour to render truthfully is nothing but mere affectation and shirking the difficulties of painting just where they begin; and in a less degree shirking the photographic difficulties of rendering the definition, with an eye to atmosphere and movement, is not a proceeding to be commended.

One may well ask if they have ever seen this nature they imagine they are looking down upon from their lofty pinnacle, condescending to look at a bit at a time, conscious, no doubt, that more than an angle of nine degrees is too much for a weak brain. If they will but study what they confess they are only conscious of, they will in time feel less inclined to cackle about it as they do. So far they are only trying to imitate a few who call themselves naturalistic painters. Do the photographic imitators imagine there is nothing more in the work of this so-called naturalistic school than haziness of outline? One would think so, seeing that is as near as they have got to it, or may ever hope to get. If they had any real artistic feeling in them, they would know how utterly hopeless it was to attempt it. There is something more in some of the work of this new school of painters difficult to express without examples, and still more difficult to find in much of the so-called impressionist or naturalistic work one sees about.

It is the mind and soul, as it were, of the man showing in his work that is the backbone of all true art work; without it, it is nothing but a meaningless daub. Where we find this quality we tolerate the slovenly execution or want of definition as we tolerate the mannerisms of an actor or musician if he appeals to us, or touches a responsive chord in our nature; just as the indifferent manipulation

* *Pictorial Definition*, by P. Everitt. Read September 4, 1890.

of Rejlander was tolerated at a time when a "clean plate" was thought more of than now, when he gave us something with a little thought in it.

Is it not, then, an insult to one's common sense to be told of the characteristics of the photographs used as examples by Dr. Emerson and Mr. Everitt that these points are all that one could desire, and that the other is just as it should be, when they are nothing but an out-of-focus transcript of the scene before them at the time of taking the cap off the lens?

A. COLLIER.

IS BLURRING DESIRABLE IN A PHOTOGRAPH?

[A Communication, , the London and Provincial Photographic Association.]

In the paper on *The Unnaturalness of Naturalistic Focussing*, read last week, it was pointed out that the desirability as a matter of taste, whether occasionally or generally, of representing objects in the camera with the blurred definition of a lens out of focus is a point that may be fairly argued, even though it may be demonstrated that such blurring does not represent the image of nature impressed upon the retina.

The question arises, What are the advantages, real or supposed, to be obtained by means of blurring the picture in whole or in part? A claim which has been put prominently forward is that by placing all but the principal object in a picture out of focus, attention is attracted to that object, and it is recognised as the leading feature. Now, as a matter of fact, does the fineness of detail in any part of a picture cause that part to strike the spectator with the prominence implied by this argument? It does to some extent probably, but the idea that fine detail is so potent in attracting attention, causing the part where it is present to be recognised as the leading feature of the composition, is probably due to the confounding of fine detail with decision of outline or harshness, both happening to be described by the word sharpness: photographers understanding detail by the term, whilst painters use it in the sense of decision of outline. If the part of the picture which is the sharpest photographically—being in best focus that is—is thereby really made so predominant, we must take it that in Dr. Emerson's *Barley Harvest* the corduroy trousers and hobnailed boots of the sitting figure constitute what Mr. Everitt calls the *motif* of the picture. The sharp contrast between the faces of the figures and the sky will, I think, be generally felt to lead the eye to that part of the photograph, rather than to the boots, although the faces are not, photographically speaking, so sharp—not so finely detailed that is—as the hobnailed soles of the boots.

The difference between the two senses in which the word "sharpness" is used, which was pointed out in the previous paper, is illustrated in this photograph. The corduroy trousers of the sitting figure close to the boots are in good focus, finely defined, and therefore what a photographer calls sharp. The upper part of the figures and the scythe stand out sharply, as a painter would say, against the sky; and although not in the best focus, and therefore photographically not so well defined or "sharp" as the trousers, are more immediately striking as the leading theme of the picture.

A real gain that may arise in some special cases from the use of such a large diaphragm as to throw part of the picture out of focus, is when some foreground object has its outline obscured by lines in the background. Suppose the case of a horse with foliage behind. In nature we have the help of colour to enable us to separate the one from the other, but in the photograph the leaves and twigs are in places so much of the same depth of tone, that the outline of the animal is either partly lost, or at all events requires to be looked for. Now there are several artificial means which may be adopted quite legitimately to separate more distinctly the foreground object, which we wish to represent, from the background. One plan is to light a fire where the smoke will blow between the two planes and thus dim the lines of the background. Another artifice that may be employed is to use the so-called naturalistic focussing, to use, that is to say, a stop large enough to put the background much more decidedly out of focus than it is seen by the eye to be. This method, indeed, will most likely be employed without the special intention mentioned when photographing anything so restless as animal life.

Other cases where advantages may be claimed for an out-of-focus representation, are where it is desired to idealise, as, for instance, in portraits or studies from the life, when the irregularities and asperities commonly existing on the skin are felt to be blemishes that it would be better not to include in the picture. There is no doubt, too, that we often see these skin marks more prominently in the photograph than in nature. The more perfect is the photograph in lighting and half tone, the less will such asperities obtrude themselves, and it is of course open to argument that the crudeness and harshness due to imperfections of the photograph are more objectionable than the absence of the fine definition seen in nature, and that if losing the detail will enable us to obscure the harshness, it is legitimate to do so. The use of orthochromatic methods and greater perfection in the photographic registration of half tones, will help to overcome the objection to detail, although, of course, where it is desired to idealise, and to obscure what are considered to be defects in the original, artificial means of some sort must be resorted to, and throwing the image out of focus is one such means. In subjects of a portrait character we find that artists more frequently avail themselves of the licenses both to use a certain amount of blurred definition in the subject, and a good deal of indistinctness in the background, than is customary in landscape and other paintings.

A departure from perfect definition of an opposite character to that implied by differential focussing was introduced by Professor Petzval in 1859. He showed how by separating the components of the back lens of one of his combinations the sharpness of the focal plane was destroyed by the spherical aberration thus introduced, and that out-of-focus planes not having sharp ones to contrast with, the blurring that existed in them did not strike the eye so prominently. He was careful, however, to describe this quality, which he called depth of focus—using the expression, however, with a different meaning from that of increased definition now generally understood by it—as an imperfection of the lens, and gave no countenance to the idea that there was any real gain of detail in the out-of-focus planes, but only an apparent gain by absence of contrasting sharpness anywhere. This line of argument has also been adopted by Mr. W. K. Burton and others.

Pinhole photography is another way—quite opposite to differential focussing—of obtaining a blurred effect. If the pinhole is small, the blurring is small also, and in a large photograph may be scarcely noticeable at all. A good deal may be said in favour of pinhole photography, particularly on the ground of the equality of definition all over the picture, and absolute freedom from distortion. An objection of course exists in the length of exposure necessary, but this does not come into the present discussion.

With respect to the image given by the pinhole, Mr. T. R. Dallmeyer, in a paper read at the Camera Club Conference, started a very strange proposition to the effect that the image given by it tended to exaggerate foreground objects. Dr. Emerson, in *Naturalistic Photography*, had very justly observed that "the drawing of pictures taken in such a way would obviously be correct." He now appears, however, to have assumed that that there was some foundation of scientific fact for Mr. Dallmeyer's proposition, for in *Photography* of August 21 last he writes that "the 'pinhole' picture is inadmissible, because the smallness of the aperture falsifies modelling and perspective."

When we are told that the details in all but one plane of the picture are too finely defined in photographs generally, and that it is more artistic to have them decidedly out of focus, we are naturally led to look to the works of recognised artists—painters and draughtsmen—to see how they represent nature. We then find that, with the exceptions before mentioned, painters generally give us a fineness of detail throughout the picture which we cannot in most cases rival in the photograph except near to the focal plane, simply from the fact that the use of such a small stop as would be required to imitate in this respect the handiwork of the painter would necessitate too long an exposure.

Take as examples familiar to photographers, the photogravures of paintings now on exhibition at the Pall Mall Gallery. In the *Al Fresco Toilet*, by Luke Fildes, we see not one face, but all the faces and figures, and not merely these, but the background, and even the vine leaves in the corner, so well defined that if a photographer were to try to get equal definition in a study of figures similarly arranged, he would have to use such a small diaphragm that the lengthy exposure would almost certainly involve movement of some of the subjects. Take the painting of *Diana or Christ*, by Edwin Long, R.A. Will any one pretend that if he had a group of figures and natural background—the living scene in fact—thus arranged, he could use a small enough stop in his lens to get the figures throughout so well defined as they are in this painting? Then look at the landscape by R. W. Leader, A.R.A., and see whether the definition throughout is more like that of the "naturalists" or of the photographer who tries to get as good focus as he can throughout the picture. These paintings are not exceptional in respect of detail, but represent the great majority of work of the best painters—subjects of a portrait character excepted—as before mentioned. If, therefore, Dr. Emerson is right in condemning the photographers who get what definition they can throughout the picture, he also condems the painters whose work we naturally look to as ideals for photographers to imitate artistically. It is not to the point to say that photography will define more minutely than artists paint. This argument only

applies to the part in focus, and does not apply to the great part of the picture, which, according to "the naturalists" contention, should be more or less out of focus. Moreover, although at the one plane the representation may be more minute in detail than the painter would think it worth his while to imitate, the difference in this respect is not necessarily either an objection, or even noticeable at ordinary viewing distance.

The fine definition of details in parts not desired to be prominent is often spoken of as though prominence was mainly due to the presence of fine detail. This is not necessarily so, and it is indeed, generally speaking, due to the character of lighting or amount of exposure rather than to focus that details become objectionably prominent.

Criticism of particular pictures is distasteful and not conclusive, because a principle may be right or wrong, independent of the character of individual results. Dr. Emerson, however, so challenges criticism by such statements as this is just as it should be, that one may be excused for specifying what seem to us to be faults in the models he puts before us. With regard to the photograph, *Where Winds the Dyke*, one of our members, at a former meeting, remarked that if the lower part of the picture were covered, it could not be told what that which does duty for a tree was intended to represent. With such criticism possible it certainly seems to be juggling with words to say that out-of-focus effect must be used, but not to the extent of interfering with structure. The *Marsh Pastoral* is certainly a pleasing picture, but rather, I think, in spite of that out-of-focus characteristic of one side of the picture than in consequence of it. If the sheep to the right of the picture had been in better focus, I believe the picture would be better, and certainly more like paintings such as those of H. M. B. Davis, for instance. Taking the work of painters generally, do not the photographs of Gale, England, and Bedford more nearly resemble them in general definition than do such productions as we are now bidden to look upon as the embodiment of the picturesque? Do they not also enable us to see better what exists in nature? If on both hands the answer is they do, let us, at all events for general work, not abandon the old models for those now attempted to be set up.

A preference for the representation of the details of nature, as a general rule, does not involve a denial of beauty of its own kind, as belonging to such works as those of Mr. G. Davison and the series of large head studies shown last year by Mr. Lyonel Clark. How far this special kind of beauty is esteemed in comparison with the beauty of the more fully expressed details of nature as seen in a finely focussed photograph must be very much a matter of individual taste, and in any case we may admire the artistic power displayed in the selection and treatment of a subject, even if holding the view that a smaller pinhole would have yielded a result still more gratifying to one's own taste.

Don't use or be misled by catch words. "Pictorial definition" is an expression that has been taken up on the assumption that some sort of definition other than that recognised as being in focus, is entitled exclusively or particularly to the designation pictorial. "Biting sharpness," as applied to photographic lenses, is another catch word. The expression will not bear analysis, but it suggests something unpleasant in connexion with fine detail, which may lead away the judgment of the casual hearer to the idea that unpleasantness is inherent in finely detailed work.

There are subjects and occasions, as has been stated, where a loss of detail may be desirable, but these are, in my view, the exception. With these exceptions, and with the understanding that "sharpness" is used in the photographic sense of fine detail, and not the painter's sense of accentuated outline, I believe that Captain Abney's proposition is thoroughly sound—that photographs should be sharp all over, and that a near object should be as sharp as a far-off one.

W. E. Debenham.

THE PREPARATION OF THIO-SINAMINE FOR POSITIVE DEVELOPMENT.

1. Preparation of allyl-sulphocyanate, or oil of mustard, C_3H_5CyS. Take black mustard seeds, bruise and macerate twelve hours with five parts of water; distil till no more oil passes. Separate the oil, and use the aqueous distillate, which contains some oil in solution for macerating fresh seed.

The crude oil is dehydrated by calcium chloride, and redistilled till colourless. It boils at 145° to 150°. The distillation should be effected in a draught cupboard, or other means taken to avoid contact with the vapour of the oil, which has a very unpleasant effect upon the nose and eyes.

2. Saturate the oil with ammonia gas, or mix it with three to four times its volume of strong aqueous ammonia. Set aside until it crystallises, and filter. The mother liquor should be boiled to expel ammonia, and evaporated.

Thio-sinamine, or allyl-sulphocarbamide, $N_2CS\,C_3H_5H_3$, is in shining, white, inodorous prisms, having a bitter taste. It melts at 70° to 74°, and is easily soluble in hot water, alcohol, or ether.

A. Percy Smith, F.I.C., F.C.S.

NATURALISTIC DEFINITION.

[Communication to the London and Provincial Photographic Association.]

Naturalistic definition cannot be in a greater degree a question for photographers than for the professors of any other graphic art which aims at the gratification of the sentiments through the organ of vision. Therefore, I cannot conceive of the question being conclusively settled on any parallelism between the human eye and photographic lenses, and it is matter of considerable satisfaction to find the subject removed this evening from the field of optics to its more legitimate one, that of æsthetics.

In considering this question of naturalistic definition, it will be well to clear the ground of all useless surroundings, and as it is before all things a fine-art subject, it is desirable to determine, if possible, what are the purposes of fine art. In the art of portraiture it is the endeavour of the artist, and within the possible scope of his art, to appeal to the beholder, not only with the more or less truthful representation of his sitters, but also of their mental as well as their physical characteristics. It must be quite understood that in saying this I am merely repeating accepted axioms based on the works and customs of the most celebrated portraitists of all times. If these axioms be accepted now, and the works I have alluded to be studied in relation to the question before us, it will generally be found that every other object or accessory in the portrait but the person represented is duly subordinated to it. That the result has often been admirably effected by photographers goes without saying; and I suppose this success has not a little depended on the possibility of adjusting their greatest powers of definition to the features of their sitters, letting other and subsidiary matters remain more or less out of focus.

Now I think it must occur to most of us contemplating this question of definition from the æsthetic standpoint that a parallelism to the rules applying to portraiture must be looked for to some extent as holding good in the treatment of other subjects in art. Let us take, for instance, a group of figures, pre-supposing of course that these have been selected and posed with some regard to linear harmony and composition; it would seem that the first consideration is to represent them as in relation to one another in a contributory sense to some action or sentiment. If this be allowed, it follows, as in the case of portraiture, the environment, though contributory to the general effect desired to be produced, must be of secondary import, and not necessarily so well defined as the figures themselves. Indeed, the importance of the group is really emphasised, not by the actuality of the surroundings, but by their suggestiveness. Of course, one is not prepared to say that this has been invariably the mode of treatment adopted in all artistic representations at all times, but I think it must be allowed that the purposes of illustration are best served by filling the mind of the spectator with the main subject of the pictorial drama, rather than equally with the accessories, as much is gained by telling the story, whatever it may be, with directness. If this principle of due subordination has not been adhered to in the methods of all painters, it must be borne in mind that circumstances alter cases, and the pictorial is not suited to all purposes of art, and it is enough for us to remember that it is the principle invariably followed and adhered to in that most important school of *genre* painters to which photography, in scale and general range of subject, may be most naturally affiliated—I mean the Dutch school.

In the treatment of pure landscape there are, and always will be, those who ignore art altogether, and insist that the physical fact is of the same or greater importance than the mental aspect. With these we happily have nothing to do. We will rather deal with those who, not content with subordinating the receding planes in deference to an agreeable aerial perspective and the custom of the greatest landscapists, would, by means of a pinhole or other blurred focus, make the entire work accessory, so to speak, to a plane of greater or less definition in the beholder's brain. This may be conjuring, but it can scarcely be called fine art, whose highest attribute is to call up sympathy between the beholder and the creative or interpretative spirit. The class of works I am alluding to are called "impressionist," and besides their not being in general convincing to the spectator, cause him frequently to doubt whether they truly reflect the conviction, if any, of the artist himself, so that that sympathy I have

stated as a characteristic attribute of fine art rarely, if ever, can have effect. It has always seemed to me that the laws of harmony in the graphic and glyptic arts are as inexorable as those which govern that of music; and it may justly be observed that the aim of the greatest composers, however variable in their harmonies and instrumentation, have held the end constantly in view that their greatest art is in contributing and giving value to thematic expression. Neither Beethoven, Schubert, Mendelssohn, nor Wagner blurr their main idea or motive, but strive to impress it on the ear and mind by the judicious background of contributive harmony.

Whether photographers will continue to take notice of the erratic works that have brought about this discussion, or allow themselves to be seriously influenced by them, is for the photographers to decide; but the aspects of the question to the outside public, if worth consideration, are simply these:—In the first place, whether the highest aim of one art can be allowed to be the more or less feeble imitation of another? (I refer here to some recent public exhibits); and, secondly, whether photography is properly understood by photographers whose foreground definition is so suggestive of fog? Also, whether they are not throwing away the substance for the shadow who, parting with that legitimate charm of photography, and wherein it must excel any other of the graphic arts—*i.e.*, in definition and detail—are not falsifying their art and stultifying themselves in the unstopping of their lenses or discarding them altogether for the blurred focus of a larger or smaller pinhole?

PHILIP H. NEWMAN.

ZEISS' NEW OBJECTIVES.

I.—TRIPLET (*Achromate and Apochromate*).

In the new triplet the functions of collecting on the one hand, and correcting the spherical and chromatic aberration on the other, are distributed between two separate elements of the optical system in such a way that the function of collection is allotted to two uncorrected collecting lenses, while the elimination of the chromatic and spherical aberration is entirely effected by a double or triple cemented combination of either positive or negative focus inserted between the two former lenses. It of course follows from the circumstances of the case that the selection of the glass employed for such a type of construction is variable within wide limits.

Those instruments in which the correction of focus difference is effected in the manner hitherto customary are termed by Zeiss "*triplet achromates*;" those in which the new kinds of glass are employed, and which being distinguished by an almost proportional dispersion, permit three different coloured rays to be combined, are termed, according to Abbe's nomenclature, "*triplet apochromates*."

1. *Testing the Triplet Apochromate.*

The instrument tested bore the manufacturer's number (35), and was free from focus difference and spherical distortion. The largest lens aperture was 88 mm., and the aperture of the largest diaphragm 50 mm. The effective aperture was determined by Steinheil's method, and found to be 68 mm. From this the relative aperture was deduced and found to be $\frac{1}{6.7}$, which agrees sufficiently near with the number $\frac{1}{6.4}$ given on the diaphragm. The diameter of the maximum fully illuminated field was 113 cm., which gives the angle included by the objective as 117°; with the smallest stop the definition increases towards the edge, but the diameter of the field illuminated then decreases to 85 cm., which corresponds to an angle of 92°. This would permit of the employment of a 50 × 60 cm. plate.

A number of practical tests were made with large plates, both in the studio and in the field.

For use in the portrait studio the objective was of course slower than the Petzval portrait-objective and portrait-euroscope hitherto in use, which have a relative aperture of one-quarter and over; but it proved itself to be quite sufficiently rapid for portraits and groups in the studio all the same.

Groups were taken on a 18 × 24 cm. bromide plate with a stop *f*·9 and two seconds' exposure. The result showed a satisfactory distribution of definition and noticeable depth.

For landscapes and buildings a stop of one-fiftieth was used with the same objective. An exposure of from one to two seconds, with good light, sufficed to bring out complete detail all over a 30 × 42 cm. plate, the definition being satisfactory right up to the edge, a fact which could be very well seen, as the whole field was occupied by buildings. The triplet apochromate was further tested in the reproduction of engravings by the wet-collodion process. The reproduction was first of all made upon a reduced scale with a field 19 × 13 cm., the result being complete definition throughout, while for reproductions in which sharpness of line was less rigidly demanded, a size of 30 × 28 cm. showed adequate sharpness throughout. The triplet apochromate gave good reproductions of coloured objects with above size.

The objective was free from "*light spot*," and distinguished by equable depth up to the edge of the field.

2. *The Triplet-Achromate.*

This instrument bore the manufacturer's number (15), and had a maximum aperture of 58 mm., the largest diaphragm having a diameter of 42 mm. The testing showed that the effective aperture (Steinheil) had a diameter of 42 mm. The focus was found to be 252 mm., which agrees sufficiently close with the 250 mm. indicated.

The relative aperture turned out to be one-sixth, agreeing sufficiently close with the ratio $\frac{1}{6}$, given. The objective was free from focal difference and spherical distortion. The diameter of the largest field included was 70 cm., corresponding to an angle of 109°; on employing the smallest stop, the field was diminished to 48 cm., corresponding to an angle of 87°.

In the studio the instrument behaved similarly to the triplet apochromate, but gave, however, a smaller image, being as it is a smaller objective.

With diaphragm *f*·9, the objective of the size tested gave good results with cabinet size. For landscapes and buildings, the stop *f*·50 was found to give a well-defined image of 26 × 32 cm.

Here also the equable distribution of definition up to the very edge of the field when the smallest stop is used is very noticeable. The objective was free from light-spot, though when the landscapes were taken the sky was free from clouds.

II.—TESTING THE WIDE-ANGLE ANASTIGMATE.

Two objectives of this type of different sizes were tested. The type is completely unsymmetrical. The curvature of the front lens is slight, and it is considerably smaller than the back lens, which is of high convexity and about double the diameter of the front lens. The revolving diaphragm is situated between the two pair of lenses.

(*a*) *Wide-angle Anastigmate* (*f* = 240).

This instrument was the larger of the two tested. Its number was 38, and the front lens had a diameter of 30 mm. (without setting); that of the back lens being 62 mm.

The practical testing of the focal length gave 244 mm., consequently a sufficiently near agreement with that indicated, namely, 240 mm.

The diameter of the largest stop or aperture in the revolving diaphragm was 13 mm., the effective aperture being found to be 14 mm. The relative aperture (240 : 14) was consequently $\frac{1}{17\cdot1}$.

The maximum field was 70 cm., corresponding to an angle of 110° to 111°.

The objective was free from focus difference and spherical aberration.

For buildings, the instrument was employed with the smallest stop but one (*f*·50), and an exposure of one to two seconds. Very good definition was obtained with 30 × 40 cm. plate.

For landscapes, somewhat less sharpness is required, and a larger plate can consequently be employed.

The instrument may be used for reproducing engravings, although the small degree of brilliancy makes the treatment of delicate engravings difficult.

The wide-angle anastigmate is thus mainly suited for landscapes and architecture, in which connexion must be pointed out its complete freedom from reflex images, even when a considerable amount of clear sky is included in the field of view.

(*b*) *Wide-angle Anastigmate* (*f* = 120).

This instrument (No. 53) was similarly constructed to the preceding, and was designed for 18 × 24 cm. plates.

The objective was free from focus difference and spherical aberration.

Testing the focus gave *f* = 121 mm., i.e., complete agreement with the focus indicated (120 mm.).

The diameters were: front lens, 14·5 mm.; back lens, 30 mm. The largest diaphragm had an aperture of 6 mm.; the effective aperture was, however, 6·5. The relative aperture deduced from these data was consequently $\frac{1}{18\cdot4}$. The largest field had a diameter of 83 cm. corresponding to an angle of 106°.

Both interiors, landscapes, and buildings were well taken with this wide-angle anastigmate. Plates of 18 × 24 cm. could be used with the smallest diaphragm.

This instrument is particularly remarkable for its equable distribution of depth.

It is especially suitable for buildings and interiors. For the former, the exposures were one to two seconds; for the latter, half to two minutes.

III.—Anastigmate, 1 : 6·3, f=150 mm.

The rapid anastigmate (No. 75) is a wide angle for instantaneous work, and consists of five lenses—a double cemented front, and a triple cemented back combination. The largest lens diameter is equal to the largest effective pencil of light, and stands to the focal length in the relation of 1 : 6·3 as indicated on the objective itself.

On testing, it was found to be free from focus difference and spherical aberration. The focus was found to be f=151 mm., which may be considerered in complete agreement with the 150 mm. given. The front lens has a diameter of 25 mm., the back lens of 21 mm. The largest stop has a diameter of 20·5 corresponding to an effective aperture of 22 mm., from which results the relative aperture $\frac{1}{6·3}$. The objective unstopped has an effective aperture of 22 mm., corresponding to a relative aperture of $\frac{1}{6·3}$. The diameter of the field with largest stop is about 27 cm., corresponding to an angle of 84°. With the smallest stop the diameter is 24 cm., corresponding to an angle of about 75°.

This objective gives *perfect definition* with the largest diaphragm ($f=\frac{1}{6·3}$) over a field of 7½ × 9½ cm. With the smallest diaphragm it gives perfect definition over a field of 13 × 18 cm.

The instrument is very rapid, and is excellently suited for instantaneous work out of doors. With the smallest stop it approaches the wide angles, but is more rapid than they are.

IV.—Anastigmate 1 : 10, f=260 mm.

This anastigmate is a rapid wide angle. The back and front lenses are close together, and the angle included is 100°.

The objective tested (No. 130) was free from focus difference and spherical distortion with focus approximately 260 mm.

The measurements were: front lens diameter, 26 mm.; back lens, 24 mm.; largest stop, 18 mm.; the relative effective aperture corresponding to which was $\frac{1}{17}$. The maximum field with largest stop had a diameter of 63 cm.; with the smallest stop it was 56 cm., the corresponding angles being 100° and 94° respectively.

For instantaneous work out of doors this objective proved itself to be an instrument of the highest order. With full aperture it gave instantaneous views of streets of 18 × 24 cm. size with perfect definition.

Views of buildings 18 × 24 cm. were taken with the smallest diaphragm but one (f-50) and turned out perfectly sharp; while landscapes 30 × 40 cm. and over could be successfully taken with the smallest diaphragm.

The instrument is excellently suited for reproductions, owing to the correctness and definition of its lines; and on smaller plates (*e.g.*, 18 × 24 cm.) it is well suited for reproducing engravings. For larger reproductions larger objectives of this type would doubtless, to judge from the tests applied to the smaller instrument, give good results.

This wide-angle anastigmate is excellently adapted for buildings, landscapes, reproductions, and instantaneous work. The reflex images, too, are very favourably situated, so that brilliant negatives may be obtained, and no light spot is observable. Dr. J. M. Eder.

—*Photographische Correspondenz.*

Our Editorial Table.

New Jena Glass Lenses.

By W. Wray, Highgate, London.

Mr. Wray has been constructing a new series of lenses for detective or hand cameras of Jena glass, having foci varying from four inches to six inches, and he sends one of the latter for critical remarks. As the majority of cameras of the class for which this lens is constructed does not exceed the quarter-plate size, we tried it on such an one, and found that with an aperture =f-8 it defined with great sharpness all over the plate. As it behaved so well when on the small camera, we tried it on a larger one, and found that it covered an 8½ × 6½ plate well, in this latter case employing, of course, a small diaphragm. The sample sent us is neatly fitted with an iris diaphragm of great scope.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 17,636.—"The Summerfield Adjustable-Extension Camera." G. L. Summerfield.—*Dated November* 4, 1890.

No. 17,662.—"Improvements in the Means of Focussing by an Adjustable Flange." F. Shew.—*Dated November* 4, 1890.

No. 17,936.—"Improvements in Apparatus for Supporting Photographic Negatives during Development." L. Helliwell.—*Dated November* 7, 1890.

No. 17,990.—"Improvements in Instantaneous and Time Shutters for Photographic Purposes." J. L. E. Daniel.—*Dated November* 8, 1890.

No. 18,029.—"An Improved Photographic Printing Frame." W. H. Smith.—*Dated November* 8, 1890.

PATENTS COMPLETED.

Improvements in Photographic Cameras.

No. 5860. Harry Ransom, 122, Newington Butts, London.—*October* 18, 1890.

This invention relates to improvements in photographic hand or detective cameras whereby a number of plates may be successively exposed in a simple and convenient manner.

In carrying out my invention I provide a rotating shaft or cylinder, to which is hinged a number of sheaths or holders, in which the sensitive plates or films are placed. The cylinder is adapted to be rotated in a suitable case or box, and is advantageously formed with as many sides as there are plate holders, say twelve for example; the sheaths or holders are flexibly hinged to the cylinder, and a suitable ratchet arrangement is provided to allow of the cylinder being rotated one-twelfth of a revolution, each movement bringing a plate in a proper upright position opposite the lens and against a flexible frame, which helps to retain the plate in a rigid position during exposure, but allows the sheath or holder with the plate to be passed through it when the cylinder is turned, whereupon the plate, by its own weight, falls down clear of the lens, bringing the next plate into position for exposure.

In practice I find it advantageous to form my sheaths or holders so that they shall act as springs to clip the plate firmly, and to form them in parts adapted to slide one upon the other, so that they may be used for different sized plates.

I employ a drop shutter with suitable arrangements for operating the same.

In some cases I adopt an auxiliary lens outside the case, adjusted and working with the operating lens, whereby I am enabled to accurately focus the object to be photographed.

Improvements in the Method for Producing Intense Light by Magnesium or by other Glowing Materials.

No. 11,784. John William Charles Cowen Schirm, 20, Potsdamerstrasse, Berlin, W., Germany.—*October* 18, 1890.

One of the two methods hitherto known for producing magnesium light consists in diffusing magnesium powder from above into the flame, while, with the other method, the lightening material is supplied to the flame from below or sideways. Though the latter method, owing to its comparative economy in the material employed, is to be preferred to the first-named, it still involves great waste of material, as a proportional diffusion of the magnesium over the flame cannot be attained, and consequently a portion of the luminous material fails to receive full glowing heat.

The said waste of material is intended to be effectually obviated by the improved method, in which the magnesium is not, as in the above methods, supplied to the flame from outside, but mixed with the current of gas before the latter reaches the mouth of the burner, while the velocity of said current is at the same time increased so as to expel the magnesium powder in a diffused state from the burner.

The claims are:—1. The method of producing intense light for photographic or other purposes, consisting in mixing luminiferous substance or substances, such as powder of magnesium, or equivalent material, with a current of gas prior to the arrival of the gas at the mouth of the burner, and diffusing said luminiferous material, and expelling the mixture from the burner by the pressure of the gas proper, substantially as and for the purpose specified. 2. The method of producing intermittent or flash light, consisting in mixing luminiferous materials with a current of gas, or other combustible vapour, prior to such current reaching the mouth of the burner, diffusing them, and conducting the mixture to the burner or flame by means of a pressure produced by a gas or vapour-compression device, which is in communicating connexion with the burner tube, the whole combined and operating substantially as illustrated and described.

A Photographic Posing Chair.

No. 13,381. James McKenzie Dow, Ogdensburg, St. Lawrence, New York, United States of America.—*October* 18, 1890.

This invention relates to posing chairs, more especially adapted for photographers, although equally adaptable to other purposes, and it consists in part of the combination with a suitable seat of a series of adjustable parts, rest supports, and braces, adapted for varied and independent adjustments for the head, back, arms, &c.; also in the construction and arrangement of said head, back, and arm rests, combined with other parts, whereby an independent vertical and lateral adjustment may be had; and, thirdly, in the construction and combination of the several parts, whereby such chairs may be utilised with a greater degree of efficiency than when otherwise constructed.

The object of the invention is to provide such chairs with such parts and adjustments that the subject to be operated upon may be posed more properly, and to the desire of the photographer or other person posing, or being posed, than by any other means, and at the same time ensure the greatest amount of comfort to the party being posed.

The details may be deduced from the claims, which are as follows:—1. The combination with a suitable seat, of supporting rods extending around said seat, and secured thereto, vertical supporting rods for the back and head rests, loosely mounted on said supporting rods to slide and fulcrum thereon, whereby said vertical supporting rods may be adjusted laterally, and means for adjustably supporting the lower ends of said vertical supporting rods in a manner to allow the same to be adjusted backward and forward, substantially as described and for the purpose set forth. 2. The combination with a suitable seat of horizontally arranged supporting rods, extending around said seat and secured thereto, couplings supported on said supporting rods, and provided with tension springs for engagement with said supporting rods, and vertically arranged head and back rests supporting rods supported by said

couplings, substantially as described and for the purpose set forth. 3. The combination with a suitable seat or frame, provided with horizontally arranged supporting rods extending around the same and supported thereby, of vertically arranged supporting rods adjustably supported in couplings, said couplings being loosely mounted on said horizontally arranged rods, and means for adjustably supporting the lower end of the said vertical supporting rods, whereby the back and head rests may have a vertical, lateral, and backward and forward adjustment, substantially as described and for the purpose set forth. 4. In a posing chair, the combination with a suitable seat or frame and two or more supporting rods secured thereto, of tubular rods mounted on said supporting rods, and having an adjustable connexion at their lower end with horizontally arranged serrated rods, which extend, and are loosely supported at their free end beneath said seat or frame, and a dog supported by said seat or frame adapted to engage said serrated rods, substantially as described and for the purpose set forth. 5. In a posing chair, the combination with a seat or frame, provided with supporting rods secured thereto, of tubular rods, adapted for the support of the back and head rests, loosely mounted on said supporting rods, and connected at their lower end with horizontally arranged rods, and sleeves pivotally secured to swivelled frames, supported by the said seat or frame, and adapted to loosely support the free end of the said horizontally arranged rods, substantially as described and for the purpose set forth. 6. The combination with a suitable seat or frame of supporting rods, extending partially around the same and secured thereto, vertically arranged, supporting rods loosely mounted thereon, and horizontally arranged serrated rods, to one end of which said vertical rods are attached a dog adapted to engage with said serrated rods, and springs, located on said vertically arranged supporting rods, adapted to keep the said horizontal rods connected thereto, in engagement with the said dog, substantially as described and for the purpose set forth. 7. In a posing chair, the combination with a seat or frame, provided with supporting rods, extending partially around the same and secured thereto, of vertically arranged rods, supported by said supporting rods in couplings, to have a vertical and lateral adjustment thereon, and horizontally arranged toothed or serrated rods, to which the lower end of said vertically arranged rods are attached, and a sleeve and dog, having a swivel connexion with said chair or frame, adapted to adjustably support and engage with the said horizontally arranged rods, substantially as and for the purpose set forth. 8. In a posing chair, the combination with a seat or frame of vertically arranged supporting rods, pivotally supported by said seat or frame, at a point between their ends, and horizontally arranged rods connecting with and supporting the lower ends of said vertically arranged rods, and sleeves pivotally secured to the chair or frame, or a part thereof, for the support of the free end of said horizontally arranged rods, substantially as described and for the purpose set forth. 9. The combination in a posing chair, with a seat or frame of pivotally supported, vertically arranged rods, horizontally arranged toothed or serrated rods, connecting with the lower ends of said vertically arranged rods, a dog for engaging said toothed or serrated rods, and a spring adapted to exert an elastic pressure upon said serrated or toothed rods, to keep the same in engagement with the said dog, substantially as described and for the purpose set forth. 10. In a posing chair, the combination with a suitable seat or frame of a rotatable vertically and horizontally adjustable arm rest, substantially as described and for the purpose set forth. 11. The combination, with a stationary plate, of a compound sliding, pivotal, and clamping disc, consisting of a plate or disc, provided with a longitudinal opening therein for the adjustable reception of a rod, a transverse opening communicating with said longitudinal opening, a clamping plate, adapted to be seated in said transverse opening, and a set screw for adjustably supporting and operating said secondary disc and said clamping plate, substantially as described and for the purpose set forth. 12. A head-rest for posing chairs, consisting of two arms, adapted at one end for the support of the head or other object, and at their opposite end have a separate pivotal connexion with a supporting plate or disc, and a set screw for adjustably clamping said supporting plate or disc on a stationary plate or disc, with the pivoted ends of said arms between the adjacent surfaces of the same, substantially as described and for the purpose set forth.

Improvements in and connected with Photographic Cameras.

No. 17,318. Frank Miall, 12, Sheldgate-road, Battersea-rise, Surrey.—*October* 15, 1890.

My improvements in photographic cameras consist of an outer box or case, preferably of a rectangular shape, within which are two boxes and a traversing carriage, and fitted with suitable view-finders.

The top box, which is placed in a horizontal position, I call the discharging box, which has formed on or in its inner surface suitable grooved recesses to receive the studs or projections, which are on the exterior surface of suitable carriers which contain the sensitive plates or films to be exposed. On the outside of the discharging box are one or more pieces, on which are formed studs or projections, which project into the inner sides or ends of the box to engage with and hold each carrier alternately as required, the outer portion of such pieces to be fashioned so as to be actuated by the traversing action of the carriage; on the top of the discharging box is a sliding lid, which has on its under or inner surface a spring, and on the bottom of the box is a hinged or pivoted bottom, on the inner surface of which is formed suitable guides to receive the carriers containing the sensitive plates or films.

The lower box, which is placed in a vertical position, I call the receiving box, and has on or in its inner surface grooved recesses to correspond with the discharging box, and is fitted with a sliding lid, on the inner surface of which is a spring, and on the exterior has suitable catches to retain the carriers with the sensitive plates or films after having received them.

The traversing carriage is formed so that it may engage in suitable runners or grooves formed in or on the inner surface of the outer box or case, and so travel in a limited direction backward and forwards, on the sides of which carriage are pivoted one or more levers, the other ends of such levers being pivoted on the outer surface of the hinged bottom of the discharging box, or these levers may be dispensed with and the lid or bottom allowed to fall by gravity.

The traversing carriage is actuated by a stud or other suitable method from the outside.

The inner surface of the outer case is also provided with suitable guides to receive the projections on the plate or film carriers, so as to guide them in the passage from the discharging to the receiving box.

A box similar in construction to these boxes, which I call the store box, is also formed with grooved recesses on its inner surface to correspond with the grooves in the other boxes, and, furnished with a sliding lid, this box serves to convey the sensitive plates or films, each in its carrier, into the discharging box, and, when empty, to receive the exposed plates from the receiving box.

In the front end of the rectangular outer case is placed the lens, which can be adjusted from the outside for focussing purposes by either a rack and pinion, cam, levers, or other suitable method.

The covering and uncovering of the lens is effected by a segment of a circle having an opening in the centre and opaque ends, so that the lens is always covered, except at the moment of exposure; the segment of a circle, which may be made of metal or other suitable material, is pivoted at the centre from which the radius is struck, and actuated by either rack and pinion or levers, pivoted at suitable distances from such centre that will cause it to oscillate at will.

Plates or films that are not contained in carriers can also be used in this camera if simply backed with paper or other opaque material; the side grooves on the rectangular case in this method are so formed so that at one portion of the passage of the traversing carriage they can be partially withdrawn to allow the plate to pass into the receiving box, and also no grooves are required in the several discharging, receiving, and store boxes.

An arrangement, by means of cam, or lever, or screw motion can be adapted to the bottom of discharging box and to the edges of receiving box, whereby a motion can be given to the plate to throw it out of the perpendicular and actuated from the exterior if required.

The lens or front containing the lens can also be made to change its position either by means of screws, levers, or cams, or the like, and actuated from the outside.

A toothed or ratchet wheel, having on one portion of its circumference figures, thus forming an indicator to register the number of plates exposed, is affixed to the side or ends of discharging box, and a pawl which is actuated by the opening and closing of this box engages with this wheel, causing its revolution teeth by teeth.

A finder or finders, and also a focussing indicator fixed on that part which contains the lens, completes the camera taken as a whole, the exterior being covered with any material, and take such external appearance as may be desired by the user.

The to and fro motion of the traversing carriage is utilised for the setting and releasing of a suitable exposing shutter by means of levers, rack and pinion, cam motion, or the like.

The mode of using the camera is thus:—After the plates, by the withdrawal of the several lids, are transferred bodily and in a mass from the store box—which is temporarily fixed to the discharging box in a horizontal position to the axis of the lens—are then conveyed by the action of the traversing carriage to the vertical position and placed in the front of the receiving box, which retains them ready for exposure, and such action to be repeated plate after plate, until all be transferred from the discharging box into the receiving box and can then be removed from thence into the store box.

Improvements in Boxes for Containing and Changing Photographic Dry Plates.

No. 19,618. George Bramley and George Butterworth, Clay Cross, Derby.—*October* 18, 1890.

The improvement is in the means adopted to ensure the delivery into the dark slide of a single plate, and for this purpose we employ the following arrangement:—

A rectangular box with two of its opposite sides closed by means of sliding doors has fitted inside it a rectangular frame, whose outside dimensions are less either in length or breadth than the interior of box, so as to admit of a reciprocating motion being communicated to it by a button or push from the exterior of the box. Attached to one side or end of the frame is a lever pivoted by its centre to the frame, and one end attached to a portion of the box, so that on moving the frame an increased movement is given to the other end of the lever. This lever is so arranged that when the frame is at one end of its path it projects into the interior of the frame, and when at the other end is withdrawn underneath the frame.

At the opposite side or end to the lever there are attached to the box two slips of brass or other metal which lie under the frame, and when the frame is at that end of its path which causes the lever to project they also project into the interior of the frame, thus forming supports upon which the photographic plates can rest without falling through the interior of the frame.

Attached to the sides and ends of the box are guides which serve to keep the plates in such a position that they descend by their weight into the interior of the frame, and rest upon the two slips of brass and projecting end of lever.

The end of frame to which lever is attached must be equal to or slightly in excess of thickness of one plate, and the opposite end of frame must have its edge thinner than one plate, the reason being that the movement of one end forms a space for the end of a plate to be moved into, and the other end, by the movement of the frame, comes in contact with the lowest plate and moves it, and if too thick would come in contact with more than one.

With regard to remaining sides of frame the thickness is immaterial.

The opening in frame is not placed exactly to coincide with opening in bottom of box, but slightly overlaps in direction of the end where the lever is placed, so that the edge of lower opening forms a rest for the plates after the end of lever is withdrawn, and while the lever on the return motion of the reciprocating frame is pushing back the plate so that it may fall through lower opening.

At the same end of box as lever is a small latch of brass or other metal

which, being pivoted on end of box, has its loose end lying on frame, and by means of an inclined path formed in frame, falls when frame is moved to that end of box, and prevents more than one plate being dropped at once should they vary slightly in thickness.

The action is as follows:—Having placed the required number of plates in the box while in the dark room and closed the slides, when you require to remove one you place the dark slide of the camera in the grooves provided for it in bottom side of changing box, then press the button home, when the bottom plate is pushed off the projecting pieces of brass, and on releasing the pressure the plate is pushed by means of the lever and springs back under the projecting pieces until it falls upon bottom door of changing box, so that when this door and that of dark slide are withdrawn it falls into the dark slide.

After exposure in camera the dark slide is placed in top grooves of changing box, the slides or doors withdrawn, the catch of dark slide released, and the plate falls back into box.

The frame is moved in one direction by pressing the button or push and is returned by means of spiral or other springs.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 18 ...	North London	Wellington Hall, Islington, N.
,, 18 ...	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 18 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 19 ...	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 19 ...	Bury	
,, 19 ...	Hyde	
,, 19 ...	Manchester Camera Club	Victoria Hotel.
,, 19 ...	Edinburgh Photo. Club	5, St. Andrew-square.
,, 19 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 20 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

NOVEMBER 11:—Ordinary meeting.—The President, Mr. J. Glaisher, F.R.S., in the chair.

Captain W. de W. ABNEY read letters which he had received from Colonel Waterhouse containing specimens of prints from several negatives obtained by using carbamide in the developer (eikonogen). He had found that by the application before development of a five per cent. solution of nitric acid, or of a three or four per cent. solution of bichromate of potash, there was a great advantage in the clearness of the resulting picture, but that even greater clearness could be obtained by the use of bromide of copper similarly applied. Bichromate in the developer in small quantity also worked well. He found that he could scarcely give a sufficiently short exposure.

The PRESIDENT then presented to Messrs. Bhedwar, G. Davison, Lyddell Sawyer, Ralph Robinson, Wilkinson, and Green, Cross, & Bevan, the medals awarded at the exhibition, and votes of thanks were passed to the Judges and the Hanging Committee.

Mr. H. CHAPMAN JONES then read a paper on *Density Ratios as Affected by Development*. The paper described some experiments undertaken to ascertain the correctness of the statement by Messrs. Hurter and Driffield "that the photographer has no control over the gradations of the negative, the ratios of the amount of silver deposited on the film being solely dependent upon the exposure." The result of Mr. Jones's experiments, some of which were shown, and calculations, which were placed on the blackboard, negatived the proposition of Messrs. Hurter and Driffield, at the same time he did not wish to detract from the value of their experiments, and desired to express his thanks to them for the trouble they had taken in making so many estimates of density for him. He had sent these gentlemen an advance proof of his paper, in order to give them an opportunity of replying, which they had done in writing, and which reply he now read.

Mr. W. E. DEBENHAM said that it had been accepted by photographers generally that variations in development might be successfully employed to regulate the gradation in the plate. General acceptance of propositions did not, however, in photography, necessarily imply absolute correctness, and it was well, therefore, to have them called in question and examined. In the present case the accuracy of Messrs. Hurter and Driffield's denial of the power to affect the gradation of density in the negative after exposure seemed to be impeached by what many photographers believed they had experienced, a power to produce a negative showing gradation in the lights upon a plate which, with normal development, would have been sufficiently over-exposed to produce reversal of image. A weak point in photography was, as Captain Abney had put it, an absence of complete range of gradation at the two ends of the scale of light. If Messrs. Hurter and Driffield's proposition was correct, there was no hope for even a partial remedy for this evil by treatment with the developer. Then at the least exposed end of the scale he thought it undeniable that a very different effect on a normally exposed plate was produced if development was stopped early and intensity obtained by treatment subsequent to fixation from that which resulted when the details in the shadows were developed out to the full.

Captain ABNEY agreed with the arguments of Mr. Jones's paper. He believed that Messrs. Hurter and Driffield's calculations were mistaken owing to the use they made of logarithms. Almost anything might be cloaked under logarithms. A very small error in a logarithm would make a very great difference in the final result. Mr. Debenham had shown that the fact that reversal of image might be remedied within certain limits of over-exposure, proved that the gradation of density might be affected by development. In some of his own work in photographing mountain scenery in Switzerland he had found it necessary to greatly over-expose the lights, or there would be no picture of the shadows. With ordinary development such a negative would be useless, but by using the proper means the gradation was fairly rendered. If there was no control over the gradation of density the photographic world had been lying under a delusion for over forty years.

Mr. VALENTINE BLANCHARD thought that photographers had all experienced the control of gradation to be obtained by variations of development. On one occasion plates had been brought to him to be developed that had been exposed by a distinguished artist not acquainted with photographic details. They had been grossly over-exposed; but the first plate developed showing this, the remainder were saved by preliminary immersion in bromide solution and continuation of the development with a very small quantity of ammonia.

Mr. JONES said that Messrs. Hurter and Driffield's reply did not appear to attempt to meet any of the arguments that he had brought forward. He could not see that the truth or falsity of the statement that development cannot influence density ratios was affected by the fact that his investigations had been experimental rather than mathematical.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 6,—Mr. T. Bolas in the chair.

Mr. J. STUART, of Glasgow, showed some lenses by Zeiss in which the new Jena glass was used, the first of the make, he believed, that had been brought to this country. The angle of view covered was remarkably great. The work of one of the lenses of nine-inch focus was shown on a plate of 15 × 12, and it would even cover 22 × 16.

The CHAIRMAN remarked upon the exceedingly deep curve of the back lens, and Mr. J. TRAILL TAYLOR said that in that respect it somewhat resembled one of Darlot's former series, the hemispherical lens.

The CHAIRMAN considered it a triumph of optical skill to produce such a lens. Zeiss' microscopic objectives were extensively used in the histological schools in this country, and it was matter for congratulation that he had now turned his attention to photographic lenses.

Mr. STUART considered that one advantage was that the perspective seemed less violent than with other lenses of wide angle.

Mr. TAYLOR and Mr. W. E. DEBENHAM protested against the idea that one lens could give more violent perspective than another, the point of sight being the same.

Several members opposed the views of Messrs. Taylor and Debenham, and Mr. Stuart undertook to photograph the scene which had led to the present discussion with another lens, and send the two for comparison to a future meeting.

Mr. TAYLOR judged from the reports he had received from the Continent that Zeiss had achieved a very great success in the construction of these lenses.

Mr. STUART inquired whether there was any varnish that would prevent brown stains on the film when it became wet whilst in contact with silvered paper. He had tried several, and thought he had now succeeded, inasmuch as a plate had remained uninjured on the corner coated with this varnish after being exposed for a fortnight out of doors, in a place where much rain had fallen and soaked the paper.

Mr. ARCHER CLARK advocated the use of ground glass for glazing printing rooms, especially in the winter. The amount of light that passed through was, he said, marvellously greater than through clear glass.

Mr. STUART said that his experience was so much to the contrary that his printers would not use the ground glass portion of the printing room. Ground glass, too, took on discolouration or stain, in consequence of which he had had to renew it three times, while the plain glass which had been in use all the time was still good.

Mr. W. E. DEBENHAM then read a paper, *Is Blurring desirable in a Photograph?* [See p. 727.]

Mr. A. MACKIE said that Mr. Debenham stated that Dr. Emerson's condemnation of detail in other than one portion of the picture involved a condemnation of the work of painters as well as of photographers. As a matter of fact, Dr. Emerson did condemn painters. There were about half a dozen whom he selected as worthy of being considered artists, but the great body were condemned by him.

Mr. ARCHER CLARK thought that the faces of the men in the haymaking picture were quite sharp, as sharp as the boots.

The picture was then submitted to the judgment of Messrs. J. T. Taylor, J. Stuart, and A. Mackie, who unanimously decided that the faces were not sharp in the photographic sense of being finely defined.

Mr. DEBENHAM said that that just illustrated the point that he wished to make clear. Sharpness in the photographic sense existed in the boots and trousers, but these did not strike the eye on that account—as according to Dr. Emerson's proposition they should do—as being the leading feature of the picture. Sharpness, in the painter's sense of being strongly defined, did exist in the heads against the sky, and this portion therefore became the leading feature of the picture, although not in such good focus as the boots and trousers.

Mr. P. H. NEWMAN said that the observations which he had to make, and which he had put into the form of a paper [see p. 728], were prepared on the assumption that technicalities were not so much to be dealt with that evening as æsthetic principles.

The CHAIRMAN was inclined to think that photography could not emphasise one subject without the danger of making other subjects in the same focal plane, which it might be desired to subordinate, come out emphasised also, and it was a question with him whether efforts in that direction would not be more likely to meet with success if applied to the printing rather than to the taking of the negative.

Mr. TAYLOR said that any attempt to photograph some object in focus and other objects immedintely surrounding it and at the same distance not in focus must fail. Mr. Thomas Grubb long since directed attention to the desirability for certain subjects of focussing with a large diaphragm, as giving greater rotundity and a better picture. *Apropos* of Mr. Debenham's reference to the use of a veil of smoke to separate two planes of the picture, he remembered to have described in an American journal, some few years since, how he photographed some headlands in a scene in that way, keeping the fire, of course, out

of the view of the camera. It was a legitimate way of imparting aerial perspective. He also showed how the prominent objects and buildings at Charing Cross could thus be photographed without interference.

Mr. P. Evernit said that in taking the name of the paper Mr. Debenham had to a large extent misinterpreted Dr. Emerson. Dr. Emerson meant by naturalism the impression conveyed to the artist's mind by the scene before him, which was very different from Mr. Debenham's realism. It depended upon whether the observer saw with an artist's eyes.

Mr. George Newman:—It seems to me that the power of artistic expression in photography is one of the subjects of interest most talked about in the present day, and even at this meeting the difference of opinion is, on the surface, very great. Honestly, are we not all just a bit tired of it and anxious to be at something else? Viewing the matter as an outsider, one can hardly help thinking that there must be something very wrong somewhere, so wrong, that even after a whole fortnight's careful study one of the leading photographic societies of the world cannot decide how a photograph should look when done. The old story of the big cuckoos and the little cuckoos; but the simile, like the subject, is just a little stale now.

One photographic pamphlet tells us, in cold blood, that all detail in a picture is to be of equal sharpness. It necessarily follows from that statement that every object on the print may be converted into the principal motive at pleasure. What becomes of the fundamental rules of harmony with this happy starting-point? Then the other prophets at the opposite end of the stick—the pinhole and brown-paper gentlemen! There certainly is harmony of a sort in their productions—of the limited and smudgy sort. Then another sort, the naturalistic photography artists, the feeble imitators of artists of the Millet school, are they to be treated seriously? Well, even they also don't seem to be entirely approved of here, or, for that matter, in many other places. So where is one to choose where so many standards of infallibility are raised, each one with a terribly long-winded written warranty attached?

Starting with the assumption that to be a photographer one must be able to take photographs, one would have thought that upwards of fifty years would be ample time to settle all disputes as to the best method of taking them. But here we are at the beginning! I for one am certain that most of the so-called art talk that goes on week after week, month after month, does harm, not good, and is but a hindrance to good work coming to the front. An objection was made here last week to short remarks in general, but I cannot help thinking that they are very useful things to intensify with, and that they are perfectly legitimate weapons, when used as they were then, to bring to ridicule foolish and useless or cheap nonsense. If familiarity can breed contempt, certainly art, or what is taken currently for it—by these worthies—has been brought to its lowest stage of intimacy.

I say this because I mean it, and apologise to no one. To the school who will have nature and nothing but it, and say "That nature is to be taken as she is, I quote from the words of a man to whose gifts few can attain, and he says: "That nature is always right is an assertion as constantly as untrue as it is one whose truth is universally taken for granted. Nature is very rarely right to such a extent even that it might almost be said that nature is usually wrong; that is to say, the condition of things that shall bring about the perfection of her every energy a picture a man, and not common at all." How little this is understood, and how decidedly the round in nature is accepted as sublime, may be gathered from the unlimited admiration produced by a very foolish sunset.

The prophets whom for convenience I have called the feeble tinitatory school, would not need nothing but for one thing, and that is the fact of their writings being powerful because accepted of the timid ones were questioned, and so becoming self-existent, must grow less appreciated! "He stands in high places, he prophesies and holds forth." Sage of the conventicles, learned in many matters, and of much experience in all save his subject. Exhorting, denouncing, declaiming. Filled with wrath and contemptuous. Bringing powers of persuasion and pulpit of language to prove—nothing. Torn with mind teaching—having nought to teach. Impressive, important, shallow. Defiant, distressed, desperate. Crying out and casting himself—while the gods hear not. Gentle priest of the Philistine wetkel, again he ambles pleasantly from all points and through many volumes, escaping scientific assertion—"bubbles of green fields."

Why do we seek after new masters? Is not the story of the beautiful already complete? What is there to learn that the precepts hewn in the Marbles of the Parthenon will not ever repeat? With a multitude of new teachings surely we must be puzzled.

Mr. Debenham would like to have it explained why it should be assumed that impressions conveyed to the mind by a scene should be more truly conveyed by an out-of-focus or blurred representation than by one in which the details seen in nature could be discovered.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

On Friday evening, the 7th inst., the Photographic Exhibition at Pall Mall was, following the usual kindly custom, opened by the Photographic Society of Great Britain to be open for the benefit of the Photographers' Benevolent Association. Owing no doubt to the inclemency of the weather the attendance was smaller than on some previous occasions. At a quarter to nine an admirable selection of slides was shown on the screen by means of the optical lantern, the manipulators being Messrs. H. D. Acheson,—Carpenter, F. P. Cembrano, W. Davey, W. Farrington, T. E. Freshwater, H. M. Hastings,—Liddle, Poulton & Sons (J. S. Baffe, J. B. B. Wellington, and S. E. Wedlaston.

In the course of his opening remarks, Mr. W. Bedford, Chairman of the Committee of the Photographers' Benevolent Association, said that during the past year there calls had been made on the funds of the Association than in any previous year of its existence, more than 1000, having been granted in relief. This might be considered a matter for congratulation, as it showed that the Association and its objects were becoming better known. It was to be regretted, however, that the institution was not more widely supported by those who at some future time might be in such a position that they might be glad to avail themselves of its assistance. The minimum subscription was fixed at 5s. 5d. per annum, so that the humblest might subscribe without taxing his resources. In conclusion, he asked for a hearty vote of thanks to the Photographic Society of Great Britain for having placed the exhibition at their disposal, and to those gentlemen who had allowed their slides to be used. This was accorded by acclamation.

All persons connected with photography are eligible to subscribe, and, in time of need, to receive assistance from the Photographers' Benevolent Association. Full particulars may be obtained on application to the Hon. Secretary, Mr. H. J. Beasley, 65, Chancery-lane, E.C.

CAMERA CLUB.

November 6.—Mr. F. Howard in the chair.

Mr. J. Gale read a paper entitled *Country Rambles with a Camera*. There was an excellent attendance, and a very interesting lecture was delivered, illustrated by a great number of lantern slides.

Previous to the paper the Hon. Secretary drew attention to the evening exhibition at Pall Mall on behalf of the Photographers' Benevolent Association.

Mr. Gale commenced his address with notes concerning some of his favourite counties, and then proceeded to urge the necessity for observation on the part of the photographer. The heads of his subject were cottages in landscape, their styles and the material used in their construction, river scenery, country ponds, commons, ploughing, and harvesting. The questions of "figure in landscape" and "lighting" were also discussed and illustrated on the screen, and the lecture throughout was adorned with extracts from the poets.

The subject on Thursday, November 20, will be *Some Old Processes of Making Lantern Slides*, when Mr. Pringle will read a paper.

HOLBORN CAMERA CLUB.

November 7,—Mr. T. Oldacres Dear (Vice-President) in the chair.

Mr. E. Clifton gave a short lecture on *Old Dry Plate Processes*. He said, At the present time, when dry plates had almost superseded the wet collodion process of a few years ago, it might be interesting, although of little practical value, to glance back on some of the early photographic processes which permitted the plate to be prepared a few hours before use and to be exposed in a dry state. He commenced with Niepce's discovery in 1813, giving a description of the process. He said it was worth while noting that this process was still extensively used in several of the methods of photographic engraving. Some of these plates could be seen in the loan collection of historical photographic apparatus at the South Kensington Museum, which had been gathered together for the Inventions Exhibition and afterwards placed in that museum. He thought the existence of this collection was but little known among amateurs, and he advised those present to visit the museum and see this collection. He believed it was in the Educational Section. He then described the Daguerreotype, which he thought was the most perfect dry plate process which had been or would be invented. He then went on to speak of the introduction of bromine to increase the rapidity of the plate, and of Mr. H. Fox Talbot's process on paper, and its subsequent modifications and improvements. After speaking of the various discoveries by Sir John Herschel and alluding to Niepce de St. Victor's albumen process, he traced the history of the various collodion processes which, up to the last seven or eight years, had been most extensively used, and the innumerable methods which were tried in order to obtain satisfactory dry plates, specially mentioning Dr. Hill Norris's dry plates. In speaking of the collodio-albumen plates, he said he had never seen any modern dry plate that could give the fine deposit which these plates gave. He thought the great advances in dry plate photography were due to the introduction of alkaline development by Major Russell. Although Major Russell thus gave a great impetus to dry plate photography, he was under the impression very few of the ordinary run of amateurs had ever heard of him.

Mr. E. Bayston asked if it were possible to obtain an image on a dry plate without development.

Mr. Clifton: Yes; but the image is very faint. It was most noticeable when a small amount of chloride of silver was present in the plate.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

November 7,—The President in the chair.

Eight members were elected.

The members were entertained by the Hon. Treasurer (Mr. H. G. Banks) with *A Tour to the Channel Islands*, the lecture being illustrated with a series of views, many of them taken by himself.

Mr. Ransom brought before the Society a novelty in focussing screens. The screen consisted of finely ground glass, in the centre of which there is a transparent spot about half an inch in diameter. On the application of the ordinary focussing glass the camera is at once transformed into a telescope.

THE LANTERN SOCIETY.

The annual general meeting of this Society was held on November 3.

A selection of about seventy slides belonging to the Society's loan collection were afterwards shown on the screen.

OXFORD PHOTOGRAPHIC SOCIETY.

November 4.—This was a lantern exhibition.

Mr. A. F. Stanley Kent, M.A., Magdalen College, and Mr. J. R. Benson were elected members.

On November 24 Mr. H. M. Smith (Eastman Company) will give a demonstration.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

November 4,—Mr. R. J. Shields in the chair.

Two new members were elected.

For the annual competition Mr. T. H. Roberts was awarded the medal for the best six pictures, and also the gold medal for the best single picture, for a view of Filey Beach.

Messrs. E. Beck and J. W. Charlesworth then gave the first of a proposed series of two-men lantern-slide exhibitions.

LEEDS PHOTOGRAPHIC SOCIETY.

NOVEMBER 6.—The members held their annual exhibition of lantern slides in the Albert Hall of the Mechanics' Institute, the exhibition being open to members and their friends. About two hundred and thirty slides were exhibited, consisting of scenery in Yorkshire. The views of scenery further away from home were instantaneous marine pictures from the Isle of Man and other places.

The PRESIDENT (Mr. T. W. Thornton), in a few opening remarks, convinced the assembly that the Society had made much progress during the year. It had secured a lecture hall replete with convenience for expeirments and general work, and the public exhibitions of the Society had been so successful that further efforts of a like character had been invited.

Mr. C. H. BOTHAMLEY, of the Yorkshire College (Vice-President), announced the titles of the various slides as they appeared on the screen.

The intervals were filled up by a selection of music performed by the Leeds Private Orchestral Society, Mr. Staniland Hall, conducting.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 6.—General meeting.

Mr. PETER FEATHERS gave a paper on *Light and Colour*, in which he briefly stated, by way of introduction, that though the phenomenon of light is so universal, the great majority of people never think how much we owe to it—how intimately it is bound up with our daily life. Were the resplendent orb that lights this pendant world to be extinguished, into what a howling wilderness would this fair earth be turned! Life would become extinct, and instead of the wavy fields of corn and the luxuriant forests, there would be one immense and thrilling region of thick-ribbed ice shrouded in cimmerian darkness. The gorgeous colouring of sunrise and sunset, the showy whiteness of the cloud-capped mountains, would be no more, and in their stead there would be total darkness—total eclipse. Special reference was made to the action of light as a chemical agent, as it is by the action of this mysterious force on certain chemicals that the science of photography rests. The refraction of light in passing from one medium to another was explained, and though at first sight this might seem an imperfection in nature's laws, yet it was one of the most beautiful provisions for our convenience that comes within the study of optics, as without it there could be no such thing as a lens of any sort. The compound nature of white light was next dwelt upon, and the various distinctive properties of the spectrum pointed out and described. The paper was illustrated throughout by a number of diagrams and experiments, which were successfully performed.

Mr. W. E. Boxer exhibited a printing frame which he had designed for making lantern slides from quarter-plates. The front of the frame has an opening of three and one-eighth inches square. The negative, when placed in the frame, could be moved longitudinally till the part desired was opposite the aperture. The back consists of three flaps, two narrow, and faced with rubber; these are at either side of the opening, and when shut down keep the negative in position, and are secured by a turn-button, leaving a space between them of three and a quarter inches for the sensitive plate, which is screened from light by the third flap.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

THIS Association held a competition on the 8th inst. for five medals presented by the President, Mr. William Shaw Adamson, of Careston. There was a large number of entries in every class, more particularly in lantern slides, about 150 of these being entered. The prize list is as follows:—"Landscape," Bailie Lawrence; "Instantaneous," Bailie Lawrence; "Portraits," Dr. Anderson; "Enlargements," Dr. Anderson; "Lantern Slides," John Denholm.

The collection of pictures was open to the public on Saturday in the Mechanics' Institute, and was visited during the day and evening by large numbers.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

BLISTERING OF SILVER PRINTS.

To the EDITOR.

SIR,—In your answer this week to a correspondent on the "blistering of silver prints" you give him advice to try my plan.

What you give as my plan is not quite correct. It should be as follows:—After the prints are fixed, drain the prints and place them in methylated spirits till they get semi-transparent; afterward place them in the washing water and wash as usual.

I may say that I have not had occasion to use the spirit bath for some years, as I now feel convinced that I have found the cause, and I therefore avoid it. At all events, I never have a blister with any paper.

I feel almost tempted to say something as to the various modes of washing prints, but will reserve this till some future opportunity, of which, with your kind permission, I hope to avail myself.—I am, yours, &c., JOHN STUART.

120, *Buchanan-street, Glasgow, November* 10, 1890.

"SUN ARTISTS."

To the EDITOR.

SIR,—The last number of *Sun Artists* has, I dare say, been a surprise to many, and, I may add, a pleasant surprise. I had the recollection of seeing at an exhibition many many years ago several pictures by Mrs. Cameron, and my recollection of them was very different to the four now reproduced in photogravure. I have a distinct recollection of being struck by the faulty manipulation which produced on the prints spot marks and dark patches quite sufficient to counteract the undeniable art qualities of the pictures. The plates now given us are models of clear manipulation. Can it be that the "immoral retoucher" has been hard at work on them? but the name of Dr. Emerson precludes such an idea. And yet in the dark masses of hair in the *Day Dream* I could almost be sure I see the marks of the retouching brush; and again in the background of *Lord Tennyson* is there not distinct evidence of stippling?

I rather think that if the poor critics who were so cruelly lashed for their judgments years ago on Mrs. Cameron saw the present specimens they might have given a different judgment; and, dare I venture to say, that if Dr. Emerson had seen the original exhibits of Mrs. Cameron *he* might have been not quite so complimentary as he is now.

Let us, however, enjoy the artistic beauty and take a lesson from them; that is, to try and produce equally artistic effects without having recourse to retouching.—I am, yours, &c., G. MANSFIELD.

Morristown Lattin, Naas, November 9, 1890.

[We have not seen the last number of *Sun Artists*, but one who knows states that Mrs. Cameron's pictures therein have been worked upon to a "fearful and wonderful" extent.—ED.]

ALLEGED SHARP PRACTICE.

To the EDITOR.

SIR,—Knowing the spirit of fairness of your valuable paper, both to employer and assistant alike, may I ask that you will kindly insert this? It seems to be a growing practice for employers to compel assistants to sign an agreement to the effect that after leaving their employ the assistant "may not go into business for himself, or work for any other firm in the same town, or within so many miles of the same," under a penalty.

I ask, is this fair? The employer, on his part, oftentimes does not bind himself to retain the services of that assistant for a stated time, and if he proves unsatisfactory he is debarred from offering himself to any other firm in the town. Myself, I cannot see that there are any such very deep secrets in an ordinary photographic business to compel employers to do this. Let me urge all photographic assistants to take a firm stand against such a piece of injustice.—I am, yours, &c.,

ONE WHO HAS REFUSED TO SIGN.

ANGLERS *VERSUS* PERIPATETIC PHOTOGRAPHERS.

To the EDITOR.

SIR,—At a meeting of the Council of the West London Photographic Society, held on Friday last, a discussion arose as to the desirability of getting special rates for photographers from the railway companies when travelling for the purposes of the art, and I was directed, as President of the above Society, to write to you with a view of ventilating the subject.

It has been a practice for some time past for railway companies to grant special cheap tickets to *bonâ fide* anglers. To obtain the privilege, all that is necessary is that the applicant for such a ticket should be a duly credited member of an angling club, and have a pass or certificate to that effect issued by a central angling society. Anglers must carry a rod and the usual implements of the craft, and actually be on fishing bent; anglers may go in bodies or singly, just as they please, and previous notice to the railway company is not necessary. I do not know the number of established angling clubs or the number of their members, but they are very numerous, and the cheap ticket is extensively patronised.

I venture to think that photographers are an ever increasing body, and as much entitled to the benefit of a cheap railway ticket as the angler. The anglers travel entirely for their own pleasure, while the photographers bring home pictures that afford pleasure to others besides themselves, and by their publicity advertise the line of railway where they are taken. I believe cheap tickets are granted to photographers on some railways, but the privilege is considerably discounted by the fact that the travellers must go in bodies of not less than eight or ten, I believe, and must give some days' prior notice of their intentions.

What I would suggest is that all the leading photographic societies should combine in a representation to the railway companies on this matter. The West London Photographic Society would cordially co-operate with older societies who would take the matter up, or would, if supported and desired, approach the railway companies themselves in the common interests of their brother photographers.

Any information on the matter would be gratefully accepted by myself, or by our indefatigable Hon. Sec., Mr. John Hodges, 87, Chancery-lane, W.C.—I am, yours, &c., WALTER ADAM BROWN,

President West London Photographic Society.

PRIVATE DARK ROOMS.

To the EDITOR.

SIR,—I see a proposal this week to form a Camera Club (why call it Camera, by-the-by? there are lots of names free, and Camera Club is already used) for South London, and no doubt things of this sort will spring up in numbers during the next few years.

People want sinks and taps and dark rooms which they cannot easily get at home, and are glad to have their houses free from the mess inseparable from photography. If those getting the clubs up would provide enough small dark rooms so that they would be able to let some of them to individual members for their exclusive use, I think the rent would be a satisfactory return on money invested. My impression is that 10s. a month for 6 × 6 feet, or so, would pay well, and be easily got. It is an awful bother to have to pack up and take away everything that belongs to you every time you do any work, and if you leave a negative or anything in a public place it is sure to get scratched, or splashed, or something, by the time you come back. If the Camera Club were to take either the basement or the attics of the houses adjoining their new premises and turn them into private dark rooms it would be a very good move.—I am, yours, &c.,

F. J. Q.

HAND-CAMERA WORK.

To the Editor.

Sir,—Can you or any of your able correspondents define clearly and satisfactorily what is meant by the above term? A provincial society has issued its prospectus for its winter exhibition of competitive work, and among the classes is one for "hand-camera work." It is contended by some that this means work done with a hand camera pure and simple, and such as is supplied by the photographic makers and dealers for that purpose; while others hold that any work done with any camera so that it is held in the hand at the time of exposure comes under that head.

The latter having the advantage of the focussing glass, swing back, rectilinear or wire angle lens for composing the picture while resting on the three legs, or even on one leg, appears to handicap the former most unfairly, and I shall be glad, Mr. Editor, if you or any one up in the question can inform me what is customary among the numerous competitions in England.—I am, yours, &c.,

Inquirer.

November 10, 1890.

FRENCH CORRESPONDENCE.

(*From our own Correspondent.*)

Emulation Among Amateurs—M. Piver's New Mode of Suspending the Camera for Instantaneous Views on Board Ship—Extraordinary Rapidity. Fifty Negatives per Second—November Meeting of the Photographic Society of France—M. Janssen Elected President—M. Pector's Report—Death of M. Paul Gaillard, a Pioneer of Photography—M. Marey's Photo-chronographical Pictures—The Busts of Daguerre Presented to English Societies—Enlargements from Hand-camera Negatives.

The vacances are come to an end, and the greater number of amateurs have returned to town elated with their success, passing many a jovial hour showing the product of their photographic tour to their admiring family. At the friendly meetings of the Photographic Societies a great animation can be witnessed, the members presenting their *clichés d'essai*, showing off the difficulties vanquished, the beauties of the site represented, the artistic taste and skill displayed in the choice, the kind of plates and films employed, getting quite excited with the pleasing recollections that each image brings to memory. "Really photography has worked wonders," said a lady present. "It has caused a joy to many parents in that it has given an intelligent and pleasing occupation to many young persons, and so kept them from idleness."

Among the many amateurs who spoke of their campaigns, M. Piver, the great Parisian perfumer, obtained the greatest attention. This gentleman has been a devotee of photography for many years, and his instantaneous views of marine objects have gained him great renown. Having been requested to inform us how he succeeded in getting the moveable image so well placed in the picture, and that in such an incommodious place as on board of a sailing yacht, "I shall be most happy," said he, "to give a description of a kind of sling that I employ on board to suspend my camera, and which gives me excellent results. The principal object I had in view was to obtain instantaneous views of shipping, coast scenes, &c., and to obtain better and more interesting scenes than what can be got by hand or what are called detective apparatus. Negatives obtained by that class of apparatus almost always require to be enlarged, which complicate the operations, and take off a great deal of the sharpness. I do think," said M. Piver, "that the description of my apparatus will render service to amateurs of sea scenes, and who practise photography on board of their yachts. First of all, I must insist upon the advantage which I have found in the use of a double camera. The top one, for focussing and judging of the position of the object to be photographed, can be four times smaller than the lower one. This part alone carries the focussing glass. I have adapted a sort of cone to cover this glass, so as to do away with the focussing cloth. When the object is focussed in the small camera, and found in the proper position, the pneumatic ball is pressed, and the image is delineated upon the sensitive surface contained in the dark slide of the camera, which is always ready for the occasion. Any size apparatus can be employed, and, in fact, a simple finder can be used. I now arrive at my system of supporting or hanging the camera over the ship's side. It is composed of a large flat piece of wood suspended from the rigging, not unlike a swing. This board bears the whole weight of the apparatus, keeps it horizontal, and permits the operator to counterbalance without any effort or force, and without any shaking, all the different motions of the ship at sea. A spar is rigged up in such a way that its extremity, to which a pulley is attached, hangs at a certain elevation over the side of the yacht. Through this pulley is passed a rope with an iron ring at its end. The swing holding the camera is fastened on to this ring. The two ropes forming the swing are kept apart at about a yard from the boat, on which is fixed the cleats by means of a bar of wood. Any position can now be given to the camera at the will of the operator, and with the greatest ease; the equilibrium is maintained while focussing, and the pneumatic ball can be pressed at the favourable moment by the hand or even by the foot. This system of suspension is so good that I recommend its employment even on land for instantaneous work. No trepidations need be feared on steamboats nor in railway trains." M. Piven exhibited some excellent sea scenes, which proved the efficacy of his simple and useful apparatus.

A great amount of excitement and wonder has been displayed in Paris by the last presentation, "à l'Académie des Sciences," of a new instantaneous photographic apparatus.

With the new apparatus, so says the *Mot d'Ordre*, fifty exposures can be obtained per second. In order to give an idea of the extraordinary perfection of the machine, a series of photographs were shown during the *séance*. These proofs represented two individuals fighting a duel. One of the opponents has been disarmed, and during the time that the sword was falling to the ground the apparatus photographed it eight times.

The Photographic Society of France met together last Friday evening, the 7th inst., Monsieur Davanne in the chair. M. Janssen, the celebrated astronomer, was unanimously voted in as the President of the Society. M. Pector presented a volume he had compiled on the last International Congress on Photography. Great honour is due to M. Pector for his perseverance, and the great taste displayed in the classification of the numerous documents. It is to be hoped that the next Congress, to be held in Belgium, may have the good fortune to find a General Secretary of the stamp of M. Pector.

The Chairman informed the Society of the death of M. Paul Gaillard, one of the first members of the Photographic Society of France, and for many years one of the most enthusiastic amateurs of photography. I personally deplore the loss of a friend under whom I began the study of our enticing and wondrously absorbing art. For six years we were inseparable comrades, and I followed him through all his experiments tending to render photography attractive to the million. His last act, suggested by me, offering 500 francs for a prize to be given for a progress in the art he was so devoted to, shows fully the interest he still took in photography, although illness compelled him to abandon an art of which he may truly be called the pioneer. *Requiescat in pace.*

Many developers were submitted to the Society—one, it appears, quite a new one, named "Yxol," presented by M. Delpérier. The Chairman cordially welcomed it, and hoped it would enlarge the number of our reagents.

M. Reeb read a communication on eikonogen, in which he contended that this salt was far inferior to hydroquinone.

Messrs. Gillet, the celebrated camera makers, presented a universal camera for the studio, fitted up with all the improvements suggested by the late Photographic Congress.

M. Marey, member of the Institut, presented a number of photo-chronographic proofs, showing the motion of bipeds, quadrupeds, and even fishes. These proofs were very much admired. They are far superior in perfection to what we have already seen. It appears that M. Marey has improved his photographic apparatus in such a way that he can now, by the aid of clock-work combined to electricity, obtain as many as fifty distinct exposures in the space of one second of time, and that without any vibration.

I informed the Society that the bust of Daguerre had been forwarded to the Camera Club, the London and Provincial Photographic Association, as well as to the Photographic Club of London. The following letter, received from the Hon. Sec. and Treasurer of the last-mentioned institution, was read, highly applauded, and ordered to be inserted in the Bulletin of the Society:—

"Dear Professor,—The busts of Daguerre came safely to hand on Saturday. Last night was the annual meeting of the Club, and the unveiling of the bust gave great pleasure to the members. A vote of thanks to the Photographic Society of France was passed by acclamation, and I was desired to convey this to the Society through you, and at the same time to thank you for the trouble you have taken in the matter. The bust, as soon as a fitting base shall have been prepared, will occupy a prominent position in our Club Room, and will doubtless be admired by all who visit us.—With regards, &c., F. A. Britor."

The architectural plan and design of the new premises of the Camera Club, London, was exhibited and admired. M. Davanne expressed the hope that one day or the other our Society might dwell in its own property, and suggested a means to fulfil that *desideratum*, which was that every member should take it to heart to persuade a friend to become a member, and each new member to use his influence to nominate two others. The Society could then, said M. Davanne, be at home.

'Tis wise that a good feeling should exist between the English and French photographic societies, and I have endeavoured for many years to bring about that desirable state of things, and I hope ere long these endeavours will bring forth fruit.

M. Molteni presented an enlargement from a negative taken in a hand camera. This enlargement was brought as a proof that hand cameras can replace large apparatus under certain conditions, such as views of mountain-tops, &c. It must be confessed that the enlargement was far superior to the small proof taken direct from the small negative.

M. C. Gravier presented some very fine photographic proofs.

After some discussion on the value of printing under coloured medium, the Chairman stated a fact which had happened to him many years ago. Some parts of a negative had been covered with a yellow tint; after printing, it was toned; but after all that could be done, the parts of the print which had been protected by the yellow pigment would not take the gold solution, and could not be toned.

The Society, after a magic lantern exhibition, broke up at eleven o'clock.

Newcastle-on-Tyne and Northern Counties' Photographic Association.—The next meeting of the above Association will be held in the Mosley-street Café, Newcastle, on Tuesday, the 18th inst., at half-past seven p.m. Demonstration upon *The Platinotype Printing Process* by Messrs. M. Auty and J. Pike.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:

Frederick Argall, Truro.—*Portrait of Right Hon. W. E. Gladstone.*

JUSTICE.—Sue the man in the County Court for the value of the background. It is the only remedy you have.

J. W. B.—We advise you to employ a local agent in preference to a London one. The person you name is not one of the firm mentioned.

E. A. LEAVITT (Portland, U.S.A.).—The *Autotype Manual* and Burton's *Photo-printing Processes*, or Wilkinson's work on the same subject.

T. HALL.—The picture forwarded is a very bad example; it is fuzzy enough, but it lacks every artistic quality. Fuzziness without art is ridiculous.

C. W. S.—You are now too late; the exhibition closed on Wednesday last. Possibly the exhibitor whose pictures you are so anxious to see will show them to you if you call upon him when you are in London.

B. O.—As you surmise, the plates are much under-exposed and the method of development has not made the most of them. As you are a novice, try developing the remainder of them with eikonogen, as your friend recommends.

D. DAVIES.—Unless the prints are very yellow there will be no advantage in using orthochromatised plates. The formula referred to is a very good one. The author has devoted a great amount of study to the subject, and may be relied upon.

G. H. A. inquires what size condenser would be necessary in a lantern to enlarge from $8\frac{1}{2} \times 6\frac{1}{2}$ negative.—It will require one at least ten and a half inches in diameter. His whole-plate rapid rectilinear will answer his purpose as an objective for enlarging.

STEREOSCOPE.—If the distance between the lenses of the camera be made five inches the stereoscopic effect will be much exaggerated when taking near objects. For portraiture, the distance they are apart should not exceed two and a half or three inches at the outside.

RETOUCHING.—You will get a suitable lamp at the nearest lamp shop. There are no lamps sold specially for the purpose, as any one will answer if placed in the proper position to illuminate the negative. If the light is too strong with one thickness of ground glass use a second sheet.

E. A. (Liverpool) asks what length of camera is required to copy a cabinet-size portrait the same size with a rapid rectilinear lens of sixteen inches focus.—A camera extending to thirty-two inches is necessary. The size of the picture makes no difference in this respect. The same length is required for a *carte-de-visite* as for a 12×10 picture.

H. MARSHALL wishes directions for a silver bath for sensitising albumenised paper.—Nothing more is required for this than a solution of nitrate of silver in distilled water, the strength being about sixty grains to the ounce. We say "about," because it is difficult to advise definitely unless we know the strength of the chloride with which the paper was salted.

OPALINE.—Unless your consumption is large it will, on the whole, be more economical to purchase the opal plates ready prepared, particularly as you say you have had no experience in the manufacture of gelatine emulsion. The formula you send will answer, but it will be advantageous to increase the proportion of bromide of ammonium a little in the emulsion.

P. DONOVAN.—Your letter is very satirical, far beyond what is warranted. You should bear in mind that ideas vary as to what a picture should be. Although some of the pictures referred to are not sharp, and, from a *photographic point of view*, are not good, they, nevertheless, possess some artistic merit. Beyond its satire your letter contains nothing but what has been said several times before.

A. SIMMONDS.—You appear to be somewhat "at sea" on the subject. Vulcanised indiarubber will not dissolve in the ordinary benzoline of the oil-shops, nor will any rubber. Moreover, vulcanised rubber will not dissolve in any of the solvents of ordinary rubber. If you wish to make a solution, take *masticated* rubber and benzole; you will then experience no difficulty in getting what is required.

HERBERT L. OXLEYS.—At first sight we were inclined to attribute your failures to the excess of silver, but now think it probable they are more likely to be due to a bad sample of methylated spirit. Be sure that your bromides are perfectly dry when weighed out, especially the ammonium salt, otherwise you may easily upset the balance of proportions. See leading article in present number.

W. R. says: "I shall feel very much obliged if you will give me a few practical hints on enamelling. My greatest difficulty is to get and keep a good hard surface on the print. You will see by the specimen sent how dull and porous the surface is. I have tried different experiments, and think the failure is due to the collodion. Can you tell me the best makes? I have no difficulty in getting the prints off the plate glass, so the fault is not in imperfect polishing. What temperature ought the room to be for drying?"—So far as we can judge from the print, there is no fault whatever with the collodion. It appears as if there was too little gelatine used—either too thin a solution or too much of it expelled with the squeegee; also, that the glass was not sufficiently waxed or chalked, as the cracks seem to have been caused by the force applied to remove the print from the plate.

M. BARDÉ.—Coignet's gold medal gelatine is not at all suitable for making reliefs in the Stannotype process. It is an excellent gelatine, but it is not always the best gelatine that will answer for every purpose. For making reliefs, one of a more soluble kind is necessary, such as several of those supplied by Nelson, Dale, & Co. Their "Amber" is well adapted for the purpose or their "No. 3 Flake."

W. RICHARDS complains that he cannot get sharp prints. He says the paper when put upon the negatives is quite smooth and flat, but upon opening the frame to see how the print is progressing it is usually cockled, and afterwards does not lie evenly on the negative.—The reason is simple. The paper when put in the frame is perfectly dry, but the pads and the frames are evidently damp; moisture is absorbed by the paper and it expands. The remedy is obvious.

HALO.—This correspondent has backed plates with burnt sienna, and yet, when taking some interiors of a chapel, gets the windows blurred. This certainly, if applied wet, *ought* to prevent the halation. Let him try something still darker; for example, a sheet of carbon tissue soaked in water containing glycerine, and let this be squeegeed on to the back of the plate so as to be in optical contact. For intensifying negatives, place in a solution of bichloride of mercury, and after the image has become bleached wash very thoroughly and transfer to a bath of water to which ammonia has been added in liberal quantity.

S. asks: "How could I best protect a special method I have for mounting photographs and giving a special name to them; also, where could I find particulars of any patented methods of so doing? Any information as to cost and procedure will oblige."—The only means of protecting the method is by a patent. The cost of this for four years is £7. The name can be protected under the Trade Marks Act. Particulars of what has already been patented can be obtained by searching the records of the Patent Office, which can be done without payment. If a patent agent is employed to do the work, of course his charges will be in addition to the Government fee.

RETOUCHER is troubled with the matt varnish which he applies to the back of his negatives running over the edge when coating it, and thus getting on and spoiling the front; and he wishes to know a remedy.—There are some benzole and ether matt varnishes which are very prone to do this, unless when applied from a bottle having a well turned over or flat lip. If the varnish were an alcoholic one it is probable than any tendency to run over might be obviated by rubbing a piece of hard tallow along the margin. While experimenting on worthless plates, "Retoucher" might try the effect of applying his matt varnish with a large flat brush, holding the plate in a sloping position while doing so.

M. HARGREAVES writes:—"Can you help me out of a very serious fix? My trouble is in toning. I wish to get a deep purple, verging on blue. I tone until the prints are slaty-blue on the surface, and purple looking through, yet after they are fixed the prints are varying shades of bronze only. I have mostly strong, brilliant negatives to print, and have tried five of the most noted brands of double albumenised paper; trying various times of floating on the silver bath, which I keep up to sixty grains. The prints tone fairly quick to what appears to me an excessively blue tone, yet this all disappears in the fixing. I have changed the hyposulphite with no advantage. I have had many years' experience, but am completely baffled. As an addition to all the foregoing I have tried other toning baths besides my usual acetate. I use the gold liberally, and both sensitising and toning baths are carefully heated for acidity. Occasionally some few of the prints refuse to tone beyond a snuff colour, and simply bleach if left in the toning bath, the density of the negative seeming to make no difference, and yet from the same sheet of paper other prints tone readily enough. But my great trouble is that though I tone to all appearances far beyond what should be requisite—in fact, till it is impossible to see any further change—nearly all the tone goes out in the fixing. I see many prints in the shop windows that have the tone I wish to obtain, but for several months I have been unable to get any batch of prints beyond a kind of chocolate colour, though now and then a few have been all I can wish. I cannot imagine that the present brands of paper vary to so great an extent, but cannot trace my want of success now. A few years ago I used to get the tone with absolute certainty."—It would seem that our correspondent's negatives are at fault. To obtain the tones desired on very highly albumenised paper *very* strong negatives indeed must be employed. It should be borne in mind that the more highly albumenised the paper, the greater is the difficulty in getting blue tones. From vigorous negatives they are easily obtained, on a less glazed paper. We imagine our correspondent, with the view to obtaining what he requires, has been carrying the toning too far. With less toning the prints would doubtless be better.

PHOTOGRAPHIC CLUB.—November 19, Annual dinner at seven prompt. November 26, Monthly lantern meeting. December 3, *Collodio-bromide Processes.*

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A NOVEL METHOD OF MOUNTING PRINTS.

So numerous are the styles in use at present for print mounting, and so various the colours and general appearance of the mounts used, that it seems almost impossible to suggest anything new. The method we are about to describe is particularly suitable for use with platinotype, gelatino-bromide, or other kinds of prints where the black engraving tone and effect are to be preserved, and it has the additional advantage of extreme economy.

One of the favourite methods, if not the most fashionable style at the present time, is the "plate-sunk" mount, with or without India tint—a style which undoubtedly adds a most artistic finish to prints in the now popular tone. But such mounts are comparatively expensive, while those we have to recommend give a nearly equal result at a mere nominal cost, and may be "plate-sunk," if desired, with very little extra trouble.

The choice of material for the mounts may take a very wide range, though for general purposes we suggest as most suitable a slightly tinted cartridge or drawing paper of not too rough a texture. For special or striking effects, the roughest drawing or even wrapping papers may be used in much the same manner as modern bookbinders adopt for catching the public eye by means of an unconventional or even eccentric cover. We have recently seen a series of prints so mounted on a species of drab wrapping paper of not too superlative quality.

There is, of course, one important precaution to be specially taken in using such common materials—common, that is, in the sense that they are not necessarily free from chemical impurities—namely, to either remove or in some other manner render harmless any foreign matters that may be present in the mount. Fortunately, from the nature of the mounts, as well as the process of mounting, this need not be a difficult matter. As will be seen, part of the process consists in thoroughly damping the mount as well as the print, which in the case of a solid paper does not present the same difficulties as in the case of a built-up cardboard; while the mount is undergoing the damping process it is an easy matter to submit it to a little extra washing, or, if necessary, chemical treatment, in order to remove the impurities if such be suspected. Or the danger to the print may be at least lessened by applying a more or less impervious varnish to the mount, which, while not preventing the absorption of water, forms a protective coating when dry. Such a varnish is found in bleached lac dissolved in aqueous solution of borax; if this be applied to the paper mount before damping, it will dry without leaving any gloss, and when the mount is subsequently soaked any excess of borax will be removed, and when dry the impurities will be isolated from the print.

The method of mounting consists in immersing the mounting paper previously cut roughly to size in clean water, assuming that any necessary preparation has been already effected. When perfectly limp, the sheets are taken out of the water and, as required, blotted off between blotting paper. The wet prints are similarly treated, and then both print and mount—the latter over such part only as the print is to occupy—well impregnated with the mountant. If the print only be treated, it will in all probability peel off at the edges on drying. Nothing answers so well for mounting as arrowroot paste made pretty thick and allowed to cool, then squeezed through fine cambric to remove lumps. It should be used fresh, as it soon becomes watery, in which condition it loses its adhesive power.

A convenient plan for applying the mountant to the centre of the mount consists in making a mask from stout, smooth paper, or perhaps, better still, from thin sheet zinc of the outside dimensions of the mount with a central aperture a little larger—say an eighth of an inch each way—than the print. If this be laid on the damp mount, the arrowroot is easily applied to the proper portions with a sponge, and the print can be laid down in its position before removing the mask. The narrow strip of arrowroot extending beyond the edges of the print may be removed by means of a damp sponge after the print is rubbed down, but this is scarcely needful, as it dries perfectly matt, and is only likely to show on a coloured mount.

With regard to the rubbing down, this is not so simple a matter with gelatine-surfaced papers as with albumen or platinotype, but all difficulty is surmounted by interposing a sheet of the thin paraffin-wax-saturated tissue paper sold for wrapping or waterproof purposes. This, while it adheres closely to the gelatine surface during the rubbing, comes easily away from it when it has served its purpose.

We next come to the drying, which is the most important part of the process if perfection of result is desired. It will be noticed that in order to avoid "cockling" of the dried print the mount as well as the print has been moistened so that each may swell and shrink equally; but this is not alone effective. If left to dry alone, the edges of the mount will dry first, the extra thickness of the print-covered portion remaining damp for a considerably longer period, and taking a saucer shape from the contraction of the surrounding portions. To obviate this, the print as soon as mounted may be pinned to a flat board, or laid on a sheet of glass and the edges of the mount turned over and stuck at the back. But by far the better plan is to have a quantity of sheets of clean blotting paper slightly larger than the mounted prints. Let these be thoroughly dried by exposing them for some time in a hot oven, then packing in a mass, and wrapping in tinfoil until required.

The prints are allowed to become partially dry, but before they lose their limpness, or show any tendency to curl, they are taken singly and placed between the blotting pads, at least two sheets of drying paper intervening between each pair of prints. In the case of gelatine-surfaced prints a sheet of waxed tissue paper is also necessary. If the pile of interleaved prints be now placed under gentle pressure for a few hours, they will be found perfectly dry, and as flat as if they had been rolled. It only now remains to trim the mounts to size, and, if desired, to apply a "plate mark" by giving the print a "squeeze" in a copying press between folds of paper or in the copying-book, a plate of zinc of the proper size, and with its edges slightly bevelled, being laid over the face of the print.

Such prints are equally suitable for framing, for binding, or for keeping loose in a portfolio; for the two last purposes, indeed, this method of mounting is more convenient than any others we have tried.

FUZZINESS AND METHODS OF OBTAINING IT.

In the article on "fuzziness" a fortnight ago, the question was mooted as to whether a new phase of photography was being entered upon. Attention was also directed to the fact that, in the matter of photographs, ideas are ever changing, and what at one time might have been condemned would at another be considered worthy of commendation. Notably is this the case with out-of-focus pictures. In the exhibition of the Photographic Society, just closed, two medals were awarded to works of the "fuzziest" order, while some years back the Society, in the report of the, at that time, Exhibition Committee, condemned praise bestowed by the non-photographic press upon the late Mrs. Julia Cameron's pictures, and hoped for better things from her with proper optical appliances.

From the fact that the ideas of a certain number of photographers may—and possibly will—run in the direction of pictures of the fuzzy type, we shall here indicate a few of the methods by which they may be obtained. The methods may be divided into two classes. First, where it is obtained in the negative; second, where it is introduced in the printing. We shall deal with the former system first.

One of the earliest methods suggested we referred to in the previous article—that made by Sir William Newton of taking the picture with the lens somewhat out of focus. The result obtained, however, by taking a negative with a perfectly corrected lens out of focus is not the same as using one with a considerable degree of spherical aberration—that is, one having no actual focal point—at its least bad defining plane. If an ordinary single landscape lens have its stop enlarged, so will spherical aberration become manifest in proportion to the enlargement; and if the stop be wholly removed, the defining power of the instrument is practically destroyed. A single lens worked under these conditions will give the highest degree of indistinctness. We believe we are correct in saying that a great number of Mrs. Cameron's pictures were taken with a single landscape lens, of twenty inches focus, with the stops removed, and worked with the full aperture. The front lens of a portrait combination will, of course, fulfil the conditions of the old-fashioned landscape lens.

The late Mr. Claudet, the well-known portraitist, was not averse to a certain amount of diffusion in his pictures, and he obtained it with a perfectly corrected portrait lens by altering the focus, by racking the tube in or out, during the exposure. But as the movement of the entire tube was liable to shake the camera, Mr. Claudet afterwards devised an ingenious arrangement by which the focus was altered by causing the back lenses of the combination to approach towards, or recede from, the front one while the picture was being taken. This arrangement answered admirably, though it was afterwards superseded by the lens of the late Mr. Dallmeyer, which enabled any reasonable degree of spherical aberration to be introduced at will by separating the components of the back combination. This means of securing diffusion is now so well-known that further allusion to it is unnecessary.

Fuzziness may be obtained to any extent by dispensing with a lens altogether, and simply using a pinhole. This plan was, however, impracticable in former times, owing to the insensitiveness of the plates then in use; but it is not the case now, as recently exhibited pictures prove.

Some years ago, when this question of the production of indistinct photographs was receiving attention, the following plan was one of those suggested, and by it some satisfactory results of the kind were produced. It was this: A cord was strained from the front of the camera to the base of the stand or to the floor. Then, after a portion of the exposure had been made, the cord was put in vibration, so as to produce a trifling movement of the camera. Another method was: While a part of the exposure was being made, a lighted spirit lamp was placed beneath the lens, and some little distance in front, so as to cause a current of air of a different density to ascend just before the camera.

We now come to the second system of producing fuzzy effects—that during printing. The effects in the Denier pictures, which might be termed at the same time both sharp and blurred, were obtained by the printing. The method of producing them was treated by its introducer as a secret one. But it was generally understood to consist in taking a thin negative on both sides of the glass, or in two negatives on separate plates, and then printing them superimposed on each other. Similar pictures to Denier's were, however, produced in the following manner:—The negative was an ordinary one, and when the proof was partly printed, a thin sheet of glass or other transparent medium was interposed between the negative and paper, and the printing completed.

The system of obtaining fuzziness by printing through an intervening medium is a very old idea. It was first suggested, if we remember rightly, by Talbot in the very earliest days of the art. He recommended printing with a piece of thin paper between the negative and the sensitised paper when it was desirable to avoid the excessive sharpness given by the lens.

The method of securing indistinctness by printing through transparent or translucent media offers certain advantages over some of the other methods alluded to, inasmuch as the same negative may be utilised for the production of either perfectly sharp or extremely fuzzy prints, according to the medium used or its thickness. This mode possesses the further advantage that the indistinctness, or sharpness, in different portions of the picture can be modified at will. For example, a single thickness—or none at all—can be used where the greatest sharpness is wanted, and any number may be employed where the greatest indistinctness is considered desirable. This is a great power at command in securing effects. We have a very strong impression that some examples of what has sarcastically been termed "fuzzigraphs" that we have recently seen have been produced by these or similar

means. The most suitable media for the purpose are the thin films of gelatine, such as used by lithographers, paraffined paper (*papier mineral*), tissue paper, or bank post paper, according to the result desired.

It is not an easy matter to keep a star in one spot in the field of a telescope in photo-astronomical work, it is still more difficult, even for an experienced hand, to keep a star in the slit of a spectroscope. M. Deslandres, however, in *Comptes Rendus* of the 20th ult., describes the method he adopts for overcoming this difficulty. He places a total reflecting prism near the dark slide, so that, while the blue end of the spectrum is recording itself on the sensitive plate, its position can be checked by eye observation of the red end.

Most photographic text-books place the atomic weight of cadmium at 112, though the latest authorities favour 111·7, that is, a difference of about one grain in three hundred and seventy, where calculations embracing that quantity are concerned. The latest investigator, however, puts the weight a little nearer the old figure, Mr. E. A. Partridge having in a paper published in the *American Journal of Science* for the current month recorded how, after some experiments he made successfully in producing pure cadmium, he from this sample of the initial redetermined the atomic weight with the above result. The means of purification consisted mainly in volatilising the metal in a continuously maintained vacuum, and the result was so exceedingly pure that the cadmium failed to give any indication of a foreign metal when examined spectroscopically.

Our readers are familiar with the tubes of sodio-chloride, or potassio-chloride of gold, with the label guaranteeing the contents to contain seven grains in fifteen, and for all practical purposes that is all that is necessary to be known about the contents. But as a matter of scientific accuracy it is well to know the theoretical composition of the salts, and this is represented by the formula $NaAuCl_4.2HO$, or $2KAuCl_4.HO$. Lately another double chloride of gold and potassium has been discovered, Herr A. Lainer having obtained a compound having the formula $AuCl_3.KCl$, by dissolving gold in nitro-hydrochloric acid and adding to the solution the molecular proportion of chloride of potassium dissolved in a little warm water. After sufficient concentration of the solution over quicklime, sulphuric acid crystals in the shape of glistening yellow needles, which remained unchanged in the air, were obtained.

Our contemporary, *La Nature*, has entertained its readers at sundry times with a description of various modes of executing pieces of photographic drollery. A fortnight ago it explained how to produce a picture of apparently a long row of figures from a single subject only. A woodcut from a photograph so produced is given. Two mirrors are placed parallel to one another, and separated by little over half a yard. In the space between the two mirrors he places the model to be photographed. Every one is familiar, the writer says, with the results of figures so placed, as, for example, in a hairdresser's shop, a *café*, or even at home in a room, with mirrors facing one another. The mirrors must be without frames, and one shorter than the other, the camera being placed in advance of the short mirror and slightly inclined to the floor. The effect is very singular, at least as shown in the woodcut, and the sitter having in her hands something light and feathery, like a pampas plume, the eye is not offended by any imperfect junction of skirts of the dress. It is evident that these results could be modified in many ways.

The friendly rivalry that exists in the work of Mr. Muybridge and M. Marey will not be unknown to our readers taking an interest in the subjects so wonderfully treated by these gentlemen. But M. Marey has devoted his attention to a class of instantaneous studies in a direction quite foreign to Mr. Muybridge's work, and the latest illustrations of his remarkable skill are shown also in *La Nature* last week. Three sets of pictures are given illustrating the modes of locomotion of sundry inhabitants of the deep. In the first we have a lively jelly-fish progressing through the water, the peculiar movements of his "umbrella" being shown distinctly. Next we have a "sea-horse," which appears to progress in a vertical position, the motion being brought about by the vibration of a dorsal fin; and, finally, there is a remarkable object ("*comatule*") more like a spider, but all legs and arms, and no body, two dozen little views of which show these arms in all their varied positions when the animal moves about after being stirred up with a stick. The instrument employed by M. Marey in the production of these photographs is called a photo-chronograph, and acts by the successive unrolling and rolling of a pellicular film before the lens, the rapidity of the "repeat" being governed by electricity made either with extreme rapidity, or at a rate that the eye could follow.

FAMILIAR FACES.

It may interest many readers to know that, under the above title, the Stereoscopic Company are running what is, to all intents and purposes, an innovation in connexion with photography and electricity as a means of advertisement and popular entertainment.

In the front of their new premises in Regent Street, and at an angle commanding both up and down the street, as well as the thoroughfare directly opposite, a large sheet of ground glass, measuring about eight feet by seven feet, has been erected. This, during the daytime, forms a handsome window very prettily draped, and in the evening is brilliantly illuminated with pictures of all the most popular people of the day.

The lantern itself is well worth inspecting, and is the outcome of a considerable amount of very expensive and troublesome experiments. It is fitted with the most delicate adjustments possible, and gives a light of 6000 candle power.

The Company have very wisely made the lantern a fixture, supporting it by a very handsome wrought-iron bracket in a corner of their reception room, so that it is only necessary for the assistant to switch on the current and pass the slides through in their proper order night after night.

It is believed that it is a form of advertising which must do a large business house a great amount of good, and certainly tend to popularise the familiar faces that they show upon the screen every evening.

Of course, every one of the studies is properly titled, so that should any of the passers-by not be familiar with the face of the latest beauty, or the most popular traveller, they are at once informed, by the title underneath, of its personality.

At some future day an illustration of the lantern may be given, showing exactly how it is worked with these delicate adjustments, not only for centralising the light in the lens (which is one of the Petzval portrait class), but also the arrangement for raising the slide into its correct position on the screen, with at the same time a very pretty curtain effect, which is gently lowered, and when raised again reveals a study in position.

ROUGH *VERSUS* SMOOTH.

The recent exhibition of the Photographic Society of Great Britain affords considerable food for reflection on the means adopted to produce photographic prints. The interest excited by blurred, indistinct work has never been greater, for the reason it has rarely before been so artistically managed; at the same time, innovators are apt to run to extremes, and in their dislike of even and microscopic definition over the whole of a picture, by substituting in its stead blurred, indistinctness without a trace of detail anywhere. If we are to consider fairly and dispassionately the advantages and failings of either system, we must start with some mental standard as to what we consider photographic and artistic perfection. This forces us to look up to the works of our best painters, engravers, and etchers, as examples to be imitated as nearly as we can. In so doing we shall be unable to find a single finished work that is either wholly blurred or wholly sharp of any subject that is at all suitable for photographic reproduction (by this reservation I allude to such pictures as misty seascapes, where everything is rendered more or less indistinct).

If we examine a landscape, say, of a corn field, we shall find much of the suggestive nature about it, but in the foreground each sheaf of

corn will, so to say, be keyed by certain ears and blades and stalks being carefully drawn sharp and distinct, the back being hazy and suggestive, but not looking so on account of the points that catch the eye being full of detail. This applies to other foliage or masses of material of the same character, in which a small portion carefully delineated explains the rest, which has only to be represented of the proper general contour to give a truthful effect to the whole work. Other objects in the foreground are almost always represented sharp, and carefully made out as regards detail, and here it is that photography far supersedes any other process in exactitude. I cannot see why such a power of reproduction should be tabooed and set aside as a fault to be avoided, either from artistic or any other consideration. We know from the examples of paintings on every side that detail and definition are not considered inartistic in any class of picture if used with discretion.

There is one class of painting in which these two qualities are not strong points—the impressionist school; but whether productions of this kind can be fairly called pictures I have some misgivings. At any rate, I do not think we should, as photographers, look to them as standards of excellence, but rather as freaks of art, failing as often as not in conveying the impression intended by the artist to the ordinary observer. The pictures that mostly challenge attention at our exhibitions are landscapes that have been deemed worthy of medals, and, like every innovation, are sure to be sharply criticised. It seems to me that the out-of-focus practice has been somewhat overdone, and that although undeniably pleasing and artistic results have been secured, they would have been much better had they stopped short of the altogether blurred effect that has been adopted. I cannot bring myself to think that a landscape is truthfully represented if there is nothing fairly defined in the foreground or in some part of the picture. The nearest approach to this universal blurr is in nature, when there is fog or mist; in that case the distance and middle distance are almost invisible and merge into the sky, and only objects near at hand have any pretensions to be fairly defined. But, providing near objects are too buried in fog to retain any detail, everthing a few yards beyond is altogether invisible, and such a representation of nature would be an absolutely blank canvas. The pictures to which our attention has been directed err in that the depth of tone is nearly the same in one part as another, and that indistinctness prevails without any mist or haze to account for it. I suppose this must be considered artistic license, but whether this artistic license has overstepped the bounds of the rational interpretation of a scene is fairly open to discussion.

Providing photographic opinion decides in favour of this new departure, lens makers will find their occupation gone, and the very earliest plans for producing photographic results may be resorted to. Pencil and brush may set to work to make negatives, discarding the assistance of the optician *in toto*, then hand work will reign supreme, and the photography of the future will be such that the pencil makes. However, I do not think we shall arrive at this state for some time to come, and in the meanwhile a word or two on suggestive photography will not be out of place.

This kind of effect depends almost entirely on the methods of printing, and little or not at all on the negative, which may be as sharp as the microscopist may desire, without in any way interfering with the results. The beauty of photography, pure and simple, consists of microscopic definition, and the beauty of artistic photography in not having too much definition, but most assuredly in not doing without it altogether. We photographers have a power, utterly unattainable by other means, of reproducing minute detail; the fault has hitherto been the use of it without sufficient discretion; we have made too much of this one quality, with the result of being considerably, and not undeservedly, sneered at by artists. But we must not, now that our eyes are beginning to be opened, rush to the other extreme and discard one of the most beautiful and otherwise unattainable qualities that a good lens enables us to secure. There is no reason why a photograph should not unite the qualities confirmed by optical aid, and the suggestiveness of the painter in one picture without offensive parade of detail on the one hand, and overwhelming blurriness of no lens at all on the other.

The time will probably come when our standard of photographic excellence in picture making will be very different from what it now is. It is only of late years that matt-surface prints have become popular. They were always esteemed by some few, but the difficulty formerly was to obtain depth in the shadows. The weak, sunk-in appearance militated very much against its general adoption. Platinotype has removed this objection, and its popularity has, in all probability, been obtained quite as much by this as by its superior permanency. Smooth paper has up to the present time been most popular, both for matt and glazed surfaces; the innovation of printing on excessively rough surfaces is now on its trial. A rough surface with the sharpest negative will give a considerably softened effect, printed in the ordinary manner. If ready-sensitised, rough paper could be purchased, we should probably see numerous examples, and more artistic work generally. A matt surface and a rough surface have little in common, any more than both are free from gloss. The irregularities of the rough surface prevent the close contact of the negative with the whole of the sensitive surface of the paper, and the effect of the picture will in a great measure depend on the character of this roughness. No amount of separation by the introduction of a transparent medium between the negative and the paper will produce the same effect on a smooth surface as the inequalities of the paper itself do. In one case the negative is equally distant from the paper over its whole area, and in the other there are alternate points of contact and separation. "I think there is a good deal to be got out of this rough-paper printing, and we may eventually get paper made with special surfaces for ordinary silver printing, as for platinotype or bromide, that will lend themselves to special effects better than any now available.

For those who would like to experiment with rough paper, the following plan may be successfully used with any (Whitman) drawing paper:—The paper being procured of any roughness desirable, is passed through a bath of methylated spirit, in which five grains of resin have been dissolved in each ounce of spirit and dried. It is now to be salted on a solution containing eight grains of ammonium chloride, two grains of sodium citrate, and five grains of gelatine to the ounce of water; dry. To sensitise, use a sixty to ninety grain solution of silver ammonio-nitrate, slightly acidulated with acetic acid, applied evenly with a Buckler brush, or by floating, or by turning up the edges of the paper and so making a dish of it, into which a little silver solution may be poured and spread over the surface with a brush. The stronger solution may be used with the brush, and the weaker for floating. Any way, the paper being sensitised is dried in the dark in a warm room, printed, toned, and fixed in the ordinary way. The negative must be fairly bright and strong; a thin, weak negative will not give good results. Such as those used for platinotype are suitable, or even a little stronger.

I for one should be very sorry to see this meritorious attempt to get out of the grooves of ordinary photographic printing pass as a freak of the day, and think if the possibilities of doing it were easily attainable, it would tend more than anything to forward the interests of photography as an art.

EDWARD DUNMORE.

STEREOSCOPIC WORK FOR AMATEURS.

V.

WHEN dealing with the development of stereoscopic negatives I refrained from offering any suggestions regarding this or that particular formula, believing that whatever developer the worker is best acquainted with was the best for him to adopt. When, however, a beginner comes to the development of a transparency made by contact with a stereoscopic negative, as fully described by me in a former article, the position of affairs is somewhat changed, for many workers who may have a considerable amount of experience in the development of negatives seldom, on the other hand, do anything in the way of developing, say, half-plate positives or transparencies, therefore a few remarks on this point may be acceptable. And, first of all, when dealing with such, perhaps one of the points of primary importance is so undertaking the work as to be able to turn out each independent picture on the one plate in as nearly as possible equal densities in each corresponding part of the different pictures.

I have known several old and really good workers quite puzzled to tackle a plate that was found to be coming up in development in a marked irregular manner.

To enable a worker to properly develop a stereoscopic transparency, one of the first essentials is a really good light; it is no use to go about such an operation with the aid of some of the dark lamps we see. In my opinion no light is sufficient that does not enable the worker to be able to read an ordinary newspaper at a distance of, say, twelve inches from the light. When such is at command there will be no difficulty in noticing every detail of the pictures coming along. When it is observed that some particular portion of the picture is starting into view, the worker should immediately look for the counterpart of the same in the other picture, and if it be found to come along in development simultaneously, it is just about ten to one all the other portions will follow suit in their proper relations, and but little trouble or difficulty experienced in bringing out a satisfactory result without the aid of any dodging.

On the other hand, when a watchful worker is eagerly scanning for

the first symptoms of development showing themselves, and it is at once apparent that one picture is coming along more rapidly than the same portion on the other, he will at once be able to say when unequal exposure or some other reason be present for the dissimilarity, and should such be of a very marked character, it is quite possible that no matter what amount of dodging in development be resorted to, the result will not be entirely satisfactory. In such a case of marked dissimilarity perhaps the best thing to do, provided the worker is quite satisfied that every care has been observed and equal exposures given, is to make a fresh scrutiny of the negative, so as to see if there be a distinctly noticeable difference in printing density which would account for the dissimilarity; and, provided such be found, recourse must be had to some means of so doctoring the weak portion of the negative, or otherwise so reckon for the difference when exposing (later on I may have to offer a few remarks on this point of doctoring), as will equalise matters when a fresh exposure and development is made. Provided, however, a reasonable amount of care has been exercised in the earlier stages of the work, it will not often fall to the lot of any one to have to deal with negatives of such inequality as will offer much trouble in this respect.

In cases where it is observed that only a slight lagging or difference is apparent, it is quite within the power of an intelligent worker to cope with the evil in the development stage itself, and many almost perfect results can be obtained eventually on plates which at first came along in an uneven or irregular manner during the earliest stage of development.

Having noted the importance of a worker being able to discern the development of the minutest details as they come along in both pictures, I shall proceed to offer a few remarks anent what in my hands has proved a most successful formula for the development of all classes of bromide plates.

Prepare a weak solution of acetic acid in water—by a weak solution I mean two drachms to, say, ten ounces of water—and have at hand a large camel-hair brush, one of the stumpy ones sold at threepence apiece or so does nicely. This solution is for the purpose of equalising and stopping development in any portion of the picture which shows symptoms of over-development before the other portions of the picture are up. Make a saturated solution of sulphite of soda, and see that it is distinctly acid with citric acid. Into a pyro bottle containing one ounce of pyro pour nine ounces of the sulphite solution. Label this pyro.

Next weigh out carefully—

Carbonate of soda	4 ounces.
Sulphite of soda	288 grains.
Bromide of ammonium	40 „
Water	32 ounces.*

Label this soda.

With these solutions a worker is ready to go ahead.

To develop, say, a half-plate lantern emulsion plate properly timed in exposure, let the operator take three ounces soda solution, and just at the moment of development add to same one drachm pyro solution. Apply dexterously to the plate in a suitably sized white porcelain tray, which ought to be scrupulously clean. In about fifteen seconds the first symptoms of development should appear. This is the moment to watch like a hawk for any signs of dissimilarity in the two pictures, and provided they both come along nicely (not too rapidly) it may be assumed all is going well, and there will be no need to resort to the acetic acid solution. Allow development to proceed till the most minute details are up, and if it should be found that there be any lack of density, a few drops more of the pyro solution may be added. This will give any amount of density, and provided all has been equal and right, the time occupied in development need not exceed, say, one and a half minutes to two minutes. *Wash thoroughly, and fix in clean filtered hypo solution.* When working large transparencies the utmost precaution must be taken to avoid grit and all other impurities. After fixing, wash well, and immerse for about one minute in Edwards's clearing solution, which is well known is composed of—

Citric acid	1 ounce,
Alum	1 „
Sulphate of iron	3 ounces,

and if a good transparency is not the result it is no fault of the formula.

So much for the treatment of plates which offer no trouble. But it frequently happens, through some error in exposure, or irregularity in the negative that is being printed, the two independent pictures do not come along in development in the exact same manner, the result of which (in the event of nothing being done to compensate for such) is that the finished transparency is somewhat marred by one picture being denser than the other. In itself, when such be viewed through a stereoscope, but little exception or fault would be noticeable. But, no doubt, it ought to be the aim of every worker to produce pictures of as great regularity as possible, and as but little trouble need be experienced in overcoming this discrepancy during the stage of development, a worker should strive to counteract such. But little observation is needed, provided at the early stage of development a worker looks carefully for the symptoms of this irregularity. When it is noticeable, recourse must be had to the use of the acetic acid solution mentioned already; and when it is judged that any picture is fully up, the plate may be lifted entirely out of the developing solution, and the camel-hair brush, which is charged with the acetic acid solution, drawn gently across the face or such parts of the picture as are deemed fully developed. This will in no way interfere with the other portions of the transparency, development of which will gradually progress, and in a short time it will be observed that it catches up or overtakes the part treated with the camel-hair brush. It is quite easy to judge when an uniform result has been reached by looking through the picture against the developing lamp. The moment it is judged that development should be stopped, the plate can be washed under tap, fixed, and cleared as previously stated. By means of this treatment two independent stereoscopic pictures may be produced of great regularity from negatives of varying densities.

When negatives have to be dealt with containing flaws which are sufficiently pronounced as to mar the beauty of the finished transparency, the same should be doctored before printing. Pinholes or transparent spots should be most carefully spotted out, so as to avoid black specks in the finished pictures; such are not so difficult as a rule to deal with, as opaque spots, but much will of course depend upon the character of each flaw. I may here just remark that I have seen some negatives containing these opaque spots in the sky portion utilised by merely printing in cloud effects which covered up their presence. When such have to be dealt with, I know of no easier way of getting over the trouble than by printing in clouds on the glass side of the negative in such a manner as to obliterate the flaw; but it must not be forgotten or overlooked that when such a cloud is worked in on one side or one negative, the other must receive as nearly as possible exactly the same treatment. There is no great difficulty in doing this, and once a worker tries his hand at such for the first time by working in clouds with a wash of Chinese white on the glass side of his negatives, it is most likely he will have learned something worth knowing as to the treatment of every negative that has thin skies. In my practice I never block out a sky that is thin; by far the best way is to adopt the treatment I have named. At first it is almost certain a beginner will apply too much pigment, but will soon be able to judge of the right quantity to work with, and also the proper wavy motion of the brush when applying the pigment. The chief thing to be borne in mind is, that whatever treatment or dodge which is applied to one negative must be worked into the other.

In my next I hope to treat of the cutting of the masks and mounting the finishing picture.

T. N. Armstrong.

* For the formula I am indebted to an article which appeared in one of the annuals. I think it was given by Mr. Lenk. It is a rare good one for transparencies on bromide plates.

REPRODUCTION OF POSITIVES AND NEGATIVES.

[A Communication to the Camera Club, printed in its Journal.]

Before I enter upon the principal subject of my paper, I should like to show you a few of the results of methods of reproduction which are not very frequently used, but are well worth very careful study.

The first is a transparency on platinotype paper, made in the ordinary way by contact, the print being fully printed and then rather over-developed in order to sink the image, after which the paper is rendered more transparent by the aid of paraffin, which, amongst its other qualities, has the very valuable property of not turning yellow with age. You will notice in looking at this transparency that when looked at by reflected light it appears dull and flat, but when held up to a strong light it is as transparent and almost as brilliant as a transparency on glass.

And now I come to the main point of my paper, viz., the reproduction of positives direct from positives, and negatives from negatives. The process is so simple and so fascinating that I trust you will all give it a trial, and that in the hands of some of you who have more leisure than I have, experiments may be carried out which will give you a perfect mastery over the methods of development necessary to obtain the best possible results.

I do not propose to go into the theory of the subject, as that has been so ably discussed already by Captain Abney and others; but merely to give you the practical results of my experiments with varying exposures and different developers.

The method which I have used is this. The negative in contact with a sensitive plate is exposed in the printing frame to diffused daylight for a few seconds, and then developed with a very weak developer.

The developers which I have used are eikonogen, hydroquinone, and pyro and soda.

The first negative which I wish to show you is of more than common interest, inasmuch as in the original negative the central figure was seated on a common Windsor or kitchen chair in a room containing, as far as my memory serves me, a kitchen clock and two other wooden chairs. The whole of the background was very skilfully worked out. I think you will allow that the present surroundings of heather, rock, mountain, lake, and sky, make the picture rather more pleasing than the somewhat incongruous furniture of the original. To obtain the reversed negative, which I will hand round for your inspection, the negative was placed in the printing frame in contact with an Ilford ordinary plate, and given twelve seconds exposure to diffused daylight at 3.45 p.m. on Saturday last, when, as you will remember, the light was rather poor.

The developer used was eikonogen, Marion's instantaneous.

Formula
- 5 parts sodium sulphite.
- 2 parts carbonate of potassium.
- 1 part eikonogen.
- 30 parts water.

Diluted with eight times its bulk of water.

Development takes place in the ordinary way, except that instead of a positive a negative image gradually appears, and continues until development is complete, which, in this case, was about fourteen minutes.

The second plate from the same negative had twenty-five seconds exposure to diffused daylight at 4.7 p.m. on the same day, and in this case development was continued for sixteen minutes.

The third plate was given an exposure of twenty-five seconds at 4.45 p.m. of the same day, but in this case hydroquinone was used. I cannot give you the exact constituents of this developer, but it is known by the truly scientific name of hintoquinone mixed in the following proportions:—Hintoquinone, 1½ drachms; water, 8 ounces. Time of development, thirty-five minutes.

It will be interesting to compare this with the eikonogen-developed negative.

The fourth plate is a transparency produced in exactly the same manner as the former, but from a paper transparency. I will hand round the transparency and the reproduction in order that you may compare them. This was given a two minutes' exposure at 5 p.m., when the light was, of course, very feeble; developed in eikonogen in the same proportions as before, and development was continued for twenty-five minutes.

The fifth, negative of bridge and trees, 20 seconds' exposure at 4.20, light dull.

Developer, eikonogen, 1 in 8.

Time of development, 15 minutes.

The sixth, exposure 8 seconds, 12.30 p.m., light good.

Developer, 60 minims S.P.

20 grains carbonate of soda.
40 grains sulphite.
8 ounces water.

Development, 10 minutes.

This seems to give very good results. There is good detail in the high lights, and, perhaps, better gradation throughout.

The seventh, exposure 2 seconds, 12.55.

Developer same as No. 6, but with the addition of 2 ounces of water.

Exposure is evidently insufficient. The high lights in the negative partake evidently of both the positive and negative image. The shadows show plenty of detail, as the exposure for shadows was probably about correct.

The eighth exposure was made in a different manner; the first object being to avoid halation, the second to delight the "new sort of lunatics" who believe in the destruction of detail. The plates were placed in the printing frame back to back. In this case it will be noticed that the evil effects of halation are greatly diminished, and the gradation appears to me much better than in the other examples I have shown.

This leads me very strongly to the opinion that far better results than I have shown would be produced by backing the plates, or by the use of films.

In the quarter-plate reproduction, which I now pass round, I would particularly draw your attention to the margin; this, although entirely protected from light by the rebate of the printing frame, is black. If you compare this margin with that of the transparency, you will notice that whereas the margin of the negative, which was exposed to no direct light, is black, the margin of the transparency, which was fully exposed to the direct light without any protection, is simply slightly fogged.

Unfortunately, my time for experimenting has been so short that I have not been able to try the effect of backing the plates to prevent halation; but I am inclined to think that this would be very advantageous. Probably, also, films would give very satisfactory results, but these will have to be the subject of further experiment.

I am at the present moment experimenting with a view to producing enlargements direct from the negative, but at present have not carried them far enough to obtain perfect results from them. If, however, I succeed, as I hope to do, the advantage of this method of producing enlarged negatives is so great that it will probably be found to be the most important branch of the subject.

ERNEST J. HUMPHERY, M.A.

TONING BROMIDE PRINTS.

THERE is mention at page 666 of a method of toning bromide prints attributed to M. Hermann Frendenthal which is said to have proved unsuccessful in the hands of Dr. Stolze. It is always difficult to arrive at the causes which prevent one experimentalist from duplicating the results obtained by another, without an examination or, at least, a description of their respective modes of working; but I do not think that in the present instance we shall be much troubled to discover the explanation of Dr. Stolze's failure, or remain in ignorance of the particulars in which M. Frendenthal's method was found wanting. The tones obtained were no doubt unsatisfactory, and possibly the whites of the pictures were stained; and as I reperuse the directions given I am tempted to speculate that there were other disadvantages.

If we rightly read one of the several lessons conveyed to us from the walls of the exhibition of the Photographic Society of Great Britain that has just closed, we cannot avoid the conviction that although albumen-silver printing—which has been boldly proclaimed by the Editor to be almost extinct—shows no tendency to return to general favour, the cold black tones of the developed bromide and the platinum processes are not in future likely to have such a degree of supremacy as hitherto. At least three of the medalled pictures—a good percentage—had, I believe, an unmistakable warmth of tone, from which we may not unfairly surmise that we are about to experience a revulsion of critical taste in this important matter. I shall be surprised if the next exhibition does not contain an increased number of protests against the long prevalent sombreness of colour we have witnessed, especially as the judges of the late exhibition, on the confession of one of them, were pleased to medal a picture simply because it "indicated a new and beautiful method of printing, producing an artistic colour which may be of the greatest use." What is this but a hint to copy Mr. Lyonel Clark's example? Definition is immaterial so long as your fuzzitype has an "artistic colour," which of itself seems sufficient to assure a coveted Pall Mall award. If this judicial declaration had been appended to Mr. Clark's exhibit it would have answered what to many was a deep puzzle.

M. Frendenthal's method of toning developed bromide prints is suggested "on account of the difficulty experienced in giving the same degree of tone to chloride of silver paper. Ordinary bromide paper is employed, developed, fixed, and washed, and then immersed in a chloride of copper bath composed of one part of cupric chloride and three parts of chloride of sodium in ten parts of distilled water, in which it is left until the surface begins to get white. It is then washed and dried, and then introduced in full daylight, which is essential, into a suitable gold bath." Thus the method consists of bleaching the positive and afterwards "toning" it with gold solution, presumably alkaline. Nothing is said about a second fixing, which, however, would be indispensable.

Although in connexion with the bleaching of developed positives most of the chlorising solutions in common use have over and over again been described in these pages, I cannot remember having seen that of M. Frendenthal. He does not state in what particular manner his cupric chloride is prepared, upon which much depends in regard to preventing the staining of the picture. A mixture of common salt and copper sulphate would probably not answer; and I have found myself that the potassium bichromate and hydrochloric acid solution so often recommended for converting a silver image into pure chloride produces a yellow stain that defies removal from bromide prints. I believe pure cupric chloride is usually prepared by dissolving the higher oxide in hydrochloric acid, and this I assume to be the compound spoken of by M. Frendenthal, and not either of those just

mentioned. If such is the case the dangers of discolouration are greatly reduced. The copper chlorides combine with the alkaline chlorides to form double salts, so that in the chlorising reaction the comparatively insoluble proto-chloride formed becomes converted to the cupric state, and so precipitation of copper on the image is obviated. This, I suppose, explains the presence of the three parts of sodium chloride in the bleaching solution.

M. Frendenthal directs the picture to be washed, fixed, washed again, and dried before it is bleached; but of this I question the wisdom, and for more than one reason. It increases the number of manipulations, and is neither necessary nor expedient. It is well-known that when one has finished the development of a gelatino-bromide plate there is, provided it is washed free of the developer, no danger of examining it out of the dark room: the unaltered salt fixes out quite clearly, notwithstanding that the light has been allowed to act upon it. In M. Frendenthal's method, fixation after toning would suffice to remove both bromide and chloride.

The exposure in full daylight, while "toning," is recommended, I take it, with the view of assuring the reduction of the silver chloride to the state of sub-chloride; and as under such circumstances it is unreasonable to expect any perceptible darkening to occur, this brings us to what I venture to think is a fatal defect of the method of "toning," and one that may easily account for Dr. Stolze's non-success. M. Frendenthal apparently supposes that the product of the exposure of pure silver chloride in full daylight, and under his "toning" solution, and the image of an untoned, untixed print on albumen paper, to be chemically identical, which for several reasons I believe to be erroneous. Even if the pure chloride be darkened to what is called violet sub-chloride, it remains to be proved that the identity is a true one. But, putting that point out of sight, I submit that the action of the gold toning bath, plain or alkaline, upon the silver chloride, or sub-chloride, as the case may be, is far from being what M. Frendenthal infers. One of two things, doubtless, happens: either the reduced chloride is reconverted to chloride pure and simple, or the silver is partly replaced by the gold. The latter appears to me improbable. In March of last year Mr. G. F. Blackmore read before the West London Society a paper on *The Toning of Lantern Slides*, in which he stated that slides bleached with cupric chloride resisted all attempts at toning. Mr. Blackmore says nothing of an exposure to daylight, but I conjecture that even with such an exposure the result would have been the same. A distinct darkening seems essential to the completeness of the "toning" action, as in the instance of albumen prints; but as this, if obtained, might prohibit the reappearance of the positive in a satisfactory state of gradation, M. Frendenthal's method must incur the suspicion of being impracticable. I have never tried what effect a prolonged exposure of a chlorised image would yield upon redevelopment, but I should say that it would distinctly tend to produce heaviness and loss of contrast.

Redevelopment of the bleached image on bromide paper gives us no reliable command over the colour of the picture, and I refuse to believe that it is of any value at all for toning purposes. Mr. Blackmore was successful in toning lantern slides by first of all bleaching the image with mercuric chloride, and then applying a weak solution of gold. Here, I presume, the gold would in reality displace the double chloride to an appreciable extent. A plain gold solution can be used to tone developed positives, so that there seems no reason why the alkaline solutions should not answer the same purpose. If found practicable, a variety of tones could be obtained by that method.

In view of the probable revival of a taste for warm tones on matt surfaces, there is undoubtedly scope for experiment in the toning of developed bromide prints. A *desideratum* would be that the progress of the toning could be watched. I cannot gather from the meagre details of M. Frendenthal's method that he was able to judge of the effect of the toning solution upon the silver chloride before fixation. So far as I know, an alkaline toning bath has no developing action. An ideal toning process for bromide prints would be one that admitted of the introduction of the toning agents into the developing solution so that development and toning could proceed concurrently. In any case, it should be possible to do without preliminary bleaching of the image, which, whenever gold tri-chloride was used as a toning agent, would be a superfluous operation.

THOMAS BEDDING.

EDINBURGH PHOTOGRAPHIC EXHIBITION.

[From a Correspondent.]

MANY readers will remember the Edinburgh Photographic Society's Exhibition which was held in the Royal Scottish Academy's National Gallery in December, 1876. It was considered the finest exhibition of photographic work of its time. On that occasion the five rooms were filled with the best productions of the day, the walls being hung with thousands of pictures forwarded from all parts of the world for exhibition and competition.

With many doubtless remains the memory of those charming interiors with groups of figures, exhibited by A. Kareline, Nijnii-Novgorod, Russia, who on that occasion carried away the gold medal for his originality and skilful arrangement in lighting and posing. Such pictures probably would be considered very ordinary work now, then they were considered a revelation.

Mounting in optical contact was also in its infancy then, and we remember that considerable doubt was expressed as to whether pictures so mounted should be allowed to compete. Payne Jennings had a frame of large views so finished that they were admired by all who saw them, because of the fine liquid feeling that this class of mounting conveyed to his prints.

Specimens of Willis's platinotype were also shown at the 1876 exhibition, and probably would have got some recognition by the judges, who fully appreciated its value; but not being exhibited by the inventor himself, it did not come within the range of awards. It did not create much notice. Things are different to-day, for specimens of platinum pictures by the various styles of manipulation will form one of the most prominent features of the present exhibition.

And now from November to January we are having the second International Photographic Exhibition promoted by the Edinburgh Photographic Society, again to be held in the Galleries of the Royal Scottish Academy, a series of rooms which stand unequalled in design for the purpose, being specially constructed and arranged for the showing of pictures and works of art. The exhibition was opened on Friday evening, November 14, with a *conversazione*, at which a large and brilliant assemblage was present. The rooms were beautifully decorated. Plants and flowers were fitted into every nook and corner all over the extensive space, whilst the walls above the pictures were festooned with a drapery of old gold colour, in the draperies of which were fitted panels bearing the names of most of the early fathers of the art science, amongst which we noted Niepce, Daguerre, Legray, Archer, Ponton, Brewster, Talbot, and many others.

The string band of the Queen's Own Cameronian Highlanders was in attendance, and played some fine selections during the evening. The Lord Provost had kindly consented to open the exhibition, and he was introduced to the assembly by Mr. H. Blanc, President of the Society. He, in his introductory remarks, stated that the membership of the Society was over 400, and that there had not been an exhibition of such magnitude as the present since 1876, which had been a financial success, and that on the surplus obtained from it the present exhibition was started, and that a like success was hoped for in this case. Regarding this present exhibition, he did not look upon it as merely a show of pictures, but that it should prove a popular educator as well.

It had been arranged that lectures were to be given on some of the more practical features of the art-science ones every fortnight during the run of the exhibition, and that several gentlemen quite familiar with the various subjects had been secured to deliver the lectures, the inner room of the galleries having been arranged for the purpose. Magic lantern entertainments also having been arranged for as one of the popular features of the exhibition. Mr. Blanc thought that these were more necessary now that photography was found in every field of art, literature, and science. In bringing his remarks to a close, he presented the Lord Provost with a beautifully bound proof copy of the catalogue, and a couple of season tickets printed in gold.

The Lord Provost then rose and delivered a short appropriate address, in which he likened the galleries to the Temple of the Sun, the walls of which were covered with sun pictures. He was of opinion that there was a great future for photography, judging by the rapid strides it had made since its birth fifty years ago. He hoped that some day they might be able to photograph in colour, but as that was a thing of the future, they had to congratulate themselves that so much had been done. He then declared the exhibition open.

With a vote of thanks, proposed by Dr. Drinkwater, to the Lord Provost, which was received with hearty cheers, the business part of the meeting terminated. The company then scattered through the rooms with intent to view the pictures; but in this respect much could not be done, for the company was so large that the inspection of the pictures was next to impossible, so that the principal business of the evening resolved itself into looking at and talking to each other.

Apparatus is well represented, and in my first cursory inspection I noted amongst the exhibitors Turnbull, of Edinburgh; Hume, Edinburgh; Baird, Edinburgh; Buncle, Edinburgh; George Mason & Co., Glasgow; McGhie & Co., Glasgow; Wray, London; &c.

The pictures are represented in a collection of some 1200 frames, which certainly means over 2000 photographs, and amongst names familiar to us were Marshall Wane, Crooke, Moffat, Ayton, Warnerke, Kilpatrick, Wane & Allan, &c. More extended criticisms must be left for future notices.

Platinotype is well represented, and mechanical processes are well to the front.

In the first room from the entrance I came upon some very old friends, both in apparatus and pictures. Here I found the Harrison & Johnson pantoscopic camera, and also Sutton's, on a table filled with such wonders out of the past, their only use now being to show what has been.

And on the walls of this same room a considerable display of D. O. Hill's pictures is shown. They possess an interest all their own, those quaint old groups and figure subjects with such names as *Bird Alone*, *The Story of Bruce*, *Farewell*. They appeal to a day gone by, when retouching was unknown, and posing was not so much an art, and before naturalistic photography was thought of. The preservation of many of these pictures of D. O. Hill's is perfectly wonderful.

Another thing of the past to be found in the same room is a frame of positives taken on black leather, sent in by A. Robertson, Glasgow.

I will consider the pictures and apparatus in my next notice.

(*From another Correspondent.*)

After an interval of fourteen years the Edinburgh Society has entered, in this age of exhibitions, successful and otherwise, upon another, with the intention of making it, as the last was, an international one, and the results are to be seen on the walls of the Royal Scottish National Galleries in that city, the east range of which has been kindly granted by the honourable the Board of Manufactures for Scotland, who are the custodians. It was opened on Friday evening, November 14, with a *conversazione* by the Lord Provost of the city, Mr. Boyd, the President of the Society, Mr. Hippolyte Blanc, and the other office bearers.

Although the evening was disagreeably stormy and boisterous, the vast extent of the galleries was almost inconveniently crowded. In introducing the Lord Provost, Mr. Blanc referred to the great success, financial and otherwise, of the former exhibition held in the same place, stating that a portion of its surplus reserved for such a purpose had enabled the Society to float this exhibition without trenching on the ordinary funds. In a few well-chosen words he directed attention to the great advances the young art science had made, even in so short a time, and stated that during the course of the exhibition a series of lectures and expositions of the varied technicalities and other matters connected with photography would be dealt with by gentlemen fully qualified to take up and explain the different subjects, and concluded by presenting his Lordship with the catalogue, season tickets, &c., in the name of the Society. Lord Provost Boyd, in a complimentary speech to the sun artists, the results of whose works they would have the opportunity of examining more minutely, proceeded to compare the galleries, illuminated with a brilliant light, adorned with sun pictures, and peopled with ladies and gentlemen wearing the sunflower, to a temple of the sun. From the extreme east to the far west, he said, there were traces of the sun worship. In the sculptured stones of Nineveh and the pyramids of Egypt, in the temples of Greece and Rome, the circles at Stonehenge and Stennis, the cromlechs of Scotland and the monoliths, sculptured and unsculptured, they had traces of that old sun worship which prevaded the whole face of the globe. It was very interesting, too, to think how these traces were still to be found in the shape of our churches, and how they came still more home to us in the Yule log, the May morning celebrations, and the mistletoe bough hung up at the close of the year. As vestiges of the old worship so prevalent in the early stage of the world's history, it all came home to them. Proceeding, his Lordship expressed the pleasure it gave him to assist at such a ceremony.

The display, it would be seen, embraced a collection indicative of much labour and industry on the part of those who practised photography. They had to thank the Association for their arrangement of the treasures committed to them, so that visitors might learn the progress which photography had made from year to year since its commencement half a century ago. He did not know that any more pleasant occupation for one's leisure hours in the country could be found than photography, and he was quite sure it had served not only to give a great deal of pleasure to those who had practised it, but it had been of immense value in connexion both with science and with art. They had far more to expect from photography in the future than they had to congratulate themselves on receiving in the past. It was hoped that they might some day be able to photograph colour as well as form, but in the meantime they might congratulate themselves that so much had been done, and do all in their power to encourage the study of the art.

He then formally declared the exhibition open, and after a vote of thanks to his Lordship having been formally proposed and agreed to, the company proceed to examine the treasures.

A rapid inspection shows that the exhibition has scant claims to be called "International," and that Continental and American exhibits are very much fewer in the present than in the last, from which a Russian exhibitor carried off the first prize (gold medal). It also shows that the present exhibits, on the whole, show a very much higher average reach of excellence, as well as a range of subjects that were then hardly obtainable.

This, however, must be taken in a qualified sense, for with the increased scientific activity which has given greater power over the processes involved, and thus secured more especially greater rapidity in the production of transient effects, which, while of the highest value for some purposes—say those of scientific research and registration—are by no means the only ones to be aimed at, although they are invaluable.

From the photographer's point of view the increased power of giving through the medium of his art, which is simply that of giving by his special mode of representation effect to the artistic thought, is a much higher one than the strictly scientific power, say, of registering the stars in their courses, and in this department there may not be visible here so great an advance, if indeed that is possible in the nature of things. But still, if on examination there may be found nothing artistically higher, undoubtedly there is a decided and a great movement in this direction and in all sections of this class of representation, whether it may be in portraiture, in sea, or landscapes, in the depiction of animals, wild, tame, or domesticated, or in the advances towards perfection in arrangement of groups of figures, real, suggestive, or purely imaginative, there has been such an improvement that if a Rip Van Winkle among the photographers were awakened and turned loose into the picture galleries on the mound, he would perforce rub his eyes and cry "Prodigious." In one other respect those moving panoramas of nature's power and beauty which we have always with us, the seas and the skies, are here more in evidence, and we have fewer expanses of white paper which used occasionally to do duty for that eternal mystery and true test of the artist's power of rendering the sky and the atmosphere, that intangible surrounding, that indefinable presence, which gives the true beauty to all land or sea pictures.

In portraiture the progress is, if possible, still more marked. In the earlier exhibition there were a few exceedingly fine examples from the best studios of Great Britain, as well as from "the neighbouring continents of Europe, Asia, and America;" but it may be questioned whether the finest of those then exhibited are not equalled by the general average of this exhibition, while the best are far superior in all that relates to *technique* even, not to mention artistic power and capacity, which is, after all, the only true element by which that class of work should be judged. Exquisite photographic manipulation, while helpful, is by no means the highest ideal the portrait photographer should endeavour to reach—that lies only in the artistic rendering of the character, the soul, the mind showing through the clothes, the gloss, the fashion, and showing the true woman or man—that is the portraitist's work.

Another but a purely technical improvement lies in the direction of permanency of results, and there a similar result must be chronicled. A glance at some of the earlier pictures on exhibition which may be called in relation to those of to-day in this art science of only fifty years old, the historical examples show at once the evanescent nature of several of them in the materials of, or processes by, which they have been executed, and in this connexion I must point first to those to which I must again revert, the examples shown taken by the combined artistic and photographic talent of Messrs. D. O. Hill and Adamson, as they point a moral. All the examples, so far as I have noticed, are on plain paper, most of them are in a fair state of preservation, some have faded and gone, while others show only the marks of indiscreet or uncleanly handling, being in great part perfect, with ugly marks and spots (hypo), such as I have been long familiar with; but several of the frames have not only the prints but also the negatives from which they were taken, and as careful an examination as a framed, glazed, hung specimen permits, seems to show that the paper negatives are perfectly intact. Why should this be? The negative must be much more fingered than any one print, and I must presume that several prints have been taken from each; how is it, then, that the negatives show the most permanency? Is it that developed pictures as such on any or in any media are more permanent than developed ones? In the printed pictures over the entire exhibition it is also noticeable that the two processes from which most beautiful results are obtained, albumenised silver prints and carbon pictures, are in the assured minority. Platinum in its varied forms is deservedly asserting itself, both for beauty of result and permanence of result, so far as I know. The various bromide and chloride processes with gelatine, or collodion developed, or printed-out are all well represented.

INTERIORS, LENSES, AND EXPOSURE TABLES.

I noticed in your issue of September 19 a communication on the subject of interiors by Mr. William Brooks, quoted from The British Journal of Photography. The article seems to me to be a misleading one. Aside from its somewhat cocksure tone, it contains several extraordinary statements which seem to run counter to general experience, and to be at variance with mathematical laws.

After some preliminary remarks about cameras and tripods, Mr. Brooks goes on to say:—"I have always obtained the best results by using a Ross portable symmetrical lens. I am well aware that this lens is not liked by many on account of its being slow; in my hands it is slow and sure. For this class of work it has no equal, and another point in its favour is that the so-called flare spot is entirely absent. If lenses of the rapid order are used, they produce halation in its worst form. I have never found the backing of plates of any service whatever. . . . I have been repeatedly asked how it is I never get halation, and my answer always has been, 'by using the proper lenses,' as stated above."

The writer seems to confound "flare-spot" and "halation." They are not convertible terms by any means. They refer to two distinct things. "Flare-spot" is caused by internal reflections at the surfaces of the lens, producing an image of the aperture of the diaphragm. If this image happens to coincide with the equivalent focus, the result is a circular fog-spot in the centre of the picture. "Halation" is something else altogether. It is a blurring of the outlines of the high lights in a picture, by which, when there are extreme contrasts of light and shade, the edges of the bright portions overlap the dark ones. It is caused by some *scattering*,

so to speak, of the rays of light among the sensitive silver particles, aided probably by reflections from the back of the plate. The lens has nothing whatever to do with halation; it occurs just the same when a pinhole is used.

I have no doubt that the "flare-spot is entirely absent" in a Ross portable symmetrical lens. It is also absent in the lenses of any reputable optician. In this respect the Messrs. Ross enjoy no immunity which is not shared by Dallmeyer, Beck, Steinheil, Wale, Gundlach, and a host of other lens makers. There is no lens made which will prevent halation, as it does not result from the action of the lens *per se*, but from the action of light upon the sensitive surface, however produced. The "portable symmetrical" lens possesses no occult, mystical power. All lenses made by competent opticians behave in identically the same manner, high-sounding claims of advertisements to the contrary notwithstanding. No matter what these lenses are christened, if they have the same focal lengths, the same sized stops, and are used on plates of the same dimensions, they give precisely the same image and produce it in the same way. Suppose two lenses, the one "rapid," the other "portable," of, say, ten inches focus, and a quarter inch diaphragm opening, are used in a whole-plate camera, they will make identically the same picture, and take identically the same time to make it. Even with lenses of different focal lengths, if the intensity ratio of the stops is the same in all, they will require the same period of exposure. It is true that so-called "wide angle" lenses work more slowly than "rapid" ones *when used without diaphragms*. But why? Because the *working aperture* of the former is by the necessities of manufacture smaller than that of the latter—the full opening of a "wide angle" often corresponding to the middle stop of a "rapid." Assume the ratio of the open "rapid" lens to be *f*·4, and that of the "wide-angle" *f*·16, the latter will require sixteen times the exposure of the former. But stop the "rapid" down to *f* 16, and both will need the *same time*, whatever their focal length.

Mr. Brooks may or may not have found the "backing" of plates to be of service; but it is certain that other photographers have found that process of inestimable service—in fact, quite indispensable when in a dark interior a strong light faces the camera. As one out of many, I recall an instance in the experience of my *confrère*, Professor G. M. Searle, of the Catholic University. The subject was the east end of a church, with brilliantly lighted windows. An ordinary unprotected plate gave a negative in which the windows were badly solarised—quite "burnt out" in fact; while on another plate, backed with Gihon's "Opaque," every detail was beautifully rendered, with no trace of halation.

"Wide angle lenses," says Mr Brooks, "if improperly used, give the worst possible results by way of distortion." Very true. And it may be added, with equal truth, that if *properly* used they give results simply unapproached by any other class of lenses. And what lens cannot be "improperly used" for that matter?

The following sentence no one can quarrel with; it is so luminous as to be axiomatic:—"I have always found that the best result is obtained by using a lens of such an angle as to get sufficient of the subject matter to give a pleasing result."

In other words, the best result results in the best result. This reminds one of President Lincoln's reply to a friend asking a criticism of a certain literary effort: "Well, for people who like that sort of thing that is about the sort of thing they'd like."

What is this "pleasing effect?" And who is to be the judge of it? How much of the subject matter *is* "sufficient?" Possibly other struggling photographers may have ideas on these heads as well as the writer in THE BRITISH JOURNAL OF PHOTOGRAPHY.

In his remarks about levels, Mr. Brooks seems to mistake utterly the purpose and use of that convenient little accessory. A level is of no use, of course, on the *bed plate* of a camera. It should be attached directly to the *swing-back*. No matter how much the body of the camera is tilted, the sensitive plate must be in a vertical plane at right angles to the axis of the lens to ensure absolute rectilinearity in the photograph. In other words, the sides of the plate must be perpendicular to, and its top and bottom parallel with, the horizon. These conditions are easily fulfilled by attaching a circular level (or one of those neat little elbow-shaped affairs sold by the Scovill & Adams Company) to the top of the ground-glass frame. When the bubble of the circular level is in the centre of the circle, or when each bubble of the "elbow" level is central, the plate is sure to be in the right position, and the picture will be rectilinear.

The writer continues: "Never attempt to use any of these nonsensical tables for calculating exposures, which are only got up by schoolmasters and figure jobbers who have nothing better to do."

This is very reckless language, prompted, it is to be feared, by a desire to say something smart at the expense of truth. A journeyman carpenter might with equal propriety say that tables of logarithms, which he could not use the use of in his trade, were "nonsensical," and "got up by schoolmasters and figure jobbers" (whatever that means). I once heard of a down-east deacon who said of one of Shakespeare's sonnets, that "he didn't call that stuff poetry; it wouldn't go to any tune *he* knew."

Exposure tables *are* of use, and of great use. They are based on strict mathematical principles which cannot be flippantly ignored. As far as they go they are perfectly accurate. But they must be used intelligently. Light is not a constant quantity; it varies from hour to hour and from day to day. And so the "personal equation" comes into play continually. Such tables form valuable guides—elementary primers, so to speak—but they must be supplemented by judicious observation and comparison. Within their province they are useful and scientifically correct. To condemn them wholesale as "nonsensical" is, to say the least, a hasty and intemperate statement.

In conclusion (though this is a minor matter), when a writer makes use of a quotation, it is unpardonable to quote incorrectly. The writer in question essays to quote as follows:—"I think it would be a funny pair of eyes that could see everything absolutely sharp in nature on every plane, possibly like Sam Weller's 'forty-horse power double oxyhydrogen gas microscopes.'"

A glance at the famous trial scene in the *Pickwick Papers* will show that Mr. Sam Weller said nothing of the sort.

—*Photographic Times.* CLARENCE E. WOODMAN, Ph.D.

FILM PHOTOGRAPHY.

A SUBSTITUTE for glass for negatives being of universal interest to all, I wish to say a few words on the progress the Eastman Company have made with their transparent films during the past year.

For the edification of those present who are not acquainted with the subject, I wish to say that the films in question are thin flexible celluloid sensitised, and take the place of glass dry plates, so that they can be spooled on a roll and carried right in the camera as a magazine and used at the pleasure of the operator, doing away with both bulk and weight of the glass dry plate.

Last year at this time the only evidence the Eastman Company could show for their claim of having invented and perfected these thin films in continuous lengths were a few samples, but now they actually have the goods on the market, and the orders for the films are so great that although they have a large plant for the express purpose of manufacturing them, still they cannot fill but comparatively a very small percentage of their orders, making some sceptical people say that they believe the Eastman Company have been forced to discontinue manufacturing the films. The facts are that the Eastman Company are working night and day on these films, and are producing from 600 to 800 lineal feet of transparent film, forty-one inches wide, per day; one-third of this product going to Europe.

Our claim of invention has been disputed by some of our contemporaries, but we are happy to state that the United States Courts have seen fit to sustain our claim to the extent of granting us letters patent, and also of setting aside an injunction brought against us by the Celluloid Company of New Jersey, one of the largest concerns in the world. The Eastman Company do not claim that they are the inventors of celluloid, nor the first to coat it with a sensitive emulsion, but their claim of invention is a flexible substitute for glass for negatives in continuous lengths. I here want to call your attention to a spool of the films, to its thin, even, smooth appearance and uniformity of surface; the great *desideratum* in a film of this kind is flexibility, and that you will find here; at the same time, the base is perfectly transparent, and is impervious to the chemicals in the developer. Among the many difficulties encountered at the commencement of the manufacture of these films, and which has caused much conjecture as to its origin, is what we term electric-spark impression, caused by an electric spark imprinting itself on the sensitive surface during the process of manufacture. This evil has entirely been got rid of, and now there seems to be only one trouble, and that is to manufacture them in quantities sufficient to meet the demand. We believe that it is only a matter of time when you all will use these films for outdoor photographing.

I wish to call your attention to our little Kodak *souvenir*, as the negatives are made on the Eastman Company's transparent films, and I think you will all agree with me that these pictures are clear and brilliant as those made on any plate. G. D. MILBURN.

—*St. Louis and Canadian Photographer.*

RESIDUES OF SILVER AND PLATINUM.

IT may be conceded, I think, that photographers look after their residues more than formerly; but I have been surprised to find on more than one occasion recently that even intelligent workers have been unintentionally remiss in this matter. Only the other day, during a conversation with a particularly careful professional, I said, "What about your *platinum* residues? Where are your waste developers and toning baths?" My friend had to confess he had not saved them. Now, considering the heavy increase in the price of platinum, this waste becomes serious. I am firmly of opinion that it pays every one who works or even "plays" at photography to save

and precipitate from time to time his washings, fixing baths, &c.; that is to say,—

1st. The fixing baths used for plates and silver prints.
2nd. The washing waters from silver prints.
3rd. The developers used in hot bath platinotype printing.
4th. The developing and *toning* bath used in the cold bath process of platinotype working.

With regard to the first and second solutions, the method of precipitation with potassium sulphide is that usually employed, and the operation is well understood. Personally, I prefer to precipitate with hydrogen sulphide. This method in many cases would be objectionable, owing to the well-known disagreeable smell distributed during the process. As, however, I conduct the operations under a large chimney with good draught, little inconvenience is experienced from these malodorous fumes. For two reasons I prefer hydrogen sulphide—firstly, the silver is thrown down as sulphide without (or, at any rate, but a small proportion of) free sulphur; secondly, I find the operation, requiring as it does the erection of suitable apparatus, an interesting and instructive chemical amusement for my apprentices.

In any chemical text-book will be found directions for fitting up apparatus for generating sulphuretted hydrogen, or the whole thing ready for use can be bought of most chemical sundry dealers at a reasonable price; the necessary chemicals for generating the gas must also be purchased—viz., sulphide of iron and sulphuric acid.

A two-gallon wide-mouth bottle is used to hold the bath to be precipitated, and a well-fitting, but easily moved, cork is arranged, through which passes the glass tube conveying the gas from the generator. In my practice, where a bath is precipitated once or twice a day, a two-gallon bottle is large enough. All that is requisite is to connect the tube in generator with that in the cork of two-gallon bottle by means of indiarubber tubing, and start the evolution of gas by applying the flame of a spirit lamp to the generating flask. The resulting sulphide of silver is collected from time to time and stored in readiness either for the refiner or for treatment (adopted occasionally) with nitric acid. If the latter method is adopted, the precipitate should be washed several times by shaking up with clean water and allowing to settle. Drain off as much water as possible, then add to the washed sulphide contained in a porcelain dish nitric acid sufficient to dissolve the sulphide of silver. Any brown precipitate remaining after this treatment may be filtered out and thrown aside. The filtered liquid may now be evaporated down to dryness, redissolved in distilled water, again evaporated or recrystallised, or it may be kept in solution and tested by the argentometer and made up with nitrate of silver to some standard strength. This solution I have successfully used for sensitising purposes; the salt itself has been used for the same purpose, or, fused with an equal weight of potassium nitrate, I have run it into a bougie mould for use as caustic points.

We some time ago had the evidence of Mr. Valentine as to the value of silver residues, even when passed and filtered, so to speak, through the hands of the refiners. The table, reproduced by Mr. Lyonel Clark (*Platinum Toning*, Appendix, page 93), shows that, estimating a sheet of sensitised paper to contain thirty-six grains of silver, about twenty-seven grains should be recoverable, or for every ten shillings expended in silver we should get back seven and sixpence from the residues.

Of course, it must not be expected that the sensitised papers of commerce contain this quantity of silver, but from practical experience I can confidently assert that the proportions of recoverable value is astonishing. Even when spending, in my amateur days, an average sum of twenty shillings per month in paper and plates, and with rough-and-ready and wasteful methods of recovery, the value of the residues would not be less than five sovereigns per year, or enough to buy a very good piece of apparatus.

Now for the treatment of waste solutions, as above—3rd and 4th—those used in platinum working. In the hot bath process it is usual to use the potassium-oxalate bath until it begins to show a yellow appearance. To a bath answering this brief description add about one-fourth its bulk of saturated solution of sulphate of iron and heat to boiling point; a porcelain dish should be used—metallic platinum separates, and may be filtered out. *Save the filtrate* for further treatment, or use it for developing purposes (bromide prints, &c.). Old platinum toning baths and washing waters should be placed in a suitable vessel, and two or three ounces of the ordinary ferrous-oxalate developer poured in; platinum in the metallic form is quickly precipitated.

The platinum precipitates, as above, may contain traces of iron, therefore it is best to place them in an evaporating dish with a little water and add sulphuric acid; this will remove iron in the form of sulphate. Wash the platinum with water, let it settle, and decant the supernatant liquor; then dry the precipitate and dissolve in *aqua regia*, say—

Nitric acid	1 part,
Hydrochloric acid	4 parts,

with gentle heat, using only sufficient acid to effect solution. This solution is evaporated to dryness, and in that condition may be used for preparing the platinum toning salt, potassium chloro-platinite; or perhaps the ordinary photographer would prefer to keep it in solution, in which case evaporate *nearly* to dryness to get rid of most of the nitrous-oxide fumes, and after adding a little water, put aside for the refiner to complete the operation. Few photographers will attempt to make their own chloro-platinite of potassium; a laboratory is requisite, and a good deal of skill in chemical operations necessary for complete success; briefly, an aqueous solution of platin*ic*-chloride at a temperature of 100° C. is placed in a suitable vessel, and a strong stream of washed sulphurous acid gas passed through, the object being to reduce the salt from the platin*ic* to the platin*ous* condition, the tube through which passes the gas should be arranged in such a manner that the flow of gas can be instantly checked from time to time, in order that the solution may be tested, and the progress of reduction gauged by the test solution—ammonium-chloride. An excess of sulphurous gas means the formation of platinous-sulphide, a salt not reducible by ferrous salts. The solution obtained consists of platinous-chloride, sulphuric and hydrochloric acids. "To convert this into the double-salt, chloro-platinite of potassium, it should, after cooling, be poured into a porcelain basin, and a hot solution containing 25 grammes of chloride of potassium in 50 c.c. of water well mixed with it by stirring; the chloro-platinite then separates in the form of a crystalline powder; it is allowed to settle twenty-four hours, the crystalline deposit collected on a filter, the mother liquor being drained off. It is then washed with a little water, and then a little alcohol, until the last washing gives no acid reaction. The powder is now spread out on filtering paper and left to dry in a dark room, as the salt, when moistened with alcohol, is reduced by the action of light."

If the study of chemistry were only allowed to occupy more of the attention of the young photographer, there are none of the above operations but could be performed on the premises. It would no doubt pay many large photographic firms to employ a man with special chemical knowledge for the purpose of utilising and recovering their waste products.

D. D.

PINHOLE PHOTOGRAPHS.

Some of the readers of the Journal may feel disposed to try their hands at pinhole photography, and a few practical hints on the subject may not be unacceptable.

First, with respect to the opening, it will be found that a fine needle heated to redness and just pressed through a piece of thin, hard cardboard will pierce a hole of suitable size, any little burr being removed by burning it off with the side of the hot needle, the point of which being again gently inserted in the opening will make it clear and round.

If it be convenient, the better plan is, of course, to get a watch-maker to drill the hole in a thin piece of sheet metal, which, being blackened, as must be the cardboard, is ready for use. It may be attached to one of the lens stops by strips of thin gummed paper, or, if preferred, a piece of metal, &c., cut to the pattern of the stop, may be pierced centrally and used in its place.

The lenses being removed from the mount, the latter is placed on the camera, the focussing glass is pushed forward to within six inches of the pinhole, and the image observed for sharpness. I have found that by turning the camera towards the sun, and getting his image as sharply defined as possible, especially if it can be observed through the branches of a tree, the approximately best position for the focussing glass is obtained. In finding absolutely the best position, the side swing is useful, as, by setting a plate at an angle and exposing, the resulting negative will be a guide in enabling the experimenter to get the best possible results.

It must be borne in mind that as a rule the pinhole should be as small as possible, for if the opening be too large a pleasantly sharp image cannot result. I have no means of measuring minute dimensions, and I suppose few photographers are better furnished in this respect, so I will not attempt to define the exact size of the opening, though I believe one-fiftieth of an inch is said to be a useful size.

The time of exposure for an Ilford ordinary plate at this time of year may be four minutes for a tolerably open view on a fine day, and up to ten minutes, or even more, for a view of a shady lane. It

is not easy to over-expose sufficiently to spoil the negative, as the very weak light does not readily pass through the film.

Developing should be started with a minimum of alkali, and should be carried on tentatively, as I have found the shadows suffer if any more than the absolutely necessary proportion of alkali has been present.

If a finder is attached to the camera, it will be useful for centring the view, as unless exceedingly well illuminated it is difficult to dispense with some such contrivance. The only difficulty in the operation is in the focussing with the small amount of light available, and the chief things to avoid are placing the focussing glass too far from the opening and under-exposing. THOMAS EARP.

Foreign Notes and News.

HERR GAEDICKE has recently been occupied in inventing and perfecting a smokeless flash-light powder. He has also devised a very practical method of firing it. The powder, as explained on a previous occasion in the columns of the *Journal*, requires a white heat to ignite it, and Herr Gaedicke prefers to strew it partially over a fragment of collodion cotton, which is ignited by a sort of port-fire, or slow match. Herr Gaedicke has further devised a kind of lantern in which the combustion is effected, the powder being placed on the lantern, which is open in front, the back and sides serving both as reflectors, and as a means to prevent any light falling directly upon the object-ve. The port-fire is attached to a kind of lever, which is kicked over by a pneumatic arrangement, and on falling down ignites the connection—the device consequently enabling two or more batches of "blitzpulver" to be fired exactly simultaneously.

THE Latte Club in Berlin has recently founded a photographic school for ladies. Twenty-eight students have already given in their names. Instruction will be given both in the artistic requirements, which should form the basis of every photographic training, and also in the various photo-mechanical processes. The course will include drawing from the living model and modelling from life, and is to occupy a period of one year.

A NEW judicial application of photography is announced from Berlin. The Ministry of the Interior has decided that in future all unidentified corpses, either found or washed ashore, are to be photographed before burial, and the photographs preserved in the State archives to enable the deceased persons to be subsequently identified. We recommend this very sensible determination of the Prussian Government to the consideration of the judicial authorities in this country, who still, as notably instanced in a recent [illegible] case, manifest an almost incomprehensible reluctance to admit photographs as legal evidence.

ONE of the many interesting little discoveries which so frequently crown with success the indefatigable energy of Dr Lüesegang is the following:—Two small strips of chloride of silver collodion are attached to a cork so as to hang side by side and inserted into a flask, the whole arrangement consequently resembling an electroscope. On exposing it to the light of the sun, the strips of course become black; at the same time they mutually repel, each showing that they are both similarly electrified, and that positively.

IT appears that the automatic photographic apparatus has first come into real use in America. Every person taking a railway season ticket is photographed in the office and the resulting effigy attached to the ticket. The object, as the *Photographisches Wochenblatt* suggests, is to prevent a misuse of the season ticket; but, as our contemporary points out, it is extremely doubtful whether such a result would be in reality attained, as nearly all the automatic photographs hitherto produced appear to present an equal likeness to the whole human race.

DR. EDER has been making experiments with the new photographically prepared silk manufactured by Tessié, of Paris. He finds that it fulfils its purpose very well, and is excellently suited for making various *articles de luxe*, such as fans, lamp shades, &c.

THIS silk, which is manufactured of either rose or blue colour, is sensitised like ordinary albumen paper, and copying is done on it by printing out in the same way. The sensitised coat lasts well, and its presence does not appear to interfere with the durability of the silk. Dr. Eder recommends the following toning bath for the material:—4 litres of water, 1 gramme chloride of gold, 4 grammes bicarbonate of soda. The bath should be prepared some hours before using, and keeps well.

WE venture to draw the attention both of amateur and professional colleagues to this new product, as there is little doubt that with some working out and pushing forward it might form the basis of an artistic and lucrative branch of business.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,067.—"An Improved Photographic Exposure Shutter." C. CUSWORTH.—*Dated November* 10, 1890.

No. 18,081.—"Improvements in Photographic Changing Cases." R. KRÜGENER.—*Dated November* 10, 1890.

No. 18,120.—"Improvements in Lantern Microscopes, forming an Instrument that can be used on the Magic Lantern or as a Table Microscope." R. G. MASON.—*Dated November* 11, 1890.

No. 18,168.—"Improvements in or relating to Shutters for Photographic Cameras." C. MONTI.—*Dated November* 11, 1890.

No. 18,181.—"Improvements in Photographic Cameras." W. PALMER.—*Dated November* 11, 1890.

No. 18,213.—"Improvements in or connected with Photographic Cameras." C. BECK.—*Dated November* 12, 1890.

No. 18,278.—"Improvements in and in connexion with Photographic or Camera Guns." C. LAWRENCE.—*Dated November* 12, 1890.

No. 18,403.—"A Shutter for Photographic Cameras." E. S. MILLER.—*Dated November* 15, 1890.

No. 18,410.—"Improvements in Photographic Backgrounds." W. WATSON—*Dated November* 15, 1890.

PATENTS COMPLETED.

IMPROVEMENTS IN AND RELATING TO THE FOCUSSING ARRANGEMENT FOR PHOTOGRAPHIC CAMERAS.

No. 8847. JAMES CHAPMAN SHENSTONE, 13, High-street, Colchester, Essex.—*October* 25, 1890.

MY invention relates to a device for attaching a focussing cloth to a camera, and it has for its object, attaching the cloth in such a manner that it may be easily attached to or removed from the camera, and that it is so firmly attached as to need no control on the part of the operator.

I attain this object in the following manner:—I take an ordinary focussing cloth, and on one edge I attach a clip designed to embrace the camera on the top and two sides, just in front of the back frame or at any other convenient point. The clip may be made in a variety of forms, and may either be made adjustable to fit a camera of any size, or it may be made non-adjustable to fit a camera of a given size.

The clip consists essentially of a bar—adapted to lie across the top of the camera—and of two spring arms, or their equivalents, at each end adapted to embrace the sides of the camera.

In an adjustable clip the bar is made telescopic, or otherwise, so that its length may be varied either automatically by a spring or springs, in which case the arms at the ends may be rigid, or by means of any suitable locking arrangement, in which case the arms at the ends would be formed as springs. In a non-adjustable clip I make the bar of one given length, and I attach the spring arms to the end of the said bar. In all cases I prefer to attach the arms to the bar by means of knuckle joints, or their equivalents, so that they may be folded to lie against the bar, thus enabling the focussing cloth to be folded up into the smallest possible space.

IMPROVEMENTS IN PHOTOGRAPHIC CAMERAS AND IN APPARATUS CONNECTED THEREWITH.

No. 16,778. SAMUEL DUNSIETH MCKELLEN, 3, Chapman-street, Manchester.—*October* 24, 1890.

THE first part of my invention has for its object an easy means of carrying any convenient number of plates in one storage box, so that they may be exposed one after another, and an easy means of transferring the exposed plate from its position in the storage box into a separate receptacle.

In cameras of the detective class I adopt the following, as some of the methods of applying my invention, and by a little modification the same may be used in connexion with ordinary cameras:—

A chamber or magazine is provided at that end of the camera which is opposite to the lens. This chamber is made to contain any convenient number of plates, preferably one or two dozen, which are placed therein face to back, the sensitive films being towards the lens. The plates are pressed forward against a frame (afterwards to be described) by suitable springs, which exert sufficient pressure at the back of the plates to ensure that the front one shall be always kept in proper register. The transferring of the front plate, after exposure, to the receiver may be effected in the following manner:—

The receiver itself is in the form of a box without a lid, which lies in the bottom of the camera, and is swivelled or hinged by one end or side close to the front of the magazine, in such a way that it may be closed up against the front of the magazine, the open side of the box being next the magazine. The

frame before mentioned, which forms the register, separates the magazine from the box. This closing up may be effected by any suitable mechanical contrivance. I do not confine myself to any special method, but I prefer to use a key or milled head, working in connexion with the swivel or hinge, and passing through to the outside of the camera. The register frame is formed by a rail from top to bottom on each side, in front of the magazine. The plates are contained in metallic sheaths, which cover the back, clip the edges, and slightly overlap the film. These sheaths have projections at the sides, two, or four, or any convenient number. These projections rest upon the rails, which stand clear of the sheaths. The rails have gaps cut in corresponding in number and relative position to, but slightly above or below, the projections on the edges of the sheaths. Now it is clear that if the magazine is turned up, so that the front plate faces downwards, and the front plate is slided along until the projections enter the gaps, the plate and its sheath will fall through into the receiver below, and the second plate will assume the position formerly occupied by the first, the projections of its sheath resting upon the solid parts of the rails. The receiver will be then returned to its normal position on the bottom of the camera. The plates lying face downwards in the receiver are protected from light by the sheaths, and an additional protection, hereafter described, can be provided. The plates with the sheaths are prevented from accidentally slipping through the gaps by the back part of the receiver, which is made to project, so that when it is in its normal position the projection supports the plate and sheath, but is withdrawn from that position when the receiver is lifted up, sufficient to allow the plate to slide the required distance.

Instead of four projections two may be used, placed near one end of the sheath, the other end of the plate resting on a register rail at the end of the camera furthest from the projections, so that when the plate is slid in the right direction the projections will pass through the notches at the same time that the other end of the plate slips off its support, the plate then falling as before into the receiver. The sliding of the plate can be done in several ways. When the receiver is raised up to its position to receive the plate, and its projection is withdrawn from the bottom of the plate, enough space is created to allow the necessary movement of the plate. A stud pressed by the hand from outside of the camera may be made to act on the edge of the plate and move it into the position before described for dropping into the receiver. Or a spring bearing on the edge of the plate may be made, to act automatically, instead of the stud, the spring being brought into action by the raising of the receiver, and taken out of action by lowering it. Or a frame with an opening made to take in the front plate, and somewhat thinner than it, may be fitted close to the register plates, and can be moved in the same manner as the plate itself is moved, as before described, carrying the contained plate with it to the required position. Suitable mechanism may be used to connect such a frame with the receiver, so that as the receiver is raised or lowered it will automatically communicate movement to the frame, which, in turn, moves the plate as required. Instead of a frame encompassing the plate, sliding pieces may be used, one on each side of the aperture, and working close to the register rails. These slides may have notches cut in them which clip the projections on the sheath when the plate is in position for exposure.

The slides being connected with the receiver by suitable mechanical means will be moved by it when it is raised up and lowered, so that they pull or push the sheath and plate into the position for passing into the receiver.

The plates may be removed from the magazine by another method. The sheaths are formed with a projection on the lower end. These projections, as the plates are pressed forward, take into a pinion, which is placed just in front of the lower edge of the plate. When the pinion is revolved a given distance it carries the sheath and plate upwards and forwards till it drops out of the magazine. A plain shaft with a projecting catch would answer the same purpose. When the sliding of the plate is effected by any non-automatic means here described t could be arranged that the plate, instead of dropping into the receiver, would be made to pass through an aperture just below the front of the magazine and lodge itself in a box outside of the camera.

The box would have to be attached by sliding to the camera, and a dark slide would be withdrawn from the camera and from the box when about to transfer the plate, and when transferred the slides would be replaced, and the box withdrawn.

The additional protection from light before named may be secured by a cover which lies flat over the receiver, and is made to move out of the way when the receiver is being raised either by the action of the receiver or by mechanism attached to it, or by a separate lever acting on it from without, and when the cover is in position over the plates they are effectually protected from any chance of light falling on them.

The receiver is made so that when it is raised to the receiving position the plates fall easily into it, and when it is closed down they are pressed upon at either side or end by a cushion, which holds them in a safe position and prevents them from being knocked about.

The second part of my invention is to provide a cover for cameras of all kinds which have to be carried about. This cover is intended to dispense with the use of a carrying case. For this purpose I employ any material of which camera cases are usually made. I cover the baseboard of the camera with the material, attaching it by means of studs placed in a convenient position or by any convenient means. I make an opening in the centre of the material corresponding in size to the turntable in my cameras, or large enough to allow a triangle to be screwed to the baseboard, or with only a small hole through which a baseboard screw may pass. I make this material of such size and shape that it will fold over and cover all of the camera when it is folded up. It can then be fastened by buckles or in any convenient way, so as to appear as if the camera were in a case. The advantage of this cover is that the camera can be mounted on its legs, and the cover being unfastened, the camera can be opened, leaving the cover still attached to the baseboard. The camera, cover, and legs attached can thus be carried about when photographing, from one point of view to another, much more easily, as there is no empty camera case to handle.

The cover may be attached to the under side of the camera, if preferred, but the action is the same. A handle may be fixed to the cover, or the handle of the camera itself may be used by having an opening in the material through which it projects, to allow of its being grasped by the hand. If the cover is attached to the under side of the camera, the baseboard aperture may be omitted, and in that case the cover would be unfastened before placing the camera on the legs.

Improvements in Cameras for Photographic Purposes.

No. 17,548. Francis Beauchamp, Hope Cottage, Chadwell Heath, Essex.—*October* 25, 1890.

This invention relates to a camera for photographic purposes, which may be used either on the tripod stand or for detective work, and is made to carry any suitable number of plates. The said camera is divided with partitions for the purpose of forming dark chambers. One chamber has a ground glass for focussing purposes. The plates are held up to an adjustable face by springs. Each plate is provided with a frame, which has an arm attached—each arm has a hole in—which is threaded on to a rod or a piece of tube for the purpose of working thereon. Each arm is provided with a notch, which comes in contact with a push piece from the outside of the camera for the purpose of lifting the said frame, which holds the plate up or down for exposure through a slot, provided with a cover. The frame has a spring tension for clutching the plate firmly. The camera is so arranged that it can be drawn in or out by hand, or by a rack and pinion working in a tube, which acts as a guide for focussing purposes. As the front of the camera, for carrying the lens, works telescopically, by tubes working in each other, or springs at each corner of sufficient strength for supporting the covering, which may be of any suitable material for excluding the light in the moveable part of the camera, I sometimes employ two chambers for the plates, one for the exposed plates and one for the unexposed. The plates are held by a spring frame in the same manner as before described, but in this case the ground glass is not used, as it has a fixed focus, and a finder is required.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
November 24 ...	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 25 ...	Great Britain (Technical).....	5A, Pall Mall East.
,, 25 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 26 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 26 ...	Burnley	Bank Chambers, Hargreaves-street.
,, 27 ...	Halifax Photographic Club	Mechanics' Hall.
,, 27 ...	Liverpool Amateur.....	St. George's-crescent North.
,, 27 ...	Oldham	The Lyceum, Union-st., Oldham.
,, 27 ...	Burton-on-Trent	The Institute, Union-street.
,, 27 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 13,—Mr. A. Cowan in the chair.

Mr. A. Haddon inquired what are the necessary conditions to substitute iridium for silver in a photographic image. Two formulæ had been given for the purpose of producing photographic enamels, one in Solomon's book and one by Nelson K. Cherrill. In both cases the iridium had been associated with gold. Cherrill says that too black a tone indicated insufficiency of gold, and too red a colour excess of gold. He (Mr. Haddon) had not been able to get substitution at all.

Mr. T. Bolas said that with commercial chloride acidified with hydrochloric acid he had found substitution to take place.

Mr. Haddon had found iridium a most obstinate metal to dissolve.

The competition of slides for the lantern then came on, the various productions of the members from four negatives that had been used in turn by them being shown two at a time side by side on the screen, and the judgment of the audience taken as to which should remain to be tried by comparison with the remainder of the same subject. There was an unusually good competition, the slides being for the most part of such quality that selection was difficult, and the opinion of the members being frequently almost equally divided. Choice being eventually made, it was found that the first place in two of the subjects was taken by Mr. T. E. Freshwater on slides made by the wet collodion process; in the third subject by Mr. G. W. Atkins, also on wet collodion; and in the fourth by Mr. P. Everitt, on a gelatine plate developed with pyro and sodium sulphite. Good second places were taken by Messrs. H. M. Hastings, C. H. Cooke, and A. C. Pemberton, whilst the last named also secured first place in the competition which was held separately of slides from the same negatives in which cloud printing and other "fake" were permitted.

Other slides were put through the lantern, including a set of hand-camera scenes taken by Mr. George Newman, very fine in quality and noticeably free from the effect of dark, sooty complexions often seen in work of this kind, the flesh mostly coming out of as natural a depth of colour as if the exposure had not been of so limited a character.

CAMERA CLUB.

November 13,—Captain W. de W. Abney in the chair.

Mr. Bevan gave a description and demonstration of Messrs. Green, Cross, & Bevan's *Primuline or Diazotype Printing Process.*

Previous to the lecture the Hon. Secretary handed round a photograph on a gelatine dry plate in colours, the work of Mr. Wormald, jun., of Sutton. The colour photograph had been printed from a chromatrope, and showed the design in fairly bright blue, red, and yellow, with a certain amount of fog throughout. Mr. Wormald had stated that he had also secured green, and

hoped to get over the fogging effect and to quicken the printing, which had taken about one and a half hours in sunlight.

Captain ABNEY pointed out that there was nothing new in the production. He had often obtained the same results, and the colours would be found to fade.

Mr. LYONEL CLARK said that the picture appeared to him to have faded in the few days since he first saw it, the plate having in the meantime been exposed for two days to such daylight as they had enjoyed.

Dr. Patterson then exhibited a useful lantern-slide printing frame introduced by the Platinotype Company, and Mr. Corbould showed and described very effectively Hume's cantilever enlarging apparatus.

Mr. BEVAN then fully described and demonstrated the primuline process of printing, illustrating his remarks throughout with many examples. Taking materials dyed yellow with primuline, he treated them with the diazotyping solution, and then showed the process of developing to various colours by treating with certain chemical solutions fabrics which had been printed in pattern from positives, either ferns laid down upon the sensitised surface or geometrical designs from transparencies. Examples in purple and brown and blue were developed. Specimens on films and gelatine negatives were also shown. Divergent substances had little or no effect on the colours. The process could be used with advantage instead of blue printing, the ferro-prussiate process. The sensitiveness was somewhat greater than with albumenised silver paper. In regard to the action of light and the class of light which acted with most intensity on the sensitive surface, Mr. Bevan stated that the image showed almost as plainly on the side of the fabric away from the sensitive surface as on that next to it, and also that the image showed even through six thicknesses of the material printed together.

On Thursday, November 27, a lantern exhibition will be given.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING held on the 14th inst.,—Mr. William Bedford, chairman.

Three applications for assistance were considered, two of which were granted.

Messrs. Arthur Weston, E. C. Boucher, H. P. Collins, and H. R. Hume were elected subscribers.

The result of the Photographic Club entertainment was 10*l.* 18*s.* 10*d.* profit.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 6.—Annual meeting. Mr. J. Traill Taylor (President) in the chair.

The SECRETARY presented the annual report and balance sheet, which showed that the Society was in a flourishing condition, and that a good year's work had been accomplished.

After the usual votes of thanks to the retiring officers and Council, the following gentlemen were elected to serve for the ensuing year:—*President*: Mr. J. Traill Taylor.—*Council*: Messrs. Bishop, Douglas, Dando, Few, Grover, Healy, Medland, Mackie, Oakley, Parfit.—*Curator*: Mr. Coventon.—*Secretary and Treasurer*: Mr. G. J. Clarke, 56, Queen's-road, Brownswood-park, N.

The meetings of the Society will be held as usual in the Wellington Hall, Upper-street, Islington, on the first and third Tuesdays in each month, at eight o'clock.

After the business had been concluded, the PRESIDENT read a paper on *The Optics of the Lantern*, which he illustrated on the blackboard.

WEST LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 14.—Mr. W. A. Brown (President) in the chair.

Mr. JONES (Platinotype Company) gave an account of the platinotype process, and illustrated his remarks by practically demonstrating its working. In the discussion which followed, Dr. Low said expense need not deter any one from taking up platinotype, a spirit lamp or gas stove, and an enamelled iron dish from the ironmonger, was all the apparatus required. He considered the hot bath process the surest, cheapest, and most satisfactory of all printing processes, providing the negative was good one. The temperature of the solution was not very important, anything above 120° Fahrenheit gave good results. As to printing, he would do nothing with a thin negative, but with a good one he found the stronger the light the better the print. The "D" salts, as used in the cold bath process, gave much better results than the plain oxalate solution.

Mr. G. F. BLANCHARD wished the lecturer had told them something about the sepia process, which was the one he preferred. He had sometimes been troubled with small black spots. He had not had time to puzzle the matter out, but thought they might be caused by small particles of calcium getting on the paper. A curious experience had happened to him recently. He had been under the impression that it was not possible to reduce a platinum print, but on putting a very much over-exposed sepia print in the developer, it flashed up immediately very dark and dense, but on transferring it to some strong hydrochloric acid, considerable reduction took place, and the print became quite possible. He would like to know whether the black process was susceptible of reduction in the same way.

Mr. C. WHITING expressed dissatisfaction with the colour of platinum prints. He pointed out that there were many shades of black, and he himself preferred a warm black. Would the use of "D" salts give a softer impression or a different colour? It was rather unfortunate that we could not modify the developer to meet the exigencies of under and over exposure.

Mr. J. A. HODGES agreed with Dr. Low and others that platinum was one of the easiest processes to work, the only difficulty being in the exposure. Unless the prints were carefully watched while printing it was difficult to detect over-exposure. The negative need not be very dense, but must be full of gradation to produce a good result. He preferred a negative developed with pale pyro of a yellowish hue, but not stained, to one developed with sulphite pyro. Like Mr. Whiting, he admired the warm black colour, but could rarely produce it. He had tried the addition of bichloride of mercury to the developer, but although the colour obtained was warmer, the lights suffered as a rule. Very much over-exposed prints could be entirely saved if developed in quite cold solution. It was very necessary to remove all traces of iron by using a sufficient number of acid baths, four or five in some cases would be required. If the operation were not thoroughly performed, the prints would turn yellow.

Mr. JONES, in reply, said it was better to print a thin negative in weak light, but a vigorous one would print just as well in the sun. When he spoke about the light, he referred to examining the print. The black specks were caused by minute particles of metal, either in the paper or from the tin. Calcium would produce white spots. The strong acid would reduce a black print just as it did the sepia one, but would rot the paper. Old paper would tend to give warm tones, and a very hot developer would also give a brownish black.

Next meeting, November 28, when Mr. Andrew Pringle will give a demonstration of *Bromide Printing*.

HOLBORN CAMERA CLUB.

NOVEMBER 11.—The annual supper was held this year at the Mitre, Chancery Lane. The President being unable to attend by reason of family illness, Mr. T. Oldacres Dear (Vice-President) occupied the chair. After the usual loyal toasts came the presentation to Mr. Fred. Brocas, the late Hon. Secretary, of an illuminated testimonial.

The CHAIRMAN, in his address, stated that it was entirely to the untiring energy and work of Mr. Brocas that the Club owed its existence and prosperity.

Mr. BROCAS, in replying, said that in the work of building up the Club, if he had not had the hearty support of the lady who was now his wife, and also some of the members of the old St. Bride's Club, he should not have been able to have been so successful. He also expressed his pleasure in seeing present some members of the Holborn Cycling Club, with whom, he felt, we could not help identifying ourselves.

Mr. Brocas' health was then drank with musical honours.

Mrs. TREGASKIS then with a few remarks gracefully presented the outing competition prizes, viz.:—For half-plate, the Hon. Secretary, first prize, presented by Mr. T. O. Dear; for quarter-plate, first prize, Mrs. J. E. Smith, presented by Mr. Gay; second prize, Mr. E. H. Baystón, presented by Mr. J. C. Dear; third prize, Mr. H. Thompson, presented by the Club.

The CHAIRMAN, in detailing a few points of the Club's progress, remarked that the Club's numbers were now seventy-five, but hoped that it would soon reach the hundred, and drew the attention of those present to the annual exhibition, to be held in February next, when among the prizes for competition would be an Optimus optical lantern, given by Mrs. Tregaskis for the best set of lantern slides; Mr. T. Oldacres Dear, one guinea for the second-best set of slides; the President's prize of one guinea, subject not decided. Mr. S. T. Chance had placed two half-guineas at the Committee's disposal. Mr. Fred. Brocas had offered a prize to the value of half a guinea for the ladies' competition, also another half-guinea for the best and largest display of pictures; and Mrs. Tregaskis had offered a consolation prize of half a guinea for the worst set of prints. The evening finished with "Auld Lang Syne."

HACKNEY PHOTOGRAPHIC SOCIETY.

NOVEMBER 13.—Dr. Roland Smith in the chair.

The SECRETARY announced that this was the last day for receiving prints for the competition, and that Mr. Henry Crouch, the well-known manufacturer of lenses, had very kindly promised to give a lens as one of the prizes. Due appreciation was shown by the members for Mr. Crouch's kindness. There is to be an exhibition of the Society's pictures (competition) and lantern slides on December 11 next, at St. Andrew's Hall, Well-street. Tickets can be obtained of any of the members.

The members had their slides put through the oxyhydrogen lantern by the Secretary. A good number were shown, the exhibiting members being Messrs. H. Smith, H. D. Hasdell, Gosling, Dean, Grant, Dodd, Barton, I. Carpenter, Beckett, Linsdall, and others.

Four names were put up for election.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

NOVEMBER 12.—Mr. A. R. Dresser (Vice-President) in the chair.

It was decided that December 10, being Mr. Newman's lecture on *Present Tendencies of Photographic Art*, followed by a lantern entertainment, should be a ladies' evening (no smoking).

Messrs. Court, Jones, and H. T. Foy contributed prints to Society's album.

The HON. SECRETARY read a paper on *Bromide Printing and Enlarging*, and a demonstration was given by him in both processes.

Next meeting at Board Room, Bexley, November 26. Mr. Andrew Pringle on *Old Processes for Slide Making*.

BRIGHTON PHOTOGRAPHIC SOCIETY.

NOVEMBER 11.—Second annual lantern slide competition—Twelve sets of six slides had been sent in for competition, and had been judged by Messrs. Herbert S. Starnes, of Bexley, and A. Pringle. The Hon. Secretary (Mr. A. H. C. Corder) secured the first prize, and Mr. E. J. Bedford the second prize. The winning sets were both of a fine black tone, those of Mr. Corder being chiefly scenes in North Wales and Devonshire, whilst Mr. Bedford's were mostly in the vicinity of Lewes.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

NOVEMBER 13.—Mr. J. B. Stone, F.G.S., in the chair.

Mr. W. H. Smith, of the Eastman Company, was to have given a paper on *Film Photography and Enlarging*, but he wrote to say he could not attend, as

he had another engagement the same evening. Mr. J. H. PICKARD, however, came forward and gave a very practical paper on the same subject, illustrating his remarks by taking a stripping film negative through all the stages and then making an enlargement from half-plate to 12×10.

The CHAIRMAN congratulated Mr. Pickard on his exposition of "how it's done," and Mr. W. J. HARRISON thought the Society owed Mr. Pickard a debt of gratitude for filling up the gap.

The SECRETARY announced that Mr. R. Keene, of Derby, had kindly offered to place any negatives he had of Warwickshire at the service of the Survey Council.

DERBY PHOTOGRAPHIC SOCIETY.

NOVEMBER 11,—Mr. Richard Keene in the chair.

Mr. H. M. SMITH, of the Eastman Dry Plate and Film Company, demonstrated their products. A fine collection of enlargements on their bromide paper was exhibited, together with other interesting features. An instructive lecture was given by Mr. Smith on enlarging on their bromide paper, with demonstration, which was greatly appreciated.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

NOVEMBER 12,—Mr. S. S. Partridge (President) in the chair.

Two members were elected.

Mr. H. SMITH, of the Eastman Company, gave a demonstration on *Enlarging and Contact Printing on Bromide Paper, Kodak Cameras, and Transparent Films.*

MANCHESTER PHOTOGRAPHIC SOCIETY.

NOVEMBER 13.—The President (Mr. Alan Garnett) in the chair.

The following gentlemen were elected members, viz., Mr. A. Brothers, Mr. J. E. Bott, Mr. Chas. E. Glascott, M.D., and Mr. S. Jewsbury. Mr. Brothers, who was present, received a very cordial reception on again joining the Society, of which he had been one of the earliest and most energetic members.

A letter was read from Sir H. E. Roscoe expressing his sense of the honour conferred on him in electing him an honorary member on the expiration of his term of office as President.

A paper was then read by Mr. D. E. BENSON on *Photo-Micrography*, in which he described the several additions and improvements which he had made to the apparatus he first used for this branch of photography until he arrived at the compact and convenient appliance shown to the meeting. This consisted of a three-wick oil lamp enclosed in a lantern fitted with condensers and lenses for projecting a parallel beam of light through the object and microscope into a camera capable of extending five feet, the image being focussed on a very thin sample of dry plate, which he found better than the finest ground glass. To enable the focussing to be done to a nicety without leaving the back of the camera, a rod was fixed the whole length of apparatus connected by grooved pulleys and band to the fine adjustment of the microscope. Another special feature was the appliance for selecting the portion of object to be photographed. This comprised a mirror silvered on the surface, and mounted at an angle of 45° in a box arranged to slide into the front of the camera next to the microscope. An eyepiece fixed in the end of the box enabled that portion of the object required to be properly centred. When the box was partly withdrawn the rays of light would pass on to the focussing glass. A photograph of Mr. Benson's first apparatus was projected on the screen, followed by one of the more perfect and compact arrangements shown to the meeting, also a number of transparencies from negatives taken with it. These were very much admired for their clearness and definition. On another screen Mr. Furnival simultaneously projected the original sections by means of the lantern microscope.

Mr. A. HEYWOOD, in moving a vote of thanks to Mr. Benson, expressed the satisfaction with which he had listened to the paper.

This seemed the general feeling of the members present.

Mr. JOHNSON advocated a lens fixed on a movable crosspiece, instead of a screen, for focussing. He admired the arrangement for centring the object. He had found it best not to flood the slide with too great a mass of light, so used a shield, cutting off all but the brightest part of the flame from an argand oil lamp.

Mr. FURNIVAL preferred the limelight for illuminating the object on account of the time saved in exposure, but if the blow-through jet was used, care had to be taken to avoid a dark spot. To obtain good results, it was necessary that the beam of light be absolutely parallel. He made no allowance for difference in visual and actinic focus.

Other members spoke in favour of the limelight.

Mr. BENSON, in replying, said he was indebted to a friend of his, Dr. Harris, for the beautiful sections to which he owed the success of the specimens exhibited.

An exhibition of members' work will be held next month.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE first general meeting of the session of the above Association was held on the evening of Thursday, November 6, in their Rooms, 207, Bath-street. Mr. William Lang, jun., F.C.S. (President), in the chair.

After the reading of minutes, the Secretary's report for session 1889-90, as also the Treasurer's, were read and adopted. Office bearers for current session were then elected as follows:—*President:* Mr. William Lang, jun. *Vice-Presidents:* Messrs. J. Craig Annan and Archdeacon Watson. *Council:* Messrs. John Annan, Robert Gardner, William J. Mellwrick, Andrew Maclean, George Mason, and John Morrison. *Treasurer:* George Bell. *Secretary:* Percy Rowden.

A vote of thanks was given to the retiring secretary, Mr. J. Craig Annan, for the work he had done for the Society during the time he had held office. Fifteen new members were then elected. Dr. Emerson's book (presented to the Society), *Life in East Anglia*, was shown to the members, and Mr. J. Craig Annan read a paper in connexion therewith. A lively discussion followed, in which Messrs. Mason, Stanbridge, and Pratt, &c. took part. The thanks of the Society were awarded to Dr. Emerson for his handsome gift. Specimens of diazotype printing were exhibited, and several series of transparencies were afterwards passed through the Society's lantern.

GLENALMOND PHOTOGRAPHIC CLUB.

NOVEMBER 15,—The President (Mr. A. S. Reid, M.A., F.G.S.), in the chair.

It was agreed that a lantern slide competition should be started, open to members of the Club. After discussing other business, the usual exhibition of members' photographs and new apparatus took place. At a previous meeting, six new members were elected, and Mr. C. Scobell gave a lucid description of the Kodak and its working, with practical demonstration of its parts, and specimens of work done by him.

VIENNA PHOTOGRAPHIC SOCIETY.

OF the various interesting communications made at the meeting of the Vienna Photographic Society of November 4, we would mention the following:—The chief interest of the evening centred in the new patented process invented by Bartos to get half-tone on zinc etchings by sand-blast. Bartos, as was explained, varnishes a stone or zinc plate, and squeegees a pigment picture on to it. The former he softens with glycerine and exposes it to the action of the sand-blast. This first perforates the thinnest parts of the relief, and, in the second place, the varnish, whereupon the exposed parts of the metal are etched, and finally show every desired gradation.

Mr. FRITZ spoke further of the anastatic printing process. This process is now often employed, because it comes cheaper than photo-lithography in making facsimiles of old books and engravings.

Professor Dr. Eder showed new coloured copies, by Veres, of Klausenburg.

In Vienna, no less than elsewhere, doctors differ, as was clearly shown by the different opinions expressed concerning Dr. Emerson's pictures, which were exhibited that evening, having been presented to the Society.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

CHRISTMAS CARDS.

To the EDITOR.

SIR,—Your leaderette on this subject on the 14th inst. reminds me of my intention (put off till too late) to send you a few lines on this subject for the ALMANAC. Last year I made a few, and sent them to my friends. The method of manufacture being very simple, I printed a vignette from any suitable negative on the opal cards introduced about that time by Mr. Friese Greene. The card, after removal from the printing frame, is placed under a thin metal plate, at the foot of which the words "Wishing you a Happy 'Xmas" are cut out, and the card again held to a gas burner for a few seconds. Of course, the same can be done with ordinary bromide paper and afterwards mounted. I enclose a specimen, which I regret is rather stained, but I had not time to make another, as I am just leaving home for a short time.—I am, yours, &c.,

Woodley Hill, Reading, November 17. CHAS. STEPHENS.

"FREE LANCE" AND MR. EVERITT.

To the EDITOR.

SIR,—As "Free Lance" impugns my veracity, I trust you will grant me space for reply. He singles out three statements and supplies his own answers. Regarding the third statement—"I pointed out that the words called glib platitudes were used by Mr. Debenham, and not by me"—"Free Lance" says: "Mr. Philip Everitt did not so point out." In my letter printed in your issue of October 24 I wrote: "It is not for me to defend Mr. Debenham against 'Free Lance's' criticism *re* planes of focus. *The assertion referred to was made by him, not by me.*" To give his denial the semblance of truth, "Free Lance" omits the words I now italicise.

Statement No. 2. "Free Lance" says it did not indicate belief in a hearty compliment paid to Mr. Debenham when, in my previous letter, I stated it was not for me to defend Mr. Debenham against "Free Lance's" criticism *re* planes of focus. At the time I wrote my first letter, no doubt regarding the compliment had been expressed, and as the compliment was conveyed in respect of a different matter, it would have been superfluous to refer to it. Mr. Debenham's words do not require defence against any criticism by "Free Lance," and the veracity of the latter is at stake when he questions my belief. But methods such as these are "the knightly instincts" which "prompts" (*vide* Murray's Grammar) "Free Lance."

The accuracy of his reply to Statement No. 1 may be determined by the answers to Nos. 2 and 3.—I am, yours, &c., PHILIP EVERITT.

London, November 17, 1890.

[We put it to our good friends, the combatants, if enough has not now been said on both sides.—ED.]

"UNNATURALISM OF NATURALISTIC FOCUSSING."

To the EDITOR.

SIR,—My attention has been called to an omission in my paper on *The Unnaturalness of Naturalistic Focussing* published in your paper on the 7th inst., in the last paragraph on page 711. The sentence in inverted commas should read, "If I take a full-length figure on a quarter-plate with, say, a seven-inch focus lens, I can get the accessories and background defined to an extent that is sufficient. Why then, if I use a lens of double the length of focus *for an image of double the size on a whole-plate*, and a stop of the same proportion or rapidity, can I not get the same amount of general focus as in the former case?" The words in italics, which I had intended to include, are required to make the sense complete and definite.—I am, yours, &c., W. E. DEBENHAM.

CONCERNING LENSES.

To the EDITOR.

SIR,—In these bad times the poor photographer must make money where he can, and I do not think I ought, in justice to my brother photographers, to withhold a new source of profit, if not a permanent one. When I started in business I provided myself with a complete set of lenses by one of the best makers. The recent papers and letters, however, of the present representative of the maker have converted me to the new ideas of diffusion of focus; this gave me a notion which I proceeded to act upon. I got rid of those celebrated lenses, for they are still saleable to old-fashioned photographers at good prices, and supplied their places with the cheapest I could find. The result is that I now get a better 15 × 12 head (according to the new ideas) with a 3*l.* lens than I did with one for which I gave the enormous sum of 18*l.* This exchange I have carried out throughout the series, and I find a considerable advance to the good, besides being in fashion.—I am, yours, &c., A TRADING ARTIST.

LOSS OF TONE IN FIXING.

To the EDITOR.

SIR,—Your correspondent, Mr. Hargreaves, in your last week's issue, has so exactly expressed a difficulty I have long experienced that he might have been writing for me; and as I have, after long trial, overcome the difficulty, though the means by which this has been done is nothing new, it may interest one in the same fix.

As sometimes the black tone desired remained, and at other times with the same paper and chemicals all turned to a disagreeable brown in the fixing bath, I blamed my manipulations rather than the chemicals, and after being sorely puzzled, thought it possible the fault might be in irregular washing before toning, sometimes removing all the free nitrate and sometimes not. To test this I washed the prints in two changes of water immersed in a strong solution of table salt (to convert all free nitrate into chloride), washed again, and then toned as usual with borax 1 in 80, gold 1 grain to 4 ounces borax solution. After this, hypo 1 in 5 makes very little change in colour, and I can from good negatives easily and certainly obtain black tones.—I am, yours, &c.,

Pare Lodge, Halifax, November 18, 1890. EDWARD J. SMITH.

MOUNTS AND MOUNTING.

To the EDITOR.

SIR,—A letter or two appeared a few weeks ago in your columns about a new patent and other means for preventing the cutting shape or *calibre* slipping on the prints. Surely the simplest way of all is to have the underside finely ground so as to be sufficiently transparent, and yet matt enough to remain in position without slipping. Cutting gauges thus ground are mostly used on the Continent, and have also an appurtenance not always found in England, but most useful and comfortable, viz., a central knob or button.

While on the subject of matt surfaces, why, may I ask, do not makers of celluloid films roughen *both* sides of the support? Surely this would much parry halation, and at the same time afford a most suitable surface for retouching, which suits much in softness from being on the opposite side of the support to that on which is the film. I should be glad to know the best way to produce a matt surface on the back of the celluloid support. cuttlefish bone and similar roughers do not seem to produce the desired effect.—I am, yours, &c., THOS.

P.S.—I should feel extremely obliged by the title and publisher of some not very expensive books about setting up electric light, more particularly the cost of plant and current cost of fuel, &c., for the steam engine.

POSTAL WRAPS.

To the EDITOR.

SIR,—I have experienced much annoyance, on receipt of photographs by post, from their being scratched all over or smudged by dirty fingers. This arises from two causes—the shape of the wrap, and the rough way (after opening at the office) they are closed up again. My suggestion is that three sides of the wrap should be cut, the fourth side to have a flap, not to be fixed up till examined by the Post Office, then for the cork to fix the official stamp as "officially examined." These post without fear of further inspection. This would not take half a minute. Perhaps Messrs. Marion might see their way to introduce this style of wrap.—I am, yours, &c., PHOTOGRAPHIC ARTIST.

RUNNING OF MATT VARNISH.

To the EDITOR.

SIR,—I see in your paper of November 14, one of your correspondents is troubled with having the matt varnish run on the film side of the negative when he is coating the back. I was troubled with the same thing myself for some time. I find that if a soft rag is moistened with chloroform it will rub off the varnish without injuring the film.—I am, yours, &c., W. A. MEIGH.

P.S.—In November 7, Mr. H. W. Nichols is troubled with blistered prints when fixing. If he will add a little borax to his fixing bath he will have no blistering.

Ash Hall, Stoke-on-Trent, November 17, 1890.

A CORRECTION.

To the EDITOR.

SIR,—In the last two lines of my letter in the JOURNAL of the 14th inst., the words "mental" and "incorrect" have become transposed. For "mental" read incorrect, and *vice versâ*. FREE LANCE.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Exchange Beeston Humber tricycle (worth 8*l.*) for good 12×10 or 15×12 camera and stides. Address, R. H. BATH, Photographer, Ilfracombe.

Two quarter-plate double dark slides, nearly new (for oblong camera), in exchange for rotating desk. Address, G. H. LAWRENCE, Hayes-bridge, Cardiff.

Wanted, large camera and lens, also studio furniture; exchange, diamond ring, gold or silver watch, safety bicycle, harmonium, &c.—Address, F. POTTER, 7, Dereham-road, Norwich.

I will exchange first-class burnisher, cabinet size, for head and body rest or studio camera stand with Archimedean screw. Difference adjusted.—Address, WALKER, Noel-street North, Nottingham.

Best Russian iron enlarging lantern (new) with five and a half inch plano-convex condenser and five-wick lamp in exchange for half or whole-plate camera, good maker. —Address, H. B., 298, Green-lanes, N.

Will exchange good lathe or first-class fifty-two-inch bicycle, Bown's ball bearing throughout, International saddle, &c., for modern whole-plate or half-plate camera, lens, and stand.—Address, A. SHEPHERD, Sign Writer, Seven Sisters'-road, South Tottenham.

Will exchange for a C.-D.-V. lens by good maker either of the following: A cabinet portrait lens, a whole-plate landscape lens with Iris diaphragm and shutter, or a wide-angle landscape for half-plates with revolving diaphragms, or will give either of above and 3*l.* cash for Rees' No. 2 Universal.—Address, HARROLD, Bedford.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

A. DONALD.—Hint noted; thanks.

E. H. HARDY (Tokopuru).—Received with thanks.

ADDRESS.—Camera Club, Bedford-street, W.C., will be sufficient.

SAILOR.—The piece of print enclosed is by the platinotype and not the bromide process.

T. THOMPSON.—Full information on the subject will be found in the forthcoming ALMANAC.

INQUIRER.—The Secretaries of the Oxford Photographic Society are W. Davis, 73, Banbury road, and F. A. Bellamy, 4, St. John's-road, Oxford.

A. B. Y. L.—Provisional specifications, when the patents are not completed, are not published. They used to be some years ago, but the practice was discontinued.

J. MUCHAM.—The plates have undoubtedly been "light struck," that is, been exposed to sufficient light to slightly fog them; but under what circumstances it is impossible for us to say.

INSTANTO.—Under-exposure is the fault. You must not expect, with the feeble light of November, to get instantaneous pictures under the same conditions you did in the summer. To get equal results now a larger stop in the lens, the shutter set to work slower, and more rapid plates, are necessary.

PERCY LINDLEY.—See "Editorial Table" of last week. This will quite answer your purpose. We have no knowledge of the properties of the lens mentioned in your second letter, never having seen it.

P. AIREY wishes to know where he can obtain a Warnerke's standard sensitometer, by which makers test their dry plates.—Marion & Co. are, we believe, the agents; but any photographic dealer will supply them to order.

A. M'D. Pyrogallol and pyrogallic acid are one and the same thing. So are quinol and hydroquinone. If you ask your local dealer for the articles under their more popular names, he will no doubt find he has them both in stock.

D. ANNANDALE says: "I have invented a new form of camera. Can I register it so that I secure the sole right of making it, as I do not care to go to the expense of a patent?"—Registration would be of no use; the only protection is by patent.

FLORENCE.—1 and 3. Better make a comparative trial.—2. See forthcoming ALMANAC.—4. We believe it is not the rule with photographers to tone prints printed by others.—5. Twenty grains to the ounce. A little more or less is of no consequence.

FRAUD.—Nitrate of silver, like other photographic chemicals, is sold by avoirdupois weight; therefore one ounce contains four hundred and thirty-seven and a half grains. This is the reason why you do not get eight drachms of sixty grains in an ounce of the salt when you purchase.

POSITIVE.—Dammar resin dissolved in benzol makes one of the best varnishes that can be applied without heat. Amber in chloroform is another varnish that can be applied cold. It is more durable than dammar varnish but much more expensive, and is now seldom used for glass positives.

S. A. R.—1. To cover a plate 18 × 15 sharply, with any form of lens of only twelve inches focus, a small stop must be used. 2. To copy the same size, a camera extending to twice the focal length of the lens used is necessary. This may be inconvenient in your case, but it cannot be avoided.

S. E. J. writes as follows: "I have just taken six negatives of the Bishop of this diocese, and wish to make all of them securely copyright, but is it necessary to register each position, or will the registration of only one suffice, the portraits being all of one person and taken at the same time?"—The pictures must be registered individually.

PUZZLED writes: "I enclose prints, and would be grateful for information as to the cause of the yellow spots on them. I fix the prints in hypo solution for twenty minutes—strength, one pound to four pints of water. I have thoroughly scrubbed dishes with sapolio, and also hot water and salt. I have also changed blotting paper (specially prepared and guaranteed free from hypo) in which I put paper after being sensitised. The spots cannot be detected after toning and fixing, but they are in evidence in the morning after all-night washing. I have been printer and toner for six years, and never experienced them before."—The spots appear to be due to minute air bubbles imprisoned between the prints, either while in the fixing bath or in the first washing waters.

B.Sc., PLYMOUTH.—If there is a fixed stop in the lens it is possible that by removing it, or, by preference, making trial of the lenses in a temporary mount with a larger opening your end might be gained. If the lens be a single one it ought to stand a larger working aperture than that mentioned. It is very difficult to advise unless we saw the lens. If you sent it for examination it could be returned the same day. Failing this, send a description of its construction.

A. H. PESTEL writes: "I shall feel greatly obliged to you if you can inform me what salary first-class retouchers get in Australia (also operators). I am at present a retoucher, but I can, when satisfied with my experience, start a place for myself, and as everywhere is so full of competition and overdone with same, I should like to start in the Colonies."—Perhaps some correspondent who is more conversant with the salaries paid in the Colonies than we are will supply the desired information.

COLLODION.—The markings seem to arise from not allowing the collodion to set sufficiently before immersing in the silver bath. From the general appearance we think that the collodion would bear being diluted with ether with advantage. A warmer tone can be obtained by immersing in a weak solution of sulphide of potassium after fixing and washing, taking care in this case not to carry the development quite so far as in the specimens sent. We prefer cyanide for fixing. Plates three and a quarter inches square may be coated to the edge with emulsion.

S. MICHELL sends a number of direct bromide prints, which, he informs us, were developed according to the instructions sent out with the paper. He wishes to know the cause of the hard, chalky whites, the intense inky blacks, and the lack of detail; also, whether we consider the paper is at fault, and that he should return it to the dealer whom he got the supply?—The paper appears to be very good. The fault with the prints is that they are all very much under-exposed. The majority should have received quite double the time they did, and the remainder considerably longer.

C. H. says: "Can you please tell me the cause of the spots on enclosed paper, and say how to prevent same? They appear soon after sensitising. Is my bath wrong, or is it the paper?"—From the appearance of the spots it seems that some pernicious matter, probably floating particles in the atmosphere, comes in contact with the paper while moist after sensitising. This opinion is confirmed by the fact that some of the spots show strongly on the albumen and very little on the back of the paper. Others, on the contrary, are stronger on the back than the front.

C. C. W. says: "I have during the past summer, with an amateur friend, gained a little insight into photography, and now think I should like to take it up as a profession, as I understand it is—and it must be, from the trifling cost of the materials—a very profitable business. Can you kindly tell me how to proceed—that is, to obtain the necessary knowledge to practice professionally?"—The only thing we can suggest is for our correspondent to apprentice himself to some photographer who will teach him the business. We have an idea that C. C. W., when he has gained an insight in professional photography, will find that the profits are scarcely so large as he appears to imagine.

J. A. ROGERS (Washington, U.S.A.) writes: "I wish to know for what year THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC was first issued, and shall esteem it as a great favour if you give me the information in your 'Answers to Correspondents.'"—The first ALMANAC issued, in book form (small), was for the year 1861. The present sized series commenced 1866.

MICRO.—We do not quite understand your optical arrangements. You will certainly do well to leave out the rapid rectilinear lens. A single-wick oil or other lamp, a bull's-eye, and the Zeiss objective, would suit you better. We propose to write to you privately on the subject. Probably the thinness of your negatives is due to under-exposure. Use more rapid plates, or expose longer. Stray light may be reaching your plates, which would account for thinness.

E. J. T. writes: "The Waterworks Company have given me notice that after a certain date my water will be measured by meter. There are one or two reasons for which I very much object to such a course, as I am already paying fifty shillings per year. I have as much rain water in my cistern as will keep my studio going by providing a tank and pumping it in. 1. Will it be suitable for washing my negatives and prints? If so, and I give them notice to cut it off from my business, (2) are they obliged to supply my house on the same terms as my neighbours? 3. Re-washing of prints: If I pass prints through twelve changes of water, one by one, and then put into pad, should you consider that sufficient washing?"—Without knowing what the bye-laws of the Company have to say on such a topic, we would suggest that, as rain water will be quite suitable for all working purposes, you cut off the Company's supply from your business department and confine it to your house. In this way, if you use the water by meter, you will be a gainer to a considerable extent. In reply to the third query, the washing indicated will be sufficient, provided the prints be allowed to remain a short time in each change of water.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Technical meeting, Tuesday, November 25, at 5A, Pall Mall East, at eight p.m. Open at seven for reading journals.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—November 27, Demonstration of Messrs. Varley and Greene's Magazine camera, also paper by Mr. Friese Greene. December 4, *The Primuline Process;* demonstration by Messrs. Green, Cross, & Bevan. December 11, Lantern night.

THE PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—From our outside columns it will be seen that the Photographic Society of Great Britain are desirous of having an Assistant Secretary (Mr. E. Cocking having resigned that position), whose duties will consist primarily of being constantly on the Society's new premises, soon to be opened in Great Russell-street, opposite the British Museum. A knowledge of shorthand and some of the foreign languages will be necessary, as, *inter alia*, the duties will include the reporting of the Society's meetings.

HINTS WHEN USING THE OPTICAL LANTERN.—Messrs. Perken, Son, & Rayment send us an advance slip from a work on the foregoing subject they now have in the press, in the hope of its proving useful at this season:—Wipe the front and condensing lenses with a piece of soft silk free from every particle of dust. Thoroughly dry new wick before putting it into the lamp; let the wick be saturated with oil before lighting. The best paraffin oil gives the brightest light. Diener's A1 safety oil, and Strange's A1 crystal oil, also the Vaseline Company's Luxor, are specially recommended. The best quality wick is indispensable to brilliant illumination. Cheap wicks and cheap oils are false economies, and answerable for very many failures and disappointments when exhibiting the lantern. A large and strong pair of scissors should be used to trim the wicks, or preferably the "Optimus" patent wick trimmer, as a perfectly straight and even edge to the cotton is necessary to the avoidance of an uneven flame and smoke. Cut off the protruding corners to allow the flame to draw evenly upwards. Light the lamp with wax vestas or tapers. The heads of matches or charred paper are liable to fall into the air passages between the wick tubes, so impeding complete combustion. When lighting the lamp, do not turn the wicks high immediately, but raise them little by little at intervals of a few minutes. This system, besides improving the flame, gradually warms the condensing and front lenses; if suddenly heated they are likely to crack. Cold air being allowed to blow on a heated condenser will also certainly cause unequal contraction, *i.e.*, a cracked glass. The oil reservoir and other exterior parts of the lamp should be wiped *perfectly* dry, otherwise the oil about them will vapourise and fill the apartment with a most unpleasant odour. The wick should be trimmed prior to each exhibition, and when not burning should be turned one-eighth of an inch below the top of wick tubes, so that they may be permeated with oil. A plentiful supply of pure air is an imperative necessity to perfect combustion or perfect illumination. In crowded rooms, opening a window or door will greatly improve the light of the lamp; insufficiency of air ensures a bad light and an unsatisfactory exhibition. Like ourselves, the lamp gives its best results when it enjoys pure air, clean surroundings, and pure food (oil).

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THE BRITISH
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THE PRESERVATION OF SENSITISED PAPER.

To the amateur whose printing operations are not extensive, and only performed at irregular intervals, the question of the preservation of the sensitive paper, both before and after printing, is one of very great importance. In the professional establishment, of course, the case is different, for there "ready-sensitised" or "keeping" paper is very seldom used, and each day's supply is sensitised, printed, toned, and fixed within the twenty-four hours. With the majority of amateurs, however, the printing must be done on chance occasions, before or after business hours, under which conditions it may require some days to complete a single print, and probably with a very small stock of printing frames proofs accumulate but slowly, and it may be weeks before there are sufficient to commence toning. Under these circumstances, then, it is essential that some efficient means of preserving the sensitive paper after it comes into his possession should be adopted by the amateur.

It is usual to read that, if properly stored, sensitised paper will retain its good properties for many months, and such is no doubt the case if the necessary conditions are observed. We are, of course, referring now chiefly to albumenised paper, though practically the same rules apply to gelatino-chloride, aristotype, collodio-chloride, or, indeed, any papers in which free silver exists in contact with organic matter. With gelatino-bromide or chloride papers for development printing the case is altogether different, for these contain no free silver, and are, therefore, if properly prepared in the first instance, little liable to decomposition or deterioration with keeping, unless submitted to such treatment as they are scarcely likely to meet with in ordinarily careful hands.

One of the first things the tyro in photographic chemistry is taught is the necessity of absolute dryness in storing the materials and chemicals, and in no department does this necessity exist with greater force than in connexion with the preservation of the sensitised paper. Not only is the combination of silver nitrate and organic matter a very unstable one at the best of times—that is, when perfectly free from moisture—but the very nature of the prepared paper itself renders it peculiarly liable to attract damp, and so hasten the decomposition to which it is naturally prone. The soluble nitrates, and in many cases citrates, introduced into the pores of the paper in sensitising are, many of them, of so hygroscopic a character as to necessitate the utmost vigilance in order to keep up a condition of even ordinary dryness, while absolute or theoretical dryness is a practical impossibility.

Here it may be said that perhaps scarcely sufficient attention is given by albumenisers to the nature of the salts employed in the preparation of the paper. In former days, before the introduction of the keeping papers, the question of tone was the principal one to be considered in this connexion, and albumenisers employed the chlorides of ammonium, potassium, sodium, or barium, according to the character of the tone they sought to produce, and independently of any other consideration. But when ready-sensitised paper is in question, another still more important consideration arises, namely, the physical conditions likely to be set up by the employment of the different chlorides. Thus the salts of ammonium and sodium—perhaps the chief favourites with albumenisers—form, by double decomposition during sensitising, the nitrates of the respective bases, and these are both extremely hygroscopic salts, or, in other words, peculiarly liable to absorb moisture from the atmosphere. Chloride of potassium, and more especially chloride of barium, on the other hand, form decomposition salts the reverse of this, and these two would therefore seem to recommend themselves as preferable to all others.

No doubt this phase of the question is kept in view by some of the manufacturers of modern sensitised paper, and equally ignored by others, for there is a very wide difference to be observed in the general keeping qualities of different commercial samples under similar treatment. This difference may be further heightened by the employment, in various ways and proportions, of citric acid and soluble citrates which tend still more to increase the hygroscopic tendency of the paper. While, therefore, it behoves the consumer to use every means in his power to keep his paper dry, it is the duty of the producer on his side to render the task as light as possible.

We assume that at least in the great majority of cases the manufacturer, or rather the sensitiser, sends out his paper in proper condition to start with—that is to say, in an absolutely dry state. Failing this, it is obviously impossible that its good qualities can last for even a brief period. This, of course, involves drying by artificial heat—no mere spontaneous drying under ordinary atmospheric conditions will do—and immediate packing in such a manner as to prevent, as far as possible, contact with the atmosphere. We assume this duty to be performed, because in the case of the manufacturer it is both obvious and easy; but with the dealer or retailer it is not so simple a matter to preserve the integrity of the original production.

For instance, we will suppose a ream of paper to be opened in a dealer's shop and its original package broken and partly removed. No matter how perfectly protected previously, the seeds of danger have now been sown, for every time the package is opened fresh contact is made with the atmosphere, and more or less the process of deterioration proceeds. We know more than one dealer whose stocks of sensitised paper are invariably kept in a drawer or cupboard over quicklime,

but even this precaution is not an absolute guarantee that the paper reaches the consumer in perfect condition, as much will depend upon the method of packing.

Of the various methods adopted for packing and despatching small quantities of silvered paper, the best undoubtedly is the tin box so commonly used for this purpose as well as storing. It adds comparatively little to the cost of the paper, and if made "returnable" when empty, costs practically nothing, while it ensures, as far as it is possible, that the goods reach the customer in perfect condition. Next to the tin box the best protection against damp is a sheet of tinfoil, which is both cheap and effective, while some makers rely upon waxed paper, which may answer its purpose for short periods. Whatever method be adopted, however, by the manufacturer or dealer, its efficiency should never be expected to extend beyond the receipt of the paper by the consumer, upon whose shoulders, then, falls the duty of preserving it in proper condition.

The first care to be observed on opening a fresh packet of paper should be to see that it is perfectly dry. We have known instances in which neglect of this important point has resulted in the utter ruin of the paper in a few days, though enclosed in an air-tight tin box. Clearly it is quite useless to attempt to protect the paper from moisture when it is itself already damp. Instances have been known in which paper sent abroad in hermetically soldered cases has reached its destination utterly ruined by the moisture enclosed with it. Therefore we say, as soon as a fresh packet of paper is opened let it be carefully dried to make assurance doubly sure.

There is one point in handling sensitive paper that cannot be too strongly impressed upon the reader, and that is to expose it as little as possible to daylight, however feeble. Though no immediate result is observable, it has been asserted by more than one practical printer that such exposure tends to hasten the spontaneous decomposition or discolouration of the paper, and therefore, as it serves no good purpose, it should be avoided as far as possible. For this reason the drying recommended should be performed in the evening by holding each sheet singly before a clear fire until it feels uniformly crisp, taking care, of course, not to apply sufficient heat to reduce the free silver it contains.

For storing the dried paper, a variety of methods and receptacles may be used, the commonest of which, and one as good as any, is the ordinary cylindrical tin case. This is especially convenient when the full-sized sheet has to be stored, as few amateurs will go to the trouble necessary to keep it in the flat state. If, however, the sheets are divided into quarters or cut to size, it will be found more generally convenient and pleasant in use to preserve the paper flat, for which purpose special receptacles are provided by several of the dealers in photographic materials. Or failing one of such receptacles, the paper may be kept under pressure in an ordinary printing frame, the pressure acting its part in preventing atmospheric contact.

Whatever kind of receptacle be used it should of course be itself thoroughly dry, and before inserting the paper should be warmed. The sheets of paper as soon as dried should be laid upon one another, and the complete pile either rolled or wrapped in a sheet of clean blotting paper, also carefully dried and still warm, and this may be further supplemented, if desired, by an outer casing of tinfoil. With such precautions the paper will remain white for a very long time and preserve all its good qualities. And if, whenever it is necessary to open the package, this be done in front of the fire with the same care as before, there will be little risk of moisture being absorbed.

The foregoing method applies rather to the stock of paper than to the small quantity in actual use. It is always wise to thus isolate the stock, cutting up a sheet or more at a time for use, and keeping that separate. It is for these cut sheets when in actual use that the specially contrived receptacles prove so convenient, but a rough and ready substitute is found in a shallow box with a piece of wood or glass dropping easily into it to form a sort of lid or covering for the paper. This is kept between sheets of dry, clean, blotting paper beneath the cover, which protects it from light, and if weighted excludes the atmosphere as well, and is readily accessible when necessary during printing operations.

But there is something more than mere damp that causes deterioration and spontaneous discolouration of sensitive paper, but what particular influence it is it is impossible to say. This much, however, is well known, namely, that the best protective against it is a sheet of the same sensitive paper, through which it appears incapable of penetrating. This is well shown in opening a packet or roll of sensitive paper that has been kept some time, when, though the outer layer may be greatly discoloured, the remainder will be quite colourless. For this reason most photographers keep a piece of silvered paper for the special purpose of wrapping round the unexposed sheets or untoned prints, and so save considerably in the course of a year.

When using cut sizes of either albumenised or gelatino-chloride paper, a very neat and simple contrivance consists in a flap envelope made out of ordinary ready-sensitised paper. The prints or cut sheets inserted in this protective envelope will keep perfectly between the leaves of a book or in a blotting pad.

We have before us as we write a curious example of the protective influence of silvered paper in preventing discolouration. A piece of sensitive paper, one-half of which had been previously exposed to light until tinted to the depth of the half tones of an ordinary print, the other unexposed has remained for some years, probably at least five or six, between the leaves of a book in contact with another piece of silver paper that had been used as a mask, and from the centre of which a figure had been cut; the portion of the paper underneath the opening gives a representation of the figure in dark, green bronze, while the other portions in contact with the mask are practically unaltered, the unexposed portion being scarcely straw yellow.

One word may be said in conclusion on the behaviour of perfectly dry paper in the printing frame. It is a well known fact that perfectly desiccated paper—that is, paper that has been preserved in a calcium tube—does not print satisfactorily until it has been allowed to absorb a slight amount of moisture from the atmosphere. Paper dried in the milder manner we have described does not present this difficulty, but there is one thing that must be guarded against, namely, dampness of the pads of the printing frame. If these be not absolutely dry, the drier paper will quickly take up moisture from them, and in doing so expend and cause wrinkles and want of contact with the negative. This fault so frequently complained of by amateurs only requires to be explained to be avoided. It is a good plan to give the pads an occasional "baking" in the kitchen oven.

THICK FILMS AND THIN FILMS.

The part played in picture making in photography by the varying extent of the opacity of the films is a subject that has received far less attention than its intrinsic importance calls for. It has many aspects, and can be discussed in many ways.

For example, there is the opacity due to the amount of silver present, to the proportion of haloids chosen, and to the particular way in which the emulsion is made, the same amount of metallic silver per square inch of film surface being, as is well known, capable of producing very different results according to the emulsion formula employed. That a good proportion of silver is necessary to enable all classes of results to be obtained at the highest pitch of excellence is so commonly accepted that it may be considered a truth, though, unfortunately, the practical photographer has only the appearance of the plate to judge by, as makers do not yet publish their formulæ, whatever the benefit to be gained by the scientific photographer by his so doing.

At the present season of the year, when light is poor and exposures are long, the merits of the two plates are in tantalising opposition; and just as in the choice of lenses, no matter what sum is paid, it is not possible to get every *desideratum* combined, and a balance of advantages has to be struck, so in plates it is not usual to find every possible quality or form of excellence combined. Does the photographer place the utmost obtainable opacity before all other qualities, he will find it difficult to obtain at the same time the highest sensitiveness, the quality which of all others will to the portrait photographer, at any rate, just now appeal. Further, to obtain great opacity, plenty of silver, quite apart from the particular form in which it exists in the plate, is necessary; to carry so much silver a sufficiency of gelatine is needed. But it will be found that the rapidity of drying is, generally speaking, *ceteris paribus*, a function of the thickness of the film, so that at the very time of the year when negatives are wanted specially quickly, if ever, the choice of a thick film causes almost twice the time to be spent over drying. This objection is to a great extent got rid of by the method of soaking in methylated spirit so often spoken of by us; but, as a matter of fact, we believe this mode of drying is by no means generally adopted; it is, indeed, a mere *pis aller* in most studios. One very great objection to the thick film is the length of time that must elapse before a finished—that is, fixed—negative can be rushed through; and where sitters are waiting, the objection is forcible and cannot be overcome. It can only be evaded by development after the sitters' departure. As this plan naturally includes an element of considerable uncertainty in any but very experienced hands, it cannot be treated as a just *per contra*. Some makers, we are aware, lay great stress upon the quickness with which their plates can be developed and fixed; hence this quality must be looked upon as a valuable one.

If we turn now to the other side of the question and inquire what are the advantages to be gained by the use of a thick film it is not difficult to reply. Where subjects embracing violent contrasts, from strong high lights to deep darks, a thick plate will carry all before it—when no backing is employed. A white marble statue, light window curtains, strongly luminous reflections—such subjects on a thin plate are, in the majority of instances, simply buried, and their shroud spreads for a considerable distance beyond the outlines of their own forms. So, again, is it in landscape work, where a bit of bright sky peeps through dull foliage, or shines above the outlines of the roof of a building. We do not assert—we are far from doing so—that a thick film obviates all these disadvantages; but it minimises them, and sometimes averts them entirely. It has long since been shown that the luminosity of a film is reflected back again at the back of the plate to adjacent portions of the film, and with a thick film there is the double possibility that the light received upon its surface may not be strong enough to penetrate the film, or that the reflection of what reduced proportion does penetrate may not be reached by the developer soon enough to be developed up to printing value.

In all these points a great deal, it is true, depends upon the nicety with which exposure is gauged; a thin plate suitably timed may give a better result in the strong lights than a thick one less judiciously exposed. But as the same photographer may use either the thick or the thin, as he chooses, this consideration cannot be allowed to form an element in judging which to select.

Turn we now to portraiture. How many of the thousand pictures that we see around us are there not materially reduced in artistic quality by an unmeaning band of lighter colour round all bright objects? A lady's white collar or lace against a black dress, a gentleman's cuffs, a letter or a newspaper held in the hand—do they not all at times, when the conditions are suitable, surround themselves with a halo which suggests more than anything else the fungoid growth so often seen fringing a dead fly adherent to a window pane or a picture frame? This particular form of evil is one of the most disagreeable of the products of the gelatino-bromide process; not, indeed, that wet plates were entirely free from it, for they were not, but it was of rare occurrence.

We will conclude our survey of the topic by putting on a further aspect of the subject a question which will perhaps indicate which way our own preference tends. If we have at times in the halo surrounding bright objects, as seen in negative and print, strongly visible evidence of the back reflections marring a picture, how very many more cases must there not be in which such reflections must exist and produce ill effect, but yet be ignored or unnoticed because of their position preventing their ready detection? Take a face for instance. If upon development we find that the image goes through the film, it is very probable, though not an actual necessity, that the light travelled through the thickness of the gelatine, and, if so, what more probable than that, to a greater or less extent, it must be reflected and degrade or obliterate those higher delicate tints that give such value to the portrait, and the absence of which in all their variety still so often constitutes the great difference between a gelatine and a wet plate negative.

RELATIVE SENSITIVENESS OF IRON AND SILVER COMPOUNDS.

We informed a correspondent the other day that it is advisable to employ rather less light when working platinum paper than is permissible with silver, and we have since thought that a brief consideration of the relative sensitiveness to light of the various iron and silver compounds now employed for printing purposes might not be ill-timed, especially as processes in which the ferric compounds perform an important part seem to be growing in popularity. There are three distinct platinum printing methods now practised in which iron salts are used, and to these we may add the kallitype process, not long since introduced, in which silver forms the image.

Generally speaking, the ferric compounds require about a third of the exposure of albumen-silver paper, so that it is not only advisable but necessary to handle platinum paper in a more subdued light than that ordinarily used for the latter. If we examine the effect of the spectrum upon silver chloride in the presence of free silver nitrate, we observe that while the ultra-

violet rays are the most active, the blue and green parts of the spectrum are considerably less effective. Now, the maximum sensitiveness of the ferric compounds lies in the green-blue rays, so that in winter, when the ultra-violet end of the spectrum is comparatively inactive, the iron salts should have a still further advantage, and consequently the same relative degree of precaution ought to be observed when working with platinum papers. We have seen numerous platinum prints in which there was a slight degradation of the lighter parts combined with a general flatness of image which we should judge to have been caused by allowing too strong light to have access to the paper either before or after exposure.

An increasing number of amateurs, we are glad to know, work the carbon printing method, so that we may opportunely insert a word on the relative spectrum sensitiveness of the bichromated gelatine. Practically, so far as the blue-green rays are concerned, the ferric compounds and bichromated gelatine are coequal in sensitiveness; as regards the violet, however, the iron has some advantage, which of course disappears in dull weather, when the bichromated gelatine is more rapid than the silver paper, though not, we believe, to the same extent as the iron.

There are two or three emulsion printing-out papers now being used at which we may also glance, although, without knowing accurately the precise constitution of the sensitive compounds, we cannot speak with certainty of the effect of the spectrum upon them. We may, however, remark that these emulsions usually consist of silver chloride in association with a definite organic salt of silver; consequently, instead of the limited range of sensitiveness possessed by pure chloride alone, the action of the spectrum is effective as far down as the orange. Although there is not the same degree of activity on these compounds in the blue-green rays as in either bichromated gelatine or the iron salts, they are more affected than albumen paper, and should therefore print quicker in dull weather. For direct sensitiveness to light, as well as rapidity, the ferric salts are undoubtedly to be set in the first place. It is needless on this occasion to refer to the developable silver compounds which require exposure to artificial light.

Of combinations of the silver haloids not at present in use for printing purposes, it is to be remarked that silver bromide in presence of free nitrate appears to be remarkably sensitive in the blue and green rays, while a mixture of the three salts has also a considerable range of sensitiveness. We allude of course to results obtained by printing out.

Not many photographers, we fear, pay any great attention to these niceties of the action of light on sensitive compounds, and, as a matter of course, they are in ignorance of the reasons why one process may be more rapid than another under given conditions, but a very slight study of the subject will not only carry some interest with it, but will also prove instructive, so that, just as in developing negatives the quality of the light we work by is determined by the sensitiveness of the plate, a like rule will come into force in respect of the sensitive printing papers employed. At present no distinction is drawn in the majority of instances, although the necessity for doing so appears to us to be far from imaginary.

A CORRESPONDENT, whose query we replied to last week through the "ANSWERS COLUMN," like many others who have gained but a slight insight into photography, appears to have a somewhat exalted idea of the profits made by professional photographers. Through the spread of amateur photography a large proportion of the public have learnt the cost of the various materials employed, and seem to conclude that the difference between it and the charge made for the pictures is so much profit. It is no unusual thing for the portraitist to be told by his sitter that the prices charged are exorbitant, and that he is fully aware of the cost of the plates, paper, &c., as a friend of his "has a machine, and takes beautiful pictures." Most of our professional friends would like to be convinced that their profits were anything beyond what is fairly remunerative.

THE cost of the production of photographic portraits is widely different from what it was a few years back. Then only one or two positions used to be taken, and resittings, provided the photography was good, were not given without an extra charge being made. Very little time was expended on retouching. Now from three to six negatives are frequently taken, elaborately retouched, and proofs submitted. Even under these circumstances it is no unusual thing for a fastidious sitter to demand resittings, which are accorded, so that in the end the sum charged for the portraits little more than covers the cost of time and material consumed in their production. The mounts used at the present time cost several times what they did when merely plain white cardboard was in vogue. Again, the spotting of the prints used to be confined to simply touching out mechanical defects; now it often means little less than finishing in monochrome, so much work is put upon the prints; and this, of course, entails skilled labour. If there is to be a Photographers' Trade Protection Society, we have little doubt that the question of proofs and resittings will receive early attention from the members.

THE movement just started by the West London Photographic Society is one that should receive the co-operation of every other Society in the kingdom. If by joint action a reduction in railway fares to tourist photographers can be secured, it would be a great advantage to members of all societies. Exceptional privileges have been accorded to anglers; and that being the case, we see no reason why—and we hope the Railway Companies will not—they should not be granted to members of our craft. Should the West London Society be the means of obtaining a reduction of rates, they will deserve the thanks of every other society. As several of the directors of the different railways are themselves, or have members of their families who are, amateur photographers, they may possibly use their influence on their Boards to secure so desirable an end.

IN the famous O'Shea divorce suit photographs were handed in as evidences of identification. But the learned judge, Mr. Justice Butt, said that in cases of this kind "we do not rely upon photographs alone for identification, but require some other corroboration." This was not the case formerly. During the trial a photograph of the party concerned was handed to a witness who recognised it, "only it was younger," whereupon the Solicitor-General raised a laugh by remarking that "photographs usually are." This is just the reverse of what used to be the case in former times. Retouching has done much in the flattery of sitters, it has also caused photography to be discredited as a truthful witness.

A FORTNIGHT ago we alluded to the great reduction in the price of silver, it being quoted at 47*d.* per ounce; that was the lowest price it had been for many months. Since then, however, it has experienced a further fall, and for two days it remained at 45*d.* per ounce, 9½*d.* less than it was a few weeks back. However, it has risen again, and the market remains, as it is likely to do, in a very unsteady condition.

THE latest thing we have seen in detective cameras is the scarf camera which is being, or shortly will be, introduced into the English market. In appearance it is an ordinary neck-scarf, and is worn as such, and in it there is nothing whatever to attract attention. The gold horseshoe pin is really the mount of the lens. The plates, six in number, are contained in a thin magazine behind the lower portion of the silk, and are raised into position by turning a small stud near the bottom. An indiarubber tube, terminating in a bulb,

passes from the scarf under the waistcoat to the trousers pocket, from whence the exposure is made. The negatives taken are about double the size of a postage stamp. Those who object to the term "detective camera" can scarcely apply the name "hand camera," which they seem to prefer, to this ingenious piece of apparatus.

Two Englishmen who have been yachting on the French canals, and who held a permit from the Minister of Public Works, took photographs of different sites in the Vosges. From a report from the Public Prosecutor at Epinal, they were arrested on their arrival at Nancy. However, they were not detained long, as, after a short investigation, the authorities there found that the arrest was due to an excess of zeal on the part of the Epinal official. Although in this case apparently no very great inconvenience was caused, yet if the gentlemen had not been armed with the permit it might have been different. Therefore it is always a good plan, when making a Continental photographic trip, to obtain from the proper authorities a formal permission, even when one is not legally imperative. No such license, however, can be obtained to photograph in the neighbourhood of either French or German fortifications. This fact should be borne in mind by those who propose visiting the Continent with their cameras during their winter holidays.

Most of the illustrated papers that issue special Christmas numbers must expend a large sum on the coloured presentation prints. It seems a pity, therefore, that some of them are not printed with a more permanent pigment than they apparently are. Already several of those which have been exhibited as specimens at the different railway stations and in well-lighted shop windows for the past few weeks show a marked deterioration. The warm glowing tint they originally possessed has almost, if not entirely, disappeared. Unfortunately many of the coloured printing inks are made with exceedingly fugitive colours in order to obtain brilliancy.

We have often alluded to this matter in connexion with collotype and other photo-mechanical printing processes. Many collotypes, if exposed for a week or two to a tolerably strong light, will have their colour very materially altered. It is a pity that this should be the case, as photographs have already an ill name as regards permanency, and it is very undesirable that it should extend to mechanical processes that are undoubtedly capable of yielding unchangeable results if only the proper kind of ink be used. Of course it must be understood that, although the colour of the print may change, there is no fear of its fading in the sense that a silver print fades. It is only the more evanescent tints, which confer warmth, that will be discharged, leaving the picture of a colder and less pleasant tone.

The "Chemical Union," of which there has been many rumours during the past few months, has, it appears, at last been carried into effect. A limited Company has been formed under the title of the United Alkali Company (Limited). The shares, we learn, were subscribed for privately, hence the directors have not appealed to the public.

A NOVELTY IN PRINTING.

Photographers—especially portrait photographers—are, like the Athenians of old, ever on the lookout for "some new thing;" and during the past twenty years numerous have been the tricks and dodges, patented and otherwise, that have been introduced to give variety to the methods of printing in general vogue, and to induce custom by their novelty. I am not now alluding to such new forms or dimensions as the "*carte-de-visite*," "cabinet," and other fashionable sizes, or to such ephemeral "novelties" as the "diamond-cameo" portrait and such like, but rather to special styles of finish in which, by more or less mechanical means, a *quasi* artistic tone is given to the picture.

Such, for instance, as Sarony's photo-crayon portraits, in which a positive transparency was backed up by a lithographed background representing a vignette or scroll drawing, the result being a picture apparently "finished" in crayon by an artist. Another plan, patented under the name of "photo-mezzotint," I think, consisted in photographing the figure or bust against a white or very light background, and after printing out the figure portion of the picture, introducing some sort of a stipple background by double printing from a second negative, such stipple being produced by photographing under suitable conditions of lighting a surface of morocco leather or similar material. The effects produced in this manner became very popular for a time, but soon lost their attraction for the public.

At the present time the most effective style of portrait is undoubtedly that known as "dry point," but this must be removed from the category of "mechanical" methods, inasmuch as the effect requires the work of an artist, and is not produced by any "royal road" method. The style of treatment, combined with the neutral black tone adopted, gives such productions the appearance of highly finished engravings or etchings, and renders them as unlike as possible to the ordinary and conventional photograph.

The popularity of such methods, as well as the universal practice of "finishing" all enlargements, at least in monochrome, go to show that the present fashion tends in the direction of anything that offers a fair imitation of the handiwork of the artist without necessitating the possession of any great amount of artistic skill. To some of the more æsthetic readers of The British Journal of Photography, it may seem a somewhat ignoble ambition to desire to produce artistic effects without artistic skill or training, and a misapplication of energy to attempt to describe how it may be done. But there are many, very many, who, while fully capable of appreciating artistic effects, have not had the necessary *mechanical* training in the methods of their production, and such are scarcely to be blamed for using any little device that will help them to give an artistic character to their productions that they could not otherwise obtain.

The method I desire to describe is one that suggested itself to me while making experiments in connexion with the production of mechanical printing blocks; and though I have not worked the process out with any definite intention of *making* it a process, I have in a rough manner produced effects that offer the promise of "great things" if the method be properly exploited. In the production of printing blocks from a photographic negative it is necessary to break up the natural half tone of the photograph into a grain or stipple which represents in an inferior manner, in the reproduction, the true gradations of nature. It seems, therefore, a decidedly retrograde step to voluntarily adopt the plan which under the conditions stated is compulsory, and to substitute for the true and beautiful gradation of nature a spurious and artificial one. Yet such is my intention, and I can only argue in defence the craving that seems to exist for something removed from the every-day photograph.

My readers may think I am about to recommend them to adopt photo-mechanical instead of other methods of printing, but such is far from being my intention, for many reasons—the processes are too difficult, the results, except in experienced hands, very inferior, and the trouble too great where only a few prints are required. I am speaking now of actually making a block and printing it in the printing press. But a precisely similar and perhaps superior effect can be obtained with practically no trouble at all by printing on to ordinary photographic paper in the same manner as upon the prepared block; in other words, by producing upon albumenised or gelatino-bromide paper instead of upon a surface of chromated gelatine or bitumen an image broken up into grain or stipple.

I have often been struck when trying the printing effect of a negative, or perhaps of a screen, with the beauty of the result produced even upon albumenised paper when the image is converted into stipple; but when the black tone of platinotype or of gelatino-bromide is substituted for the uncertain colour of the albumen print, the illusion is perfect, and a pure mezzotint effect is produced. Under favourable conditions, and with a suitable screen negative, I can conceive the possibility of producing a better effect in this manner than by the most carefully prepared and worked block, for there is no danger of spoiling the delicacy of the gradation in the etching process or in inking. On the other hand, there is no opportunity of "dodging" the etching to produce effects, nor of working on the block after it is etched; but a good deal may be done by selection of a suitable

screen, and on this point I may have something to say on another occasion.

The requirements for trying the process are not numerous, being confined chiefly to the screen negative or negatives, for two or three of different grades of fineness will be desirable. This, however, is the difficulty; such screens are not readily obtainable, and then only at considerable cost. For trial purposes the methods described in a leading article a few weeks back will enable the photographer to prepare his own screen, or if a natural grain similar to *photogravure* be preferred the following plans can be adopted:—

Take a sheet of tolerably fine glass paper and cement it by means of gelatine or glue to a piece of plate glass, the smooth side of the paper in contact with the glass. When perfectly dry, convert it into a sort of Woodbury mould by pressing a sheet of thin tinfoil—previously brushed over with a solution of indiarubber in chloroform—into close contact with it. This can be most conveniently done by passing the whole between the indiarubber rollers of a wringing machine, if such be at hand; or, if not, by carefully going over the surface, commencing at the centre, and with the fleshy part of the palm of the hand pressing the foil into the grain of the glass paper. When this is quite dry, it may be used as a matrix from which to form any number of screens.

To do this, make an ink consisting of gelatine eighty grains, water one ounce, coloured by the addition of a little liquid India or China ink. The quantity of colouring matter can only be ascertained by actual experiment, as the samples of ink vary so greatly in strength that no reliance can be placed upon any statement of qualities. What has to be borne in mind is that the screen must be very thin, and that therefore the ink must not be too highly coloured. Next we want a thin transparent film, and here spoilt celluloid negatives come in very handy.

To print the screen, lay the plate glass carrying the glass paper and tinfoil on a solid and level table, and pour on to the centre a pool of warm gelatinous ink. Upon this the sheet of celluloid is laid, "roughed" side downwards, and on top of this a sheet of stout plate glass as level as possible. Apply the weight of the body, and squeeze out as much of the ink as possible, keeping up the pressure for at least two or three minutes, or until the ink that has oozed out has set; then, removing the plate glass carefully, strip the celluloid from the matrix, and, if all has gone well, the result will be a negative representing the grain of the sand paper in varying grades of opacity.

I should have mentioned that before inking the matrix it should be smeared over, by means of a soft rag, with a mixture of olive oil and paraffin in the proportion of 1:4, in order to prevent the ink sticking to the mould. If the gelatinous ink show a disinclination to adhere to the celluloid, the latter may be prepared by brushing it over with the well-known varnish of bleached lac dissolved in solution of borax.

If a hydraulic press be available a better mould will be produced by placing the sand paper in contact with a piece of smooth sheet lead and submitting them to pressure between two sheets of iron or steel, by which means an impression of the rough surface will be reproduced in the lead.

It may be found more convenient to employ a coarser kind of sand paper, and after obtaining a screen in the manner described, to reduce the grain in the camera to a suitable degree of fineness. But, on the whole, I think the more uniform result is obtained by using a fine grain at once. If any difficulty be experienced in getting sufficiently fine and uniform glass paper, powdered emery of any degree of fineness—represented by the number of apertures to the inch of the mesh employed in sifting it—can be obtained, and may be utilised in a variety of ways, which would take up too much space to enumerate here.

As a matter of course, negatives may be taken direct in the camera for this process by interposing the screen negative just in front of the plate; but I imagine the principal use of the screen will be in contact printing from negatives produced in the ordinary way. Either plan produces good results if properly worked.

In conclusion, the process is almost equally applicable to any size of picture, only the grain must be suited to the dimensions. For small portrait work a degree of fineness represented by from 100 to 120 lines or dots to the inch will be found suitable, and coarser in proportion to the increase in dimensions. The grain may be much finer than would be admissible if it were intended to print from an etched block.

W. B. Bolton.

EVENING WORK FOR AMATEURS.

[A Communication to the Greenock Camera Club.]

When I received, through Mr. Turner, your kind invitation to spend this evening with you, I was at first somewhat at a loss for a subject that would be of sufficient interest to bring before your notice; for nowadays I find there is an insatiable desire among all workers in photography, be they professional or amateur, for something new; and so, after some consideration, I thought, were I to submit to your notice my illuminating chamber, and with its aid give you a practical demonstration of enlarging and reducing, and also its capabilities for photographing book illustrations by means of artificial light, I would, at least to some extent, be submitting to your notice that which was new.

In the few remarks which I have to offer, I shall endeavour to treat these subjects in such a manner as will make our evening pleasant and profitable from *an amateur point of view*, not but what the same subjects would at all times be interesting to professionals; but, simply, were I addressing my remarks to professional gentlemen, it is just possible I would, in some essentials, deal with enlarging in a somewhat larger and different manner; but seeing that most of you are gentlemen who practise photography for pleasure, not profit, I shall only offer to your notice such remarks, and demonstrate that which is more particularly suited to any lady or gentleman desirous of spending a pleasant winter evening at photography, and of such a nature as would, with care, suffice to turn out really perfect results with the aid of artificial light. Undoubtedly, since the introduction of rapid bromide papers, amateurs and professionals alike became possessed of a ready means for producing enlargements on a large scale by means of projection direct from a negative illuminated with the aid of a suitably sized condenser and good light; and when a worker happens to be clever with his brush, and an adept at the working up of his rough enlargements, most excellent productions may be turned out; and where only one copy is required, this method has some advantages, provided an evenly illuminated disc be secured. Among amateurs, however, we seldom meet in with those who are sufficiently expert with the brush as enables them to work up the enlarged picture to such a state of perfection as is often desired, or would at all compare with the work turned out by an artist who makes a special study of this work, and who earns his beer, bread, and cheese at it. The question, therefore, often crops up for decision as to what is the best means for an amateur to employ.

In contradistinction to the projection method referred to may be mentioned that of making an enlarged negative from a positive or transparency, and where numerous or several copies are desired of the same picture, undoubtedly this method stands far and away in advance, for the enlarged negative can be worked up with pencil and brush in such a manner as will yield prints in carbon, platinotype, or even on ordinary silver paper, and which latter can be toned so as to yield more pleasant results than are, as a rule, obtained on bromide paper. The finest enlargements I have ever seen have been produced from enlarged negatives by means of carbon, and I can with confidence recommend those of you who are desirous of treading on pastures new the trying of this most interesting and delightful process. Only, to start with, don't fly at too high game. By this I mean not to go in at the beginning for too large sizes; begin by obtaining a small size transparency of a suitable kind, and which will stand enlarging to, say, whole-plate size. Then practise the working up of this negative with pencil and brush until you are proficient and able to turn out perfect enlarged negatives, and when you manage this you may go in for larger sizes in other ways, such as by projecting through the camera a small-sized negative direct on to a sensitive opal plate.

One of the first items of importance when undertaking this work is the necessity of evenly illuminating the positive or negative, as the case may be, and when possible I strongly advise you to employ *daylight*. Unfortunately, however, amateurs are not always able to command time through the day for the practice of their hobby, and this alone tends to make the projection method so popular. For a long time I felt in my practice as an amateur there was a sad want of some reliable method of so illuminating negatives and positives, especially, say, whole-plate negatives, by artificial light as would yield negatives from positives, and small-sized positives from large-sized negatives, free from unequal illumination with its attendant flare spots and under-exposed portions; and so during the early part of last winter I set about making a series of experiments, in the hope that I would overcome the difficulty and be able to devise some means whereby I would be able to illuminate large negatives without the

aid of condensers by artificial light in an absolutely perfect and even manner.

I need not detain you, ladies and gentlemen, with a detailed statement of the numerous trials and failures I had to contend with. Suffice it to say, that during the course of these experiments I was strongly impressed with the opinion that if I was to succeed at all it would not be by the use of any direct light streaming through the negative with an intervening diffusing screen or condenser, and so I took daylight for my pattern, and thought that were I to employ a sufficiently intense diffused light I would be on the right track. No sooner did I begin operations on these lines than I saw at once I had for all time coming solved the problem of evenly lighting negatives and positives for enlargement or reduction; and so, after a good many trials, I decided upon the form of chamber which you have been so good as to invite me to submit to your notice to-night; and not only did I find that with its aid I could make lantern slides by reduction through the camera from large negatives, but that I was able to so evenly illuminate photographs and book illustrations as enabled me to produce negatives from such that were quite equal to those produced from the same objects by daylight.

Now, gentlemen, I am sure you will not desire that I take up the little time at our command this evening with any lengthened description of my chamber, but would prefer that I went on to the practical part of my subject with as little delay as possible, and demonstrate what can be done with the aid of my box, and as we jog along we can talk over all the little thoughts that crop up as having a bearing on the subjects we are considering.

I propose, therefore, first, to submit to your notice a very pleasant and, for an amateur, a very suitable method of making an enlargement from a small-sized negative up to whole-plate size direct on opal. This is one of those neat and simple ways whereby any lady or gentleman may spend a delightful evening at their hobby by means of such a contrivance as you see before you and any ordinary whole-plate or other large camera.

Of course, the first thing is a suitable negative; it is no use attempting such work with miserable and unsuitable negatives, such only tend to dishearten a worker and prevent any real pleasure at photography. With a nice, clean, sharp negative of suitable range of tone from clear shadows to vigorous high lights, the work becomes a real pleasure, and of much ease in accomplishment. Therefore, don't attempt enlarging unless from a suitable negative or positive.

You will observe I place in the aperture of my chamber this small 3¼ × 3¼ negative, which I have made by placing a bromide dry plate (a very slow one) in contact with a very perfect collodion lantern slide. This negative has been developed in the ordinary way with soda and pyro, and, as you will see, is tolerably well-exposed and full of detail, at the same time possessing an almost perfect range of tone from almost clear glass to vigorous high light. Otherwise, as I have said, it would be quite unsuitable for enlarging purposes.

Having placed this little negative in the front aperture of my chamber, I begin to light up my box by means of two lime-light safety jets. When this is done you will be surprised at the extraordinary manner in which this little negative will be illuminated, and not only will the light be of great intensity, but the entire disc of the box will be most equally lit up; in fact, I question if it would be possible to accomplish this in such a perfect manner by any other means of artificial lighting.

To enable me to submit this neat little demonstration to your notice to-night I have received direct from the Ilford Company a supply of their excellent opals, and I have to express my thanks to Mr. Howson, of the Britannia Works Company, for his kindness in providing me with these opals so as to enable me to undertake a series of experiments in enlarging with their aid direct from negatives through the camera. I may just here state that I propose to develop these opals with a pyro and soda developer, not that it is in any way to be preferred to that recommended by the Ilford Company, which by the way is ferrous oxalate, but simply because I fear, seeing I have to use the same developer for other plates later on, were I to begin messing about with ferrous oxalate and pyro with the limited accommodation at hand nothing but trouble would ensue. I hope, however, to show you that these excellent opals are amenable to any good developer.

So much for enlarging. After showing you the capabilities of my box for such by means of any camera, I propose to ask your attention while I make a negative from a book illustration. To do this you will see me utilise my chamber in a somewhat different manner. You will see me place the picture in an ordinary printing frame having a sheet of glass. The picture is pressed closely up against the glass and held in position by the back of the frame and springs. The frame is then placed inside the chamber, and when such is done there will be an entire absence of reflections, which are so troublesome at times when working in daylight, and with the aid of an ordinary bromide nineteen sensitometer plate and lens working at *f*-11, I hope to show you that I can get a nice negative with an exposure of about twenty seconds.

After that I hope to show you the capabilities of my chamber for making lantern slides from large negatives by reduction through the camera. I shall place a whole-plate negative in the front aperture of my box, turn up the lights, and with lens working at *f*-8 give an exposure of one and a half minutes in this case, using a slow lantern plate (Mawson & Swan's). I am sure, ladies and gentlemen, most of you know I am a collodion man, and prefer at all times to make my lantern slides with collodion, but having to bring so much apparatus from Glasgow to-night I really could not find room for my wet bath with its attendant necessary chemicals. Doubtless, however, my showing you the demonstration by means of these excellent lantern plates will be quite as acceptable, for most of you will practise this work with these or other similar plates when you make your lantern slides. These plates, you are aware, are very much slower than ordinary bromide plates, and you will therefore be able to form some idea of the enormous body of light I bottle up in my chamber when you see me make a slide by reduction through the camera in such a short space of time on special lantern plates. With collodion it is quite as easy.

The making of lantern slides in itself is a subject that would fill up an entire evening, but as we go along we can talk over many things connected therewith which I need not take time now to refer to.

In copying pictures from books or mounted photographs, perhaps there is no more suitable means of placing them *in situ* for being photographed than the simple way of placing them in an ordinary printing frame carrying a sheet of glass, and then by means of the back and the springs press the picture closely up against the glass. But it frequently happens that illustrations have to be copied that are bound up in the books. Some adopt one means, others another. In my practice I find the following plan to answer admirably. I have a special box frame, by this I mean one having a very deep rebate, and when I have to photograph some illustration contained in a bound book I place the same in the box frame and so pad up the unequal portion of the book till it is of the same thickness on both sides, the same is then pressed close up against the glass, and all goes nicely.

Should it fall to any of you to undertake this work in the daytime, you may at first have some little trouble to overcome reflections, but once understood these troubles are easily overcome. In my practice I have a long black cloth with a hole to permit my lens peeping through. This cloth extends over the front of the camera, thereby covering up all brass fittings, &c., and the other end extends along the copying board to the frame. By this means there is no bright object to reflect, and the trouble with me never exists. I can confidently recommend this black cloth arrangement to those of you who do this sort of work in the daytime. When, however, the work is to be done at night, by such an arrangement as you see me use to-night there is absolutely no bright objects to reflect, and such precautions are not necessary.

Should some idea occur to any lady or gentleman upon which they might desire some explanation upon which I have not touched I shall be very pleased to have the question put to me as we go along, or provided they write to me on the subject I will be very pleased to give them all the information in my power.

When I gave a similar demonstration on the 11th inst. before the Paisley Photographic Society we spent a very pleasant evening together, and as we went along we entered into a nice discussion as the various thoughts struck the members present. I should be very pleased were a similar discussion to arise to-night: I rather like a good talk at a meeting of this kind, for it makes a gathering all the more pleasant and tends to impart information to a few timid workers who otherwise would not come out of their shell. So please, ladies and gentlemen, speak out and let me have any questions you may desire information upon. I notice with pleasure the presence of your lady friends this evening, and if they will do me the honour of accepting the enlarged opals which I make in your presence this evening I shall be extremely gratified. T. N. ARMSTRONG.

THE PLATINOTYPE PROCESS.

[A Communication to the Newcastle-on-Tyne and Northern Counties' Photographic Association.]

I INTEND to occupy only a small portion of your time this evening, and merely to give a brief description of the process, for there are certain points which deserve notice, and I am wishful also to en-

large somewhat the scope of the title and refer to platinum toning generally. Most of the older photographic text-books contained formulæ for platinum toning, designed, I imagine, for use with ordinary albumenised paper. Personally, I never met with any success whatever with such formulæ. The error, or failure, arose from using the chloride of platinum, or chloro-platinic acid as some prefer to call it; but with platinic nitrate or sulphate a successful toning bath may be made, and this bath was introduced so far back as 1859. It is noteworthy that the gentleman who devised this formula also used chloro-platinite of *sodium*, a salt closely analagous to the platinum toning salt in use at the present time. The same gentleman, Mr. Burnett, also at nearly the same period recommended, as developers of the images formed by his ferric and uranium printing processes, salts of gold, *platinum*, and palladium; and here we have foreshadowed many years ago the platinotype process of the present day.

No member of our Society should forget the share taken in experiments of this kind fifty years ago by Sir John Herschel, the distinguished relative of our own distinguished late President. The fact that the action of light reduced the ferric salts to the ferrous was one of the earliest known in photographic chemistry. It was also known that the ferr*ous* compounds would throw down gold and silver from their soluble salts, while the ferr*ic* salts would *not*. Sir John Herschel was aware of this, and devised his chrysotype process. In this process paper was washed over with a solution of a salt of iron, dried, and exposed; it was then toned with a solution of gold chloride, made as neutral as possible, and a picture obtained formed of *purple oxide of gold*. If for gold we substitute platinum, we do not get a precipitate; and here we come to the experiments of Willis, who discovered that the addition of *a soluble oxalate* would cause such a precipitate. Willis also used a plat*inous* salt, viz., the chloro-platinite of potassium, and was enabled thus to get a double deposition of platinum.

The method of obtaining prints by Willis's process depends firstly on the fact that ferr*ic* oxalate is reduced by the action of light to ferrous oxalate; secondly, that the ferrous oxalate, when dissolved in a hot solution of potassic oxalate, instantly reduces the metallic platinum from chlorides and other salts, more particularly when in the platinous state; for instance, a solution of a platinous salt, *i.e.*, the chloro-platinite of potassium, is mixed with one of ferr*ic* oxalate. A properly sized and prepared paper is floated upon this solution and carefully dried; on exposure to light the *iron* salt is affected, being changed to ferrous oxalate, and the particles of this salt will be in close contact with those of the platinum salt. Float this paper upon a hot solution of potassic oxalate, the ferrous image is at once dissolved by the potash salt, but at the moment of solution is reduced also *in situ* some or all of the *platinum*, and the result is a picture in pure *platinum* black. This, the hot bath process, Mr. Auty will demonstrate first. The advantages of this process of Willis's are the replacing of all the iron salt by one of platinum, and not forming an alloy with that metal; the disadvantages are the faintly visible appearance of the picture during printing, and the numerous precautions to be observed against damp.

So far we have been getting nothing but black tones, hence further experiments to meet the desires of those who were wishful for the warm tones of the silver print. With the matt surface of the platinotype the Platinotype Company issued a special solution to be added to the hot bath for the production of sepia tones. This solution is believed to contain a salt of mercury, probably the chloride.

In the cold bath process, which we also propose to demonstrate, Willis's paper is coated with a solution of ferric oxalate and a small quantity of mercury salt; on exposure to light the ferric salt is reduced as before to the ferr*ous* state. The exposed prints are developed or rather toned in a cold solution of potassic oxalate, say fifty grains to the ounce, to which has been added six or eight grains to the ounce of chloro-platinite of potassium (the toning salt of the Platinotype Company); with a strong solution of oxalate of potash *cold* tones are obtained, with a weak solution warm tones. There are some advantages claimed for the use of cold bath paper, prints made by this method are more transparent in the shadows. This may be because the toning is produced by *application*, so to speak, of the platinum salt to the surface of the paper, and not precipitated in the body of the paper, as in the hot bath method. Another important characteristic is the greater purity of the *whites;* this is because the paper is coated with iron only.

The developed prints are placed *at once* in a bath of acidified water, one part of hydrochloric acid to fifty of water, for ten minutes, and then transferred to a second and third acid bath, by which time all traces of *iron* should be removed; a final wash in clean water follows, and this completes the operations.

You will observe that the cold bath platinum method is essentially a toning process, and by all accounts it admits of many modifications and various ways of application. My own work is generally done by floating. The solution may be applied by means of a brush or flannel roller, or a spray producer may be used.

So far we have been using paper and referring to paper containing a basis of an iron salt, when we come to use silver we are able at once to secure a greater variety of tone, platinum being well known to form alloys with silver. Blanchard's paper has a basis of silver, and the other matt-surface papers sold for platinum toning are also sensitised on a silver bath. The name of Mr. Lyonel Clark is, of course, very intimately associated with fine work in this direction, and prints prepared by his method are, in my opinion, a distinct advance in photographic work. Mr. Clark recommends home-prepared sensitised paper, and some pithy remarks of his on the relative merits of ready-sensitised and home-prepared and selected paper are well worth quoting. He says:—"With the advantages that ready-made paper brings, it has also its concomitant disadvantages; we are more or less bound to one quality of paper, slightly thicker or slightly thinner in substance perhaps, or of a more or less hideous tint, but still always the same texture or surface, and on this are indiscriminately printed the bold outlines of large heads, or grand landscapes, or the exquisite details of stereoscopic work, or the micrographical fidelity of nature's minutest organisms."

Mr. Clark therefore suggests wisely that the paper be selected to fit the subject, and it naturally follows that the tone or colour should also be obtained which more accurately represents the idea to be carried out. I am glad to say our Society has not been altogether behindhand in experiments with Lyonel Clark's processes and methods. Mr. Parry, Mr. Sawyer, and Mr. Goold have all, I believe, followed the lines laid down, though I am not sure that platinum has been in all cases the toning salt used. Possibly one or all of these gentlemen will, if present, favour us by remarks on this subject.

In conclusion, let me remark that years ago on the walls of our exhibitions was to be seen nothing but the glossy surface of the prints and warm tones; nowadays we seem to have fallen into the opposite extreme of all matt-surface papers and *cold tones*. Abolish the albumen surface if you will, but let us at least show some idea and sense of fitness in the matter of colour, and remember that variety is pleasing.

JOHN PIKE.

NOTES FROM SCOTLAND.

A FORTNIGHT or so ago the penny-in-the-slot system of photography was still in embryo, now it is an accomplished fact, at what cost we are not yet made acquainted, but a cognate affair which has been popular in the now moribund and disgraced "Edinburgh International Electrical Exhibition Association of Electrical Engineering Inventions and Industries, 1890" (surely the Enventor of this title must have had a cute alliterative Ear)—which has failed for about 50,000*l*.—has, although a failure in one respect, been a success in another. A fortnight ago Cumming's patent penny in the slot for any of the half-dozen or so exhibited, which were widely distributed in the grounds, stood thus:—"The card for which there has been the greatest demand has been that having a view of the Forth Bridge, no fewer than 25,000 of it having been sold. Mr. Gladstone ranks next in popularity, 20,000 of his photographs having been disposed of. When Lady Dunlo was in Edinburgh there was a tremendous demand for her likeness, and in about a week or so 15,000 of her photographs were bought. Of Miss Engle's portrait there have been sold 15,000; of Mr. Stanley's, 10,000; of Sandow's, 8000; of Barnum's tattooed lady's, 8000; of Miss Jennie Dawson's, Miss Wentworth's, Miss Horlock's, Miss de Sortis', and the Misses Vernon's about 5000 each. For *cartes* of Mary Anderson or Mrs. Langtry there is very little demand, the ladies in tights evidently being first favourites. Royalty sells well, and there is a good demand for Burns, Scott, and Queen Mary; but of some politicians, such as Mr. Parnell and Mr. Morley, there is no sale. Mr. A. J. Balfour and Lord Randolph Churchill, however, have been hot favourites." On trying to ascertain what the result of Mr. Gladstone's Mid-Lothian campaign was upon the further number of his portrait (a very good one, by the way), I found the numbers had not been made up, but that, in addition to those held in stock, a further supply of 20,000 copies had been ordered, and several of the "slotters" were quite out of Gladstones. So much for photographic in addition to other popularity.

The rapid approach of winter has seldom shown so great a variation in eighteen hours as on October 27, when the forenoon cloudy

sunshine registered 50·5, and next morning we had two inches of snow on the ground, bitterly cold wind, and a temperature of 30°, a fall of about 30° in less than twenty-four hours.

In your editorial, page 662, *A New Style of Framing Photographs*, Mr. Henry Stevens is credited with a new departure in picture framing; but, alas! like many a so-called new thing, this method has not only been well known and long used in the provinces, but even in conservative London it is in use in many of the best print shops for what we call the show frames of the establishment, *i.e.*, those used to show engravings and keep them free from soiling finger marks. A considerable number of years ago a portfolio of the same character was patented. In this, one side of the folio was glazed with fine glass, and the drawings or engravings, in addition to being protected from dust, with the power of changing the one to be shown *ad libitum*, was also safe from pilfering fingers by having a lock and key. Nevertheless, it is well to reintroduce or reinvent a new old thing. Let us hope it may pay Mr. Stevens's ingenuity.

Among the minor difficulties which beset and annoy the amateur (especially) is the keeping and making his camera slides and appliances quite black and unreflective. Where wood is so concerned, perhaps there is no readier or better material for this purpose than good writing ink. One or two coats of this, well brushed and soaked in, will give a perfect dead black. If the ink be not dense enough, add to it a little *gas black*, made by catching the smoky flame of a gas burner on a plate. This is a fine impalpable dead black, much better than that sold as lampblack. But it is a much more difficult thing when the brass portions require blacking. An instance is to hand where the original set of stops of a Ross lens had been lost by a *careful* borrower, and, of course, the new ones (home-made) have never been so good, being uneven and altogether subject to and afflicted with scratches and scrapes. I have now to remedy that grievance, and that by making an entire new set of them of black vulcanite, which answers the purpose admirably. Should any of your readers wish to do likewise, it would be well to note that in boring the openings of the various ratios to focus, a very easy way is to clamp the vulcanite between two pieces of wood and bore with a centre-bit of the proper size through the wood and vulcanite. The opening will be found to be perfect, and, if necessary, this can be reduced to a knife edge with a rosebit. Vulcanite can be cut and worked almost like wood in addition to its other special qualities.

A rather curious instance of the effects of mercury has occurred within recent months. A negative had to be made as a companion to an existing one, that the prints might be a pair. The subject being dead, a portrait had to be copied 12 × 10, and this, to bring it to the density of its companion, had to be, and was, intensified with mercury; and it has been found that by no possible means hitherto tried can the same colour be got in platinum printing, the mercury-intensified negative always turning out a warmer black coloured print, which has been refused by the client time after time. The belief is that, in addition to a change in the colour, there may also be a change in the relative permanency of the prints. I have suggested varnishing the negative with collodion first, and, if necessary, ordinary varnish afterwards. Perhaps some of your readers who have suffered, or who believe they can give better advice, will kindly do so through your columns.

Supplementary to the leader on *Fuzziness*, out of accurate focus or rather broadly treated artistic photographs were an accomplished fact long before even Sir W. Newton spoke on the subject, and were on evidence as early as the forties, and executed, too, by an artist of no mean fame, if at all inferior to Sir William. I refer to the late D. O. Hill, Secretary to and Member of the Royal Scottish Academy, who, in conjunction with Mr. Adamson, of Edinburgh, made an immense series of photographic pictures, consisting of groups, portraits of eminent men, views both of the fast disappearing typical and historical buildings of the city, as well as those of the more modern era. These were of the highest artistic quality, all on proper negatives, many of which are yet extant. As it is sometimes necessary to give historical accuracy to a statement lest it be thought to be too general, I may mention that I purchased after his death, at a sale of some of his artistic paraphernalia, a number of these negatives, and among them were a series of views of the monument to Sir Walter Scott, in Edinburgh, from its foundation, or very shortly thereafter, until it was about two-thirds of its present completed height. If it is desired by any of the societies or others interested to have a selection of Hill's negatives for examination or show, I have no doubt the requisite number could be obtained, as his accomplished wife, Mrs. D. O. Hill, Sculptor, sister of Sir Noel Paton, Her Majesty's Limner, &c., is still alive, and has many of his works; and the gentleman to whom I sold my portion (G. A. Panton) is also to the fore.

W. H. Davies.

CHLORIDE OF SILVER GELATINE EMULSION PAPER.

[A Communication to the Holborn Camera Club.]

Although the subject is rather out of season, bromide paper being perhaps more on the *tapis*, I hope the few notes which I have gathered together will be of some service to you in trying this paper, as I have no doubt some of you will.

This paper is not by any means a new discovery—the discovery dating some twenty years back—but it is only of late that the paper has been taken up by amateurs. In my opinion it is the best paper for them, their negatives being sometimes too thin for albumenised paper, or else too dense for platinotype. Albumenised paper is now, I think, slowly fading into oblivion, attacked as it is on all sides by platinotype, plain salted, bromide, and now by this chloride paper.

The advantages of this gelatine emulsion paper over the ordinary albumenised paper are numerous. It tones more quickly with a much superior richness and delicacy, while the range of tones extends from a warm brown through all the various shades of brown, chocolate, purple, and right on to black. Excellent prints can be obtained from all sorts of negatives, whether thin or dense. Every little detail which exists in the negatives is brought out in the finished print, and any surface, from the highest enamel to the finest matt, can be obtained at will. It has good keeping qualities—some makers say it will keep eighteen months if it is kept dry, and I have myself used it eight months old and found it print and tone almost as good as fresh paper. If properly manipulated the results are, practically speaking, permanent. I think the depth of detail which can be obtained by the use of this paper is due to the thin coat of gelatine, as the impact between the negative and the surface of the paper is much closer than with albumenised paper, where a good deal of the minute detail is lost in the grain of the paper.

As some of you might like to know how this paper is prepared, I will give a brief outline of that part of the subject. Any fairly strong paper is coated with an insoluble film of gelatine, in which some tinted or white sulphate of barium has been mixed. A gelatine emulsion of chloride of silver is then prepared and the paper coated with it. The use of this emulsion accounts for the brilliancy of the resulting print, as the silver is held on the surface instead of sinking into the paper.

There are four commercial brands of this paper now sold in the English market, viz.:—Obernetter, which I believe is the oldest; Liesegang's aristotype; Fallowfield's; and the latest, called celerotype, manufactured by the Blackfriars Photographic and Sensitising Company.

The colour of the paper when printing varies considerably. If the paper is fresh and is printed in a dull light the colour is a brilliant purple, but if printed in a strong light it sometimes resembles that of an untoned fixed albumen print. In the directions supplied with the various brands of paper we are told that it must be printed until the high lights are discoloured, but I think the depth of printing depends to a great extent upon the toning bath used. If the combined toning and fixing bath is used the prints should be deeply printed, but if the prints are first toned and then fixed in separate baths the ordinary albumenised paper is a very good guide. Prints to be finished with a matt surface should not be printed so deep as those which are to be finished with a glossy surface. A strong fixing bath and a prolonged fixation will materially reduce an over-printed proof, while an under-printed one will look much darker if squeegeed on ground glass. The prints should be examined in a weak light while printing, because this paper is much more sensitive than albumenised paper, and care should be taken that the print does not shift, as in consequence of the shiny surface it is very likely to do. An extra pad of felt should be placed at the back of the print to obviate this as much as possible.

There are various toning baths, a special bath being recommended by the makers of each brand of paper, but I have used the following toning and fixing bath for all the commercial brands:—

Distilled water	20	ounces.
Hyposulphite of soda	4½	„
Citric acid	1	drachm.
Acetate of lead (pure)	1½	drachms.
Sulphocyanide of ammonium	3½	„
Alum (powdered)	1	drachm.
Chloride of gold	8	grains.

Half sheet of unfixed scraps of aristotype paper.

When first made this solution turns into a milk-like turpid liquid, which will settle in three or four days, when it is ready for use. The prints should be placed in the bath without washing, turning almost directly a yellowish colour. After five minutes the fixing is complete

and toning commences, the whole operation taking between ten and fifteen minutes.

The following toning bath I have also used for Liesegang's paper :—

A.

Sulphocyanide of ammonium	30 grains.
Water	3 ounces.
Hyposulphite of soda	1 grain.

B.

Chloride of gold	2 grains.
Water	2 ounces.

Pour one part B into equal A. With this bath the prints turn a peculiar yellowish colour, which gradually changes until the required tone is obtained. If the margin of the print tones quicker than the centre, the gold bath is too strong, and must be thinned down with water. This bath gives a brilliant purple tone, or if the hyposulphite of soda is omitted a warm chestnut brown. The print is then fixed in the following fixing bath :—

Hyposulphite of soda	1 ounce,
Water	10 ounces,

from five to ten minutes being sufficient for the operation.

With the celerotype paper I use the following toning bath :—

Tungstate of soda	¼ ounce.
Chloride of gold	4 grains.
Water	20 ounces.

It gives a range of tones from purple to black. For those who like rich brown tones I would recommend the following bath :—

A.

Acetate of soda	¾ ounce.
Chloride of gold	4 grains.
Water	20 ounces.

B.

Sulphocyanide of ammonium	100 grains.
Chloride of gold	2 „
Water	6 ounces.

These solutions should be kept separate, and when required for use take in the proportion of twenty ounces A to six ounces B. The best tones will be obtained if the solutions have been mixed together about twelve hours before use. With this paper and these toning baths the prints should be washed in two or three changes of water before being toned. The ordinary borax toning bath can also be used. The prints should then be fixed in the fixing bath quoted above, the operation taking about twenty minutes.

With all these different brands of paper and various toning baths the tone must be judged by *transmitted* light, and you must be very careful in doing this not to touch the face of the prints, as the contact with the hot fingers will cause the delicate gelatine film to melt. The toning baths should not be too strong, or uneven toning will result, and the tone of the print will be much inferior.

The washing should be thorough, but not rough. The gelatine surface of the paper is not at all improved by being knocked about in a print washer. About the best way to wash any prints is to place them in water for a short time, then drain for a few seconds and place in another bath of clean water, repeating the process about a dozen times. In this way, as Mr. Woodbury says, "the pictures will in half an hour be more perfectly freed from the hyposulphite of soda than if they had been left in a running stream of water for six times that length of time."

When thoroughly washed, we can hang the prints over a line to dry, and mount them in the same manner as we do a print on albumenised paper, or we can squeegee it on to glass, an enamelled iron plate, or a piece of ground glass. The glass should be free from scratches, and well cleansed with a piece of chamois leather. With a piece of cotton wool, powdered talc or French chalk should be rubbed gently over the glass, and after that, with another piece of cotton wool, the glass is dusted until none of the talc is visible. The print is then taken out of the water and placed face downwards on the glass, a piece of blotting paper is laid over it, and with a roller squeegee it is forced into absolute contact, care being taken that all air bubbles are expelled when thoroughly dry by placing a knife under one of the corners; the print will peal off with a highly glossy surface or a matt surface, as the case may be. Care should be taken that the print is thoroughly dry, or it will stick. I find it generally takes about six hours for the prints to dry thoroughly. With an enamelled iron plate no preparation is required, the prints are simply squeegeed down, and will fall off when dry. They should on no account be stripped off, as it spoils the gloss. After the plate has been used it can be cleaned with a piece of sponge. The prints when finished show wonderful detail.

Mounting the glazed prints in the ordinary way will result in a considerable loss of gloss. We have, however, three courses which enable us to mount these prints without this loss :—

1. To paste a piece of waterproof paper on the back of the print directly after it has been squeegeed on the glass.

2. To apply the mountant only to the edges of the print.

3. To apply the mountant to the back of the print when about half dry, and press the mount into contact with the print while the latter is still on the glass; when the print is dry it will fall off with the mount attached.

The first way is perhaps the best. Directly after squeegeeing take a piece of waterproof paper, which can be obtained at Fallowfield's, called "enamel black paper," and trim it to a size about one-sixteenth of an inch smaller all round than the print. Paste the white side of the paper, and place it on the damp print as it rests on the glass or plate. Squeegee well down and leave to dry, when the print will come off with the backing paper attached. It can then be trimmed and mounted as usual. The backing paper must be cut smaller all round than the print, as if the paste gets over the edge of the print it will become pasted to the glass.

This gelatine emulsion paper is more expensive than albumenised paper, and requires a little more gold for toning, but the increased expenditure is, I think, more than repaid when we consider the results; and then there is no difficulty in obtaining a good tone, which, I think, is one of the worst troubles an amateur has to contend with.

In conclusion, I may say that if any amateur has not tried this paper he cannot do better than to give it a fair trial, and I feel sure that if proper care and cleanliness is observed, he will not be at all dissatisfied with the results which he will obtain.

HERBERT THOMPSON.

EDINBURGH PHOTOGRAPHIC EXHIBITION.—II.

(*From a Correspondent.*)

THE catalogues were not ready at the opening of the exhibition. The press of business to meet all necessary demands, so as to be ready for the opening day, became so heavy on the Executive that they had to postpone the issue of the catalogue for a day or two; but in an exhibition that has to remain open so long a time as this one, this does not so much matter. Since now it is in our hands, it shows that a considerable amount of care and labour must have been expended in the compiling of it. Quite irrespective of the cataloguing of the pictures and apparatus, it contains considerable information and illustrations. Amongst the pictures in the little work there is *A Study from Life*, by the Direct Photo-Engraving Company, London, also examples of blue printing; a picture of Old Temple Bar, by the Graphotype Company; and a specimen of Meisenbach's improved process of engraving from a chalk drawing. A syllabus of the lectures to be delivered during the run of the exhibition is also given—"Historical Sketch of Photography," by William Lang, "Photographic Optics," by Professor James Hunter; "Chemistry in the Dark Room," by Dr. T. W. Drinkwater; "Woodburytype," by R. H. Walker; "Ten Days in Norway," by L. Howie; and the "Architecture of Normandy and Brittany," by H. J. Blanc, Architect.

Then follows an introduction, principally historical, which must be very interesting to all who delight in photography. In this condensed, careful sketch we find the points of advance lightly handled, and notes made upon various processes—such as carbon, Woodburytype, photogravure, photo-etching, photo-lithography, and photo-zincography.

So much interest is bound up in this handy little work that we feel sure that it will be preserved by many as a *souvenir* of the exhibition, and it will remind them of this charming collection of pictures long after it has passed away.

The display of apparatus is considerable, the floor spaces of the five rooms being quite filled with cases and tables, giving to the whole a comfortable and well-filled appearance. In the north room, which is the first on entering, the cases are filled with relics out of the past. In one of these cases I came upon the *Sun Pictures* by Fox Talbot—a collection always interesting because so rare. Another of Fox Talbot's books is to be seen on one of the tables in the centre room; it is entitled *Sun Pictures in Scotland* and to guide the uninitiated, the following caution was evidently printed and issued with the book in 1845, and still remains there :—"The plates of the present work are impressed by the agency of light alone, without any aid whatever from the artist's pencil. They are sun pictures themselves, and not, as some persons have imagined, engravings in imitation."

But to return to the cases. Alongside of Fox Talbot's books are six paper negatives, also the work of Fox Talbot, lent by Mr. W. Lang. Negatives of views at Southampton are also shown here, being original

gelatine negatives taken by Dr. Maddox in 1871. A very large collection of Daguerreotypes, silhouettes, glass positives, and old miniatures, are here on view—material that would enlist the enthusiast's time and study for hours, and which must be of great value from an educational point of view, a feature that Mr. H. Blanc feels to be one of the most promising to increase the ranks of the photographic army.

On entering the second room, the first table that we come to is that of George Mason & Co., where cameras are shown from twenty-five inches square down to the smallest detective. The various studio stands form one of the prominent features in this exhibit—the "Automatic," the "Archimedean," and the "Lever" stand, this latter being constructed to carry with ease the twenty-five-inch square camera now in use in so many studios. Here we saw an enlarging camera with eight-inch condenser, and arranged with a back bellows, so that the light can be moved to any point desired, which is a considerable improvement on the apparatus with rigid back. They also show a new burnisher, which gauges the thickness of the card and sets the roller, so that all thumb-screwing is dispensed with, the roller being adjusted at once without trouble. A smart notion for squaring the camera without set levels is also shown. It is in the form of a tripod top screw, with pendant underneath fitted with plumb cord and ball, so small that it can be carried in the vest pocket, and so useful that doubtless many will be found to appreciate its usefulness.

Opposite to this table is that of McGhie & Co. (Glasgow), where some good cameras are shown. Notable amongst these is an enlarging camera with considerable bellows extension. There is also an adapting flange on view here, a very clever piece of mechanism. It is so arranged that it can be made to fit any lens constructed after the iris diaphragm plan.

Coming to the next room, Mr. Hume's (Edinburgh) exhibit attracts attention, most prominent being a series of various sizes of his cantilever enlarging lantern, and a considerable show of condensers of all sizes. Some samples produced by the diazotype process are to be seen at this table.

Opposite in the same room is Mr. J. M. Turnbull's (Edinburgh) exhibit. He shows lamps, slides, cameras, and general apparatus. His own hand camera, slides, and specially constructed stands are the most notable features of this exhibit.

On the same table is shown a large album containing one hundred calotype sketches by D. O. Hill and R. Adamson—an object of interest that should not be overlooked.

Mr. Wood has various sizes of his popular washing machines and racks on view in this room.

Lens-makers are represented by Mr. Wray, London, and M. Strüben, Paris: the latter is new to us as a maker. The lenses shown are well finished.

J. W. Smiles (Edinburgh) shows a changing box and camera. The box on inspection seems of the same pattern and construction as that of Hare's, so familiar to us all.

Baird (Edinburgh) and Buncle (Edinburgh) both make a good show of general apparatus.

Arndell & Marshall have on view a variety of their grooved packing boxes. An improvement has been introduced in the manufacture of these, the sides facing down about half an inch, so that the plates stand free to be handled. This is a decided improvement on the old form.

Mr. Harding Warner (Rugby) exhibits a developing tent for use in hotels and other places, and along with it a washing tray or trough fitted with syphon and supporting angles. It is named the *Multum in Parvo*. The apparatus and arrangement seem very complete, but some description should have been appended to it that would have guided the visitor to the value of its various parts, without which the value of its usefulness will be lost upon many of those interested in such appliances. In a stand in the lecture room some very fine transparencies are on show, the work of Andrew Swan Watson. They are of a subdued blue colour, are well manipulated, and produce a very charming effect. Round the bottom of this stand there are several frames filled with samples of mounts and mounting boards, the exhibit of Hannam & Mellvenne.

A thing of wonder and special interest to the uninitiated here is an exhibit sent down from the *Daily Graphic*, showing how a photographic type-block is produced. It begins with the original sketch, then the negative taken from it is shown, also a paper matrix, a zincograph block, and a curved stereotype metal specimen page ready for printing.

A considerable collection of Dr. P. H. Emerson's productions will be found upon the table in the centre room—*Norfolk Broads, Fishl and Fen*, &c.; they are not entered for competition. This selection will give all who are interested a fair showing of that class of work known as the naturalistic, and also will be no small source of enlightenment to those who have been reading the wordy war that has been going on for such a time anent this school, and who have never had the opportunity of judging of results before. In this collection the work of the naturalistic school is fully demonstrated.

TESTING LENSES.

THE various means adopted of testing that most expensive and important item in the photographer's outfit—the objective—has recently given rise to a good deal of discussion, the result of which has been to show in a very unmistakable manner how unreliable these different methods are. The empirical method seems destined to hold its own for some time to come, in spite of the existence of more scientific though less generally adopted means. The astronomer tests his telescope upon a distant book in order to form an idea of its capacity for revolving nebulæ and double stars. Similarly the microscopist tries the powers of his instrument upon so-called test objects. Why, then, should not the photographer be allowed to adopt a similar method, and to try his objective upon test landscapes and portraits? It must certainly be admitted that opinions upon the capabilities of a lens may differ a good deal. For instance, nearly every one attaches a different interpretation to the expression "adequate definition up to the edge," any one intending to enlarge subsequently desiring the maximum of clearness, while other persons will be content with medium definition.

Agreement on this point is practically impossible. By adequate definition I mean a definition which, when magnified six times by a lens, still shows perfect line. When this is the case I know that the negative will stand a sixfold enlargement, which is, at any rate, worth consideration.

It has hitherto been customary to rest content with determinations of the chemical focus, brilliancy (relative aperture), size of image, and field of view—the latter being generally expressed as an angle. I am of opinion that matters would be more comprehensible for the general practitioner if all quantities were expressed in terms of the focus as a base. When it is said that the image is 54°, only a mathematician can succeed in forming an idea of its actual size *when he knows the focus*. But to be certain he will have to hunt up a trigonometrical table. Who knows at once how big a plate an objective with an image-angle of 60° will cover? We must calculate out to ascertain that it is 1·15 times the focal length.

All this is obviated by giving the image in terms of the focal length. If I say the effective image is 1¼ times the focus, the reader can at once form an opinion of what sized plate the objective can cover without consulting trigonometrical tables, which are not usually to be found among the photographer's stock-in-trade.

There is no doubt that Miethe's method of determining the focus by focussing for infinity and for natural size is to be preferred to that recommended by Dr. Stolze. I have tried the latter method, and found that it gives rise to much greater errors than the former. In the former method it is sufficient to focus an object exactly the natural size. Two strips on a dark ground, one of which is pasted on the ground surface of the focussing screen, enable this to be done with ease. In employing the other method, it is necessary to measure the size of the image on the matt surface of the focussing screen with great accuracy, which is still attended with difficulty, even when a millimetre scale (which is not easily seen) is engraved upon it.

To make measurements of Zeiss' objectives I have employed both methods, and have regularly found that Stolze's method gives much greater errors than Miethe's. For determining the effective aperture the Steinheil method appears preferable to Miethe's, inasmuch as it does not necessitate unscrewing the objective. I have encountered instances in which this is impossible. Measuring the circle of illumination, however, easily gives rise to errors which I will consider later.

Supposing the circular image has been ascertained, we are still a considerable way from knowing the size of the plate which may be used. The accompanying table shows the different dimensions which the image-field must possess to cover plates of the ordinary sizes.

Size of Plate. Cm.	Diameter of Image-field required. Cm.
9 × 12	15
12 × 16	20
13 × 18	22·2
13 × 21	24·7
18 × 24	30
21 × 26	34
24 × 30	38

Thus, if 1·2 *f* be the effective image-field, and the focus 19 cm., then 1·2 × 19 = 22·8 is the diameter of the effective image-field, which, as shown by the table, will completely cover a 13 × 18 plate.

In general I regard as good an objective when, with aperture *f*·6 and a stop *f*·40, it will give good definition over the whole of the plate employed. With full aperture an objective may be regarded as good when it gives a sharply defined round image of *f*·36.

Photographische Mittheilungen. Professor Dr. H. W. VOGEL.

Our Editorial Table.

Sun Artists.—No. 5.

Kegan Paul, Trench, Trübner, & Co.

The subject of this number of *Sun Artists* is the late Mrs. Cameron. Four of her pictures form the illustrations. These, thanks to the various reproducers, surpass in technical excellence those of her works printed in silver from the original negatives—at any rate, any we have seen. Two of these are portraits respectively of Lord Tennyson and Sir John Herschel. Of the latter we may say that it is greatly to be regretted she did not make better use of her opportunity and produce a more noble portrait of that eminent man. The engraver has done his part of the work well, and by occasional employment of the roulette has softened in some measure what would otherwise have given patchiness. In *The Kiss of Peace* a lady with a lackadaisical expression is resting her nose upon the forehead of a younger woman of sedate countenance, her wearied look giving eloquent expression to her sense of the great length of the photographer's exposure, for, as we are informed in the text, "Mrs. Cameron gave very long exposures, ranging in duration from one to five minutes." It appears that Mrs. Cameron in 1865 sent some photographs to the Exhibition of the Photographic Society of Scotland, and because a medal was awarded to H. P. Robinson's *Brenda*, and none to her, the writer of the text in the present number of *Sun Artists*, Dr. Emerson, says, *more suo*, "Had Mrs. Cameron been well advised she would never had entered for these contemptible exhibitions; the judges were incompetent, her competitors beneath contempt, and her public uneducated." Dr. Emerson doubtless considers this and numerous similar expressions clever, but we are afraid his readers will fail to perceive in them other than the utterances of a disappointed, unappreciated man, the quality of whose own works places him in a species of isolation from the photographic artists of the times. With a wider experience his style will change. For the sake of an estimable periodical, *Sun Artists*, we are sorry to see an essay containing so many offensive phrases occupying its hitherto admirable pages. With this exception the work maintains its high position.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 18,723.—"System of Mechanism for the Automatic Change of Plates in Photographic Apparatus, to be called 'The Triumph.'" A. Toby.—*Dated November* 19, 1890.

No. 18,734.—"An Improved Form of Apparatus for keeping Dishes containing Liquids in Regular Motion; specially for Use in the Practice of Photography." J. W. Hunter.—*Dated November* 19, 1890.

No. 18,749.—"Improvements in Machinery for Printing, Finishing, and Producing Photographs." J. E. Thornton.—*Dated November* 20, 1890.

No. 18,967.—"Improvements relating to Photographic Printing Presses." L. J. Sellier.—*Dated November* 22, 1890.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 2	Carlisle and County	Cathedral Hall, 57, Castle-st., Carlisle
,, 2	North London	Wellington Hall, Islington, N.
,, 2	Holmfirth	
,, 2	Sutton	Sutton Scientific Soc., 1, Grove-rd.
,, 2	Sheffield Photo. Society	Masonic Hall, Surrey-street.
,, 2	Paisley	Paisley Museum.
,, 2	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 3	Coventry and Midland	The Dispensary, Coventry.
,, 3	Edinburgh Photo. Society	Professional Hall, 20, George-street.
,, 3	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 4	Bolton Photographic Society	The Baths, Bridgman-street.
,, 4	Leeds	Leeds Mechanics' Institute.
,, 4	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 4	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
,, 4	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 5	Sheffield Camera Club	Whiteley's Institute, New Surrey-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

November 25.—Technical Meeting.—Mr. W. Bedford in the chair.

Mr. Chapman Jones said that it had been stated that platinum prints became weakened by treatment with strong hydrochloric acid. Some one had said that the sepia prints were reduced in this way, but the Platinotype Company had stated that the black prints were thus affected.

Mr. A. Mackie recalled a statement made some time since that platinum prints were much weakened by treatment with hydrochloric acid.

The Chairman inquired if it was known what was the difference between the image of the sepia and the black-toned platinotypes.

Mr. Jones said that the preparation was supposed to be a secret, but if cupric chloride or mercuric chloride were added to the platinum solution before putting it upon the paper, it made a very marked difference in the colour of the image. The one-five-hundredth part of mercuric chloride added to the solution was sufficient to produce the effect. Mr. Willis, he believed, thought that the brown image was due to an oxide of platinum; but he (Mr. Jones) did not think it possible. He thought both deposits were the metal, and nothing else. A change of appearance might not be due to a solvent action of hydrochloric acid. The intensity of a negative was reduced by that acid, but he did not infer any solvent action from that fact. Two photographers with whom he was acquainted, living in different parts and unknown to each other, had told him that they used acid to reduce their negatives, and were obliged to be careful not to let the action go too far, or the negative would be too thin.

The Chairman said that with negatives developed with a considerable amount of sulphite, acid had no reducing effect. The alteration caused by it was due to a change to a grey colour, which in the sulphite negative was already there.

Mr. Mackie remarked that with regard to the action of sulphite in inducing black tone in the deposit, he could not find that it took place in collodio-bromide. If one of the red-toned collodio-bromide lantern slides were treated with acid, would the colour be thereby altered?

Mr. A. Cowan said that sometimes it would not be at all altered. He did not find much alteration of colour even by treatment with perchloride of iron.

The plates and proofs sent by Colonel Waterhouse in illustration of the reversing process for the production of direct positives were then handed round. One treated with thio-sinamine alone added to the eikonogen developer was only partly reversed. In another, in which bichromate had been used in conjunction with thio-sinamine, reversal was more complete, as was the plate developed by phenyl thio-carbamide.

The Chairman then referred to the process published some years since by Mr. T. Bolas, in which a collodio-bromide plate was treated with bichromate before exposure in order to produce reversed image. He had never succeeded with this process in getting clearer images than those shown by Colonel Waterhouse.

Mr. W. H. Harrison said that Captain Abney had stated that it is easy to get reversal when there is a trace of an oxidising agent in the film. Some time since he had thought that thio-sinamine should be useful in the developer, and had tried to obtain some for experimenting, but found that the nearest he could get to obtaining it was to order sinamine from Germany and convert it into thio-sinamine himself, so he gave up the experiment. On the question of dyes, Mr. Harrison added that Professor Hummler, of Leeds, had read a paper some time since in order to dispel the prevailing idea with reference to the fugitive character of coal-tar dyes. He found that many of them were fugitive, but not in a larger proportion than dyes from other sources. Eosine dyes were especially wanting in permanence.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

November 20,—Mr. G. Nesbitt in the chair.

Mr. A. Mackie called attention to an editorial statement in one of the photographic papers in connexion with the making of lantern slides, that the collodio-bromide process is a far more difficult process to work than the wet collodion, and inquired whether that was so in the experience of the members. He added that probably of all processes the collodio-bromide is the easiest to work, and requires the least time for all the operations concerned in it.

The Chairman quite agreed with Mr. Mackie's statement. The collodio-bromide was the most convenient for lantern slides of any.

A question from the box was read:—"What is the action of the ferricyanide and uranium intensifier on the silver image?"

Mr. P. Everitt had tried it once but would not do so again.

Mr. J. S. Teape said that there was a great difference between his experience and the statement of an authority on the subject—Mr. Howard Farmer. That gentleman had said that the deposit found was insoluble. He (Mr. Teape) had used the process for years, and found it very good, but it was necessary that the final washing should be of but short duration. If the plate was left for some hours in the water the intensification entirely disappeared, and the negative was left as thin as at first. He found that ten or twenty minutes was quite sufficient. If, however, the negative had been somewhat over-intensified a longer stay in the water sufficed—by dissolving out some of the product of the intensifying process—to reduce it to the required amount.

Mr. Mackie thought that the constituents of some waters might account for an effect upon a deposit which was not necessarily soluble in pure water. At Huddersfield the water was especially highly charged with mineral substances that sometimes had a decided effect upon photographic processes.

Mr. H. M. Hastings agreed that solubility alone might not be the cause of the fading away of the intensified image, but there might be a chemical change in it.

Mr. George Newman was elected a member.

CAMERA CLUB.

November 20,—Mr. H. M. Elder, M.A., occupied the chair.

Mr. A. Pringle gave an address on *Some Old Processes of Making Lantern Slides*.

Previous to the lecture Count Primoli, of Rome, handed round a large and excellent series of instantaneous photographs and other larger work of his own production. An exceptionally interesting one represented an indoor function, with the Pope seated in full ceremony. This had been given ten seconds, detective fashion, but the figures during the time had not moved. To show the energy and enthusiasm of amateurs in Italy, it was observed that Count Primoli had made over thirty thousand exposures in the last two years or so, and sets his little photographic account for that period at 2000*l*.

Mr. Pringle, in his lecture, commenced by gainsaying assertions to the effect that lantern-slide pictures did not come within the domain of art. He insisted

on a high scale of lighting, clear shadows, and warmth of colour. He sportively suggested that the screen pictures could easily be made as naturalistic or as definite as the speaker liked by varying his distance from the sheet, and if rough surface was the aim, then all that had to be done was to use a good fuzzy travelling rug as a screen. He then proceeded to give the formulæ, working details, and distinctive characteristics in connexion with several old processes—dry collodion, wet collodion, collotio-albumen, &c.; and he illustrated his remarks by exhibiting on the screen comparative slides in the several processes.

Some discussion followed.

On Thursday, December 4, Mr. Henry Sturmey will read a paper on *Rollable Transparent Films*.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 18.—Rev. E. Healy in the chair.

The Chairman showed several prints on Fry's specimen plates, films, and paper.

The lantern was then got into requisition, and some excellent slides by several of the members were exhibited.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

ON Friday and Saturday, November 21 and 22, the second annual exhibition of the Society was held. The pictures were divided into four classes, the judges being Messrs. Leon Warnerke, A. R. Dresser, and J. Traill Taylor, whose awards were as follows:—Class A, for "Best general work," silver medal, Mr. W. Rice; bronze medal Mr. T. C. Kirby. Class B, for "Pictures taken on the Society's excursion," silver medal, Mr. J. F. Kelly; bronze medal, Mr. H. E. Farmer. Class C, "Local views." Mr. F. W. Webbs. Class D, "Lantern slides," first, Mr. W. Rice; second, Mr. H. E. Farmer; both of whom were disqualified, as they had been awarded medals in other classes, therefore the bronze medal was given to Mr. E. Boydell.

There were a number of fine exhibits on view, and the attendance on both nights was large, the hall being packed to its utmost capacity.

HOLBORN CAMERA CLUB.

NOVEMBER 21.—Mr F. J. Cobb in the chair.

Mr. HERBERT THOMPSON gave a lecture on *Chloride of Silver Emulsion Papers* [see page 761]. After giving the lecture, Mr. Thompson proceeded to tone some prints in a combined toning and fixing bath, and after squeegeeing a few prints on an enamelled iron plate and on a piece of ground glass, he mounted a print in the way he recommended without any loss of gloss.

In the discussion which followed, Mr A. J. GOLDING said he had found it necessary in hot weather or in a hot room to put the prints in a preliminary bath of alum to harden the film. In hot air the prints, after being placed in the toning bath, had run like treacle. He generally soaked them in a ten per cent. solution of chrome alum for about five minutes before toning. He recommended the use of the following toning bath for Obernetter paper—

Sulphocyanide of ammonium	2½ drachms.
Chloride of gold	3 grains.
Water	16 ounces.

He very highly praised the chloride of silver emulsion paper.

Mr. T. S. CHANG said during the last year or so he had made aristotype paper to a great extent, but had found the combined toning and fixing bath very tedious.

The meeting closed with a vote of thanks to Mr. Thompson for his instructive paper.

During the evening, prints on the various commercial brands of this paper, some from negatives of Messrs. Thompson and Golding, and others sent by the manufacturers, were passed round.

THE LANTERN SOCIETY.

NOVEMBER 24.—Exhibition of lantern slides for members and their friends. A selection of about ninety slides were shown on the screen, and several lantern attachments were then shown practically in operation, namely, the kaleidoscope, panoramic, cyclostrope, and vertical attachment. The curious effects capable of being produced by some of these instruments appeared to be somewhat in the nature of a revelation to many of those present.

GREENOCK CAMERA CLUB.

AT the November meeting of this Club on Thursday evening, Mr. T. N. ARMSTRONG, of Glasgow, gave a paper and demonstration on *The Use of an Illuminating Chamber in Enlarging and Reducing and in the Making of Transparencies*. There was an uncommonly large attendance of members and their friends, including, for the first time, some ladies.

Mr. T. L. EASTWOOD, the President of the Club, introduced the lecturer, and referred in complimentary terms to the most instructive paper on *Wet Collodion* which the same gentleman had given about a year ago.

[Mr. Armstrong's paper will be found at page 758.]

Mr. Armstrong's illuminator, as shown at the meeting, consisted of an oblong wooden box about a yard long, a foot high, and some eight inches broad, tastefully whitewashed inside and lighted at the ends by two limelights. A negative placed in an aperture at the middle of the box was most uniformly lighted, and thus capable of being perfectly copied in any proportions by a camera suitably placed. A non-transparent subject, such as a drawing or mounted photograph, could be placed beside the box and was so well lighted as to be practically free from the usual troublesome reflections. After describing the construction of the instrument, the lecturer proceeded to make with the aid of the slide-plate opals from a lantern-slide negative. The Ilford Company had most kindly sent a dozen of their opal plates and though the developer used was pyro-soda instead of the ferrous oxalate usually recommended, the results well upheld their good reputation. Mr. Armstrong next copied a pen-and-ink drawing, and then made a lantern slide on a Mawson & Swan plate from a whole-plate negative of the steamer *Columba* at Princes Pier. All the developing was done under the eyes of the audience, and every particular given that could possibly help members to understand and afterwards carry out the various processes.

The Club afterwards unanimously decided that instead of an exhibition of framed work in January next there should be two lantern nights, and that the Council should be empowered to make arrangements accordingly.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 18.—Mr. J. P. Gibson in the chair.

The subject for the evening being a demonstration of *The Platinotype Process* by Messrs. M. Auty and J. Pike, Mr. PIKE, in introducing the subject, read a paper [see page 759].

Mr. AUTY then proceeded to demonstrate *The Hot Bath Process*, developing a large number of prints in view of the members.

Mr. PIKE afterwards showed the working of *The Cold Bath Process*, and referred especially to its greater range of tones as compared with the older method.

Both demonstrations were equally successful, and the resulting prints very much admired by the members.

The HON. SECRETARY announced that over 15*l.* had been subscribed by the members towards the purchase of a new optical lantern for the Association.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 17.—Mr. Archibald Watson in the chair.

After the usual business and election of twelve new members, Mr. W. GOODWIN read a paper on *The Development of Negatives*, followed by a discussion.

A number of transparencies by Mr. Miller, illustrating a tour in Holland with the hand camera, were shown on the screen by means of the limelight lantern. These were followed by a number of other transparencies by various members.

ANOTHER NEW PHOTOGRAPHIC SOCIETY.

AT a meeting held at "The Old Lyceum," Bailey-street, Rochdale, on Monday evening, the Rochdale Photographic Society was duly formed, Mr. Spedding, Edmund-street, Rochdale, being appointed Secretary *pro tem.*

There was a good attendance, twenty members joining in the room. Subscription, 5*s.* per annum. Meetings to be held on the fourth Monday in each month, except in December, which is fixed for the third Monday.

After the above had been agreed to, W. T. MCKINSON gave a short demonstration on *Printing in Carbon*, which was much appreciated by the audience, none of whom had ever seen the process.

The 10*s.* 6*d.* Presto Detective Camera and outfit (Franks' patent) was also shown and admired for its efficiency and small cost.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

TONING PRINTS.

To the EDITOR.

SIR,—Allow me through your columns to thank Mr. E. J. Smith for his kindness in coming forward to help a stranger, though, unfortunately, the plan he recommends does not answer with me, as after the salt water bath, my prints absolutely refuse to tone at all! My difficulty in obtaining a good tone has now gone on for over six months, and though I have had upwards of thirty years' experience, I own myself, for the present, thoroughly beaten; hence my letter to you for help, as the trouble has been a serious loss to me, besides the worry and vexation.

I will as briefly as possible now detail my method of working and the difficulties that occur. All the best brands of double albumenised papers have been tried, with nearly the same result—almost an impossibility to secure a rich purple tone—the tones being mostly brown of more or less unpleasant shades. I work as follows:—Bath fifty to sixty grains silver, neutral; floating time, five minutes. Blot off and thoroughly dry the paper. The prints out of the frames are everything one can wish in look—rich purple brown, slight bronzing in shadows, cool half tones. Washed in three or more changes of water until all milkiness disappears, then placed in acetate toning bath, in a minute or two the prints begin to change and pass through various shades until of an intense purple-blue whilst laying in the dish; by transmitted light the prints are now a deep red, and if fixed at this stage, the finished print is quite foxy. According to the maker's directions, I try to push the toning further, until "bluish" by *transmitted* light; but it is seldom or never possible to do this, and the prints are, when dry, of a browny-black—certainly not purple—in spite of an enormous amount of over-toning. Now, what appears most extraordinary is, that most often in the same bath many of the prints do not pass through the purple shades at all, but turn to a leathery brown tint, and no treatment will alter them, prolonged stay in

the bath only bleaching them till they are quite useless, apart from bad tone. I have tried the lime, borax, tungstate, and carbonate of soda baths with no improvement; also plain gold and water. As to the papers themselves, I know that all of them will take rich purple and even black tones, but I cannot find out in what respect my practice is wrong. The chemicals, though above suspicion, have all been changed several times. The toning baths are allowed to ripen before use, and their perfect condition is shown by the fact that I have had prints in over two hours without mealiness or excessive bleaching, though they appeared fully toned on the surface in about ten to twelve minutes. I have heard of similar troubles to mine, but not so persistent, for at present I cannot rely upon any day's batch of prints being presentable.

I may sum up the results of my recent experiences as follows:—

1. Some prints change in the toning bath in twelve to fifteen minutes to a deep rich blue with a trace of purple; when fixed they are a fairly good brown.

2. From the *same paper* and the *same negatives* in the same bath others only take a brown leathery tone; no treatment alters them. Why?

3. Other prints under same conditions in the toning bath only take on a brownish-black tone, without any glowing warmth in the deep shadows, and with a tendency to a yellow look in the lighter parts; these are of a greeny-brown when finished. Why?

I consider the most beautiful photograph should be of purple *verging* on blue tone, with cool half tones, and rich glowing shadows of an almost crimson lake tint, the whole effect to my eyes being a rich purple with a shade of blue. According to former experience, I ought to get this (from *good* negatives) by toning to just a shade deeper than I want the finished print; but I cannot do so now, except by a complete departure from the usual course. With the single albumenised paper, floating on a weak bath and fuming with ammonia, I can mostly get what I have described above; but there are objections to the single paper in practice, and the fuming is a complication which I wish to avoid, and as it is not much used in this country, I assume that the greater part of the photographs I see in shop windows and showcases are produced by what I term the "straight-forward" mode of working. In fact, I know of several instances where it is so, and that one or other of the popular brands of double paper is used.

Mr. Smith attributes the trouble he experienced to irregular washing before toning; but on most occasions when a print has had only a very short washing the toning has taken place extra quickly, and, if anything, with a finer tone than the others, though here again I have met with singular contradictions. As I now and again get the right tone, I am not seeking the unattainable, but wish to secure it as a regular thing, without having to throw out daily half the prints. I cannot suppose that all printers do this. Though the most general tone is brown, which is much more easily obtainable than a purple or black, there are many who, like myself, prefer these tones, and I cannot suppose that these suffer the daily waste and uncertainty that I do. I could fill the whole of THE BRITISH JOURNAL OF PHOTOGRAPHY with an account of the many curious facts and discrepancies that I have noticed, but space forbids, and if you will kindly publish this letter it will, I hope, elicit correspondence that will prove of benefit to others besides.—I am, yours, &c.,

134, *Hoole-road, Chester, November* 22, 1820. M. HARGREAVES.

FERRIDCYANIDE-HYPO BATH.

To the EDITOR.

SIR,—This will be found useful as a final in cases of old and partially discoloured paper. Some time ago I came upon a packet that I had bought ready sensitised, and overlooked. It seemed hopeless, but by printing deeply and using the above bath to finish with I got very fair prints. Am afraid platinum-toned are not amenable to this treatment. Pt is stubborn.—I am, yours, &c., F. J. QUICK.

SUN ARTISTS.

To the EDITOR.

SIR,—I must confess to a feeling of surprise on reading Mr. Mansfield's communication and your footnote on the same in your issue of last week.

Surely, if your correspondent had any doubt on the genuineness of the pictures in our last number, he should, in the first place, have communicated with those responsible for their publication, and not prejudice the number in the eyes of the photographic community by a note of alarm in your columns. His apprehensions, however, have little foundation in fact. The four reproductions of Mrs. Cameron's subjects accurately represent the pictures from which they were taken. The work was placed in the hands of a most skilful engraver, and one, moreover, conversant with Dr. Emerson's views on the "immoral retoucher."

So far as Dr. Emerson is concerned, he no doubt will answer for himself in due time; but I may at once say that his essay was written long before the engravings were finished, and consequently his appreciation is not based on them.

The evidence Mr. Mansfield brings forward in support of his contention strikes me as singularly inconclusive. He states that "many, many years ago" he saw "several pictures by Mrs. Cameron" at an exhibition, which were spoilt (artistically speaking) by "faulty manipulation, which produced on the prints spot marks and dark patches."

It will be observed that he neither specifies the pictures in which he observed these blemishes, nor does he give us the means of identifying them, beyond very vague indications as to time and place.

It is quite possible that the four pictures we have reproduced were not among the "several pictures" which so vividly affected him at that remote period. It is also possible that the "faulty manipulation" he complains of occurred in the printing, and not in the production of the negatives.

It is a very remarkable fact that in the almost complete exhibition of Mrs. Cameron's pictures given at the Camera Club but a few months ago there was not a picture which could fairly be said to be disfigured with "spot marks and dark patches." This exhibition attracted considerable attention at the time, and I feel sure there are many who could come forward to bear me out in this statement. "The poor critics who were so cruelly lashed" (many of whom are fortunately still alive) had ample opportunity to revise their judgment of years ago on this occasion; that they did not avail themselves of it is ample comment on Mr. Mansfield's argument.

The four subjects we have reproduced were selected from the pictures shown on this occasion, and whatever "clean manipulation," over and above the "clean manipulation" there evident, is due entirely to the quality imparted by photogravure, and to the necessities of the process.

I am not attempting to champion in these remarks the cause of any school of photography; I am very content to confine myself merely to the task of dissipating an unfounded impression, so far as it affects the reputation of this Association.—I am, yours, &c.,

W. A. BOORD, *Hon. Sec.* "*Sun Artists*" *Association.*

7, *Temple Chambers, Temple-avenue, E.C.*

A NEW SCHOOL OF PHOTOGRAPHIC ART.

To the EDITOR.

SIR,—I think your correspondent, "A Trading Artist," deserves the thanks of the community for his well-meant hints. Doubtless he is quite right in discarding his good lenses and buying cheap ones; still, his plan is not half complete. Certainly, as he says, he is "in the fashion;" but nowadays, if one is to be considered a true artist, it is not sufficient merely to be in the fashion—one must aspire to lead it.

A very short time ago I should have trembled to express an opinion on matters artistic, but now I have learnt that lack of knowledge is no reason for remaining silent. Thanks to modern teachings, and my own powers of pursuing a line of reasoning to its logical issue, I have arrived at the foundation of a new School of Photographic Art, which I propose to call the "Imaginistic." This school has for its aim the perfect reproduction of "the effect produced upon an artistic mind" by any scene. The details of this scheme I now disclose in the interests of my fellow creatures yearning for artistic productions at a cheap rate, and for artistic and scientific culture without the expenditure of brain power.

My plan, then, briefly, is this. Since modern teaching infers that "suggestion is the backbone of true art, and detail is a defect, it is obvious that if we have a means of readily supplying the "suggestion," the "picture" may be left to take care of itself; for is it not a canon of art that imagination will supply that which the picture lacks? I discard, therefore, cameras, lenses, pinholes, and all such antiquated nostrums, as being not aids, but hindrances, and I take a sheet of plain paper, which may be of any desired warmth of tone, and have it framed and glazed. Having thus prepared the basis of the picture, all that remains is to supply the "suggestion." This is done in the simplest manner possible. All that is necessary is to write beneath the plain paper the title of any desired subject, and the thing is done.

Suppose, for instance, I take for the title "A River Scene," how beautifully the plan works out! Taking the title as a starting-point, the delighted eye travels over the surface of the paper unfettered by "detail," unoffended by "biting sharpness," and untrammelled by "conventionality," whilst the omnipotent and all-important "imagination" has free scope to supply all the salient features of the most perfect picture, from the willows in the foreground to the middle distance, where, expectant, sits the angler awaiting the tardy tittlebat, and to the far-off hills which melt almost imperceptibly into the tender and mellow distance. There, then, we have "pictorial definition" in perfection.

Of course, sceptics tell me that they do not see these things, and that my picture does not produce the same mental effect as looking at a scene in nature; but I have my reply ready. I tell them that they do not see with "the eye of an artist," and it requires an artistic mind to appreciate true art.

Again, suppose I write as a title "Naturalism Idealised"—mark the effect. On the instant my imagination fills in the picture, and the animal stands revealed in all its noble proportions, and harnessed to its self-elected burden; note the long, grave face, the flashing eyes, and the zebra mark upon the shoulders; see the hoofs firmly planted, the four legs inclined back until the tail touches the ground, the characteristic ears set back in the most self-assertive and aggressive obstinacy—the harmonious whole suggestive of a firm intention to upset the artistic apple-cart somehow. Let those who like pick up the pieces. Wonderful are the powers of imagination—wonderful!

I intend during the ensuing year to produce several masterpieces on the above plan, and I shall exhibit them in Pall Mall. I know that the

Society will award me a medal, for, look you, should the sceptics fail to see the beauty of my productions, the jury can triumphantly point to the "artistic feeling" displayed, and should this not prove conclusive, there remains the fact that I have invented "a new and beautiful printing process."—I am, yours, &c., NEVIL MASKELYNE.

9, *Dent's-road, Wandsworth-common, S.W., November* 24, 1890.

PINHOLE PHOTOGRAPHY.

To the EDITOR.

SIR,—I confess I am not quite able to follow your correspondent Mr. Thomas Earp's remarks on pinhole photography, where he alludes to methods of obtaining the sharpest definition possible. But when he says that "as a rule the pinhole should be as small as possible, for if the opening be too large a pleasantly sharp image cannot result," he appears to me to fall into the popular error that the smaller the aperture the finer the definition.

The sharpness of image depends upon the diameter of the aperture relatively to the focal distance. Theoretically, the greatest degree of sharpness possible is obtained by the following rule:—Multiply the square root of the distance in inches of the plate from the aperture by 0·08. The result will give the diameter in fractions of an inch of the aperture to be employed to give the greatest amount of sharpness possible. Thus, with a focal distance of sixteen inches the diameter of the aperture should be one-fortieth of an inch. For artistic work, in my opinion, this definition will be found to be too sharp. I am, yours, &c., ALFRED MASKELL.

Camera Club, 21, Bedford-street, W.C., November 24, 1890.

SPECTACLES AND DEFECTIVE VISION.

To the EDITOR.

SIR,—In answer to Mr. Evans's letter in your issue of October 17, I write as one similarly circumstanced, and after thirty-one years' short-sightedness.

I think that Mr. Evans should use a pair of weak glasses for reading and in the house—more particularly in the dark room; and that for out-door vision a stronger pair is necessary. I fancy that the reason for the use of two sets of spectacles is this: The short-sighted eye is feeble in its power of accommodation or focussing, and therefore the use of one pair of spectacles for distant vision and for reading must, in one case or the other, strain the eye.

As with a certain pair of spectacles Mr. Evans saw objects unequal in size, I think the glasses must have been unequally adapted to his eyes, and that the left lens, through which objects appeared the smaller, was too strong. It is quite possible that, through disuse in distant vision, the "keenness of vision" of the left eye has deteriorated; hence, to see objects with it as clearly as with the right, a lens has to be used which is too strong for it, as shown by the objects appearing smaller.

Mr. Evans should be most careful to get his lenses accurately adapted to his eyes. If he does not know of any particular optician, I can strongly recommend him to go to Mr. George Spiller, optician, 3, Wigmore-street, who thoroughly understands how to suit glasses to defective vision.—I am, yours, &c., S. L. DOBIE, *Surgeon-Major.*

Secunderabad, India, November 5, 1890.

RECORDING METEOROLOGICAL PHENOMENA.

To the EDITOR.

SIR,—At the Leeds meeting of the British Association a committee, consisting of Mr. G. J. Symons, F.R.S., Chairman, Professor Raphael Meldola, F.R.S., Mr. John Hopkinson, and myself, was appointed to report upon the application of photography to the elucidation of meteorological phenomena, and to collect and register photographs of such phenomena. The success with which these instructions can be carried out necessarily depends in a great measure upon the voluntary co-operation of others. Will you therefore allow us to appeal to photographers through the medium of your columns, and to ask all who have in their possession negatives of clouds, lightning, hoar-frost, hail-stones, or other meteorological phenomena, or of damage done by whirlwinds, tornadoes, or storms, to communicate with me?

We shall be grateful for copies of any such photographs, but shall especially welcome offers of future assistance in the shape of photographs taken in accordance with some simple instructions which will be supplied on application.—I am, yours, &c., ARTHUR W. CLAYDEN.

8, Cecil-street, Lothbill Park, London, S.W., November 18, 1890.

INTERNATIONAL EXHIBITION AT VIENNA.

To the EDITOR.

SIR,—Appended I have the pleasure of giving you the list of the gentlemen who have been chosen to form the jury at the International Photographic Exhibition to be held here next spring:—

H. Angerer, Professor at the Imperial and Royal Academy of Fine Arts, Vienna, painter; *J. Eder*, composer; *J. Jansa*, Professor at the Imperial and Royal Academy of Fine Arts, Vienna, painter; *K. Kovarik*, Professor at the Art Industrial School at the Austrian Museum, painter; *J. Lowenstein*, Professor, Imperial Councillor, Photographer to His Imperial and Royal Majesty the Emperor; *A. Schaeffer*, Director of the Imperial Picture Gallery at Vienna.—I am, yours, &c.,

CHARLES SCENA, *President.*

Club of Amateur Photographers, Vienna, November 16, 1890.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange two good magnesium flash lamps, complete, with reflectors and junction mouthpiece, for *Pictorial Effect in Photography* and *Picture Making by Photography*.—Address, P. J. LEHMANN, Photographer, Mold.

Five large showcases, two 12 × 10 Lancaster cameras, Hunter & Sands' 2B lens, head and body rest, two burnishers, Eclipse light, half-plate box camera, C.-D.-V. rolling press, studio camera stand, a tripod, and sundries, in exchange for safety bicycle or whole-plate wide-angle lens and whole-plate dark slides.—Address, J. C. WILLIAMS, 29, Princes-street, Shrewsbury.

Answers to Correspondents.

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to "*THE EDITOR," *2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:—

James Hughes Anderson, Welshpool.—*Two photographs of the Right Hon. the Earl of Powis.*

Thomas Thorburn, Prestwick, near Ayr.—*Two photographs of dogs.*

J. E. YATES (Auckland, N.Z.).—Received with thanks.

PHOTOGRAPHER.—Such lenses are sold all over the country.

DOUBTFUL.—You cannot much improve upon this make of plate.

A. W.—We use B very frequently, and like it much. We have not tried the others.

H. G. PIKE.—The address of Messrs. Poulton & Son is Lee, Kent; and that of Valentine & Sons, Dundee, N.B.

W. A. C.—Better get some elementary work on photography; from that you will gather what apparatus you require.

CORRELLI BELL.—The platinotype process for sepia tones or the method recently published by Mr. Lyonel Clark.

ED. LIESEGANG.—The photographic drollery about which you inquire appeared in *Le Naturaliste*, No. 918, November 8, 1890.

W. G. B.—*Le Moniteur de la Photographie* will serve your purpose. The address is L. Vidal, 13, Quai Voltaire, Paris.

FONTAINE.—We shall have occasion soon to look through the patents, and if we come across the one referred to will communicate.

A. H. PEZELL (Dublin).—Had you been a more careful reader than you evidently are you would have seen that your query was attended to in last issue.

G. MOON.—We have not seen any book on photo-lithography of the nature you require but Wilkinson's, published by England Brothers, 6, St. James's-square, W.

GOTTMANN (Liverpool).—The markings on the prints are precisely similar to some by Vandyke of your town, which was the subject of an action some months since.

C. W. BENNETT.—The marks are due to sulphuretting, probably from contact with another print while in the fixing bath, which prevented free action of the hyposulphite of soda.

C. TURNER.—The difficulty will be overcome by glazing the side of the studio facing the road with either flatted or ground glass. Neither of these can be seen through, and they obstruct but little light.

E.S.C. (Plymouth).—It is not possible to make the wide-angle doublet work at *f*-8. But it may be possible to increase its rapidity to some extent by opening out the largest aperture in the revolving circle of stops.

LUX.—Remember that with such a lens as you describe, the focus being measured from its centre, there is so much in effect added to the length of your camera. From the figures given, both camera and lens will answer quite well.

ALPHA (N. B.).—1. With thinly coated plates halation is only to be avoided by backing them.—2. With subjects having little contrast there is small risk of halation unless the plates are more thinly coated than most ordinary commercial ones.

WEEKLY SUBSCRIBER.—1. To get what you wish you must employ a wide-angle lens of shorter focus than the rapid one you now have. 2. Many photographers demand payment at the time of sitting; some do not. 3. The treatment of the prints seems quite right.

REV. R. W. has had a background done in distemper by a local painter, and complains that the colour rubs off when touched. He asks if this is usual with distemper backgrounds, and, if not, how it is to be obviated. It is not at all usual for the colour to come off in the manner described. The fault is that too little size has been used in the distemper. The background should be recoloured and more size employed.

BOUNDER asks if the papers read before the Photographic Society of Great Britain are published in book form or are to be had separately.—The papers are not published separately. They appear in the Society's journal, and are also published in our pages and in those of some of our contemporaries.

J. A. BIRD.—The hardness of the bromide enlargement is partly due to the negative and partly to under-exposure. When dealing with a hard negative, a very full exposure must always be given, so that the detail may be obtained without forcing the development. Whenever the development has to be forced the shadows of the picture are always liable to become black and inky. If you try again with the same negative, give three times the exposure, if not more.

FOCUS asks: "1. What is meant by the length of focus of a lens? and, 2, Where can I get the last number of *Sun Artists*?"—In reply: 1. By the focus of a lens is meant that spot at which parallel rays of light cross the axis. It can be ascertained experimentally by pointing the lens to a bright sun and holding the hand so as to receive the rays at their smallest point of convergence. In this way the focus will be both felt and seen. 2. Messrs. Kegan Paul, Trench, Trübner, & Co. are the publishers.

F. T. H. asks for a good receipt for sizing rough paper for single transfer carbon prints.—Dissolve one ounce of good gelatine in a pint of water, then add twenty grains of chrome alum dissolved in one ounce of warm water. It is almost impossible to say exactly the amount of chrome alum that any sample of gelatine will require without a trial; too much will coagulate the gelatine, but as much should be added as the solution will take without causing the solution to coagulate while it is being used. One or two experiments will settle the point.

R. HENSLEIGH WALTER writes: "I understand that a series of articles appeared in the JOURNAL two or three years ago fully describing the Woodburytype process. I shall feel obliged if you would let me know if such is the case, and if the numbers in which the articles appeared are still obtainable."—No series of articles on the Woodbury process has been published since 1884, in which, and also in the volumes for 1882–3, much useful information will be found. These volumes have long been out of print.

BUILDER.—The design for the new studio will do very well, but twenty-two feet will be rather short for groups. Being able to place the camera in the dressing room when required will ameliorate this difficulty to a great extent, therefore we advise you to make the doorway somewhat wider than you propose, particularly as there is another entrance to the room. Seven feet is full low for the eaves; six or twelve inches higher would be preferable. It will be advisable to carry the glass in the roof to the centre of the studio, or, perhaps, a little beyond, as the studio is wide; you will then have greater scope for effects. Two feet wide, with glass of ordinary thickness, will not be too much for the panes.

TONING writes: "Will you kindly favour me with a little information respecting silver and toning baths. I have lately been a trifle dissatisfied with tones which are not exactly my ideal. Is it necessary to keep any chemical in the silver stock bottle in order to maintain in best condition? If so, will you favour me with name and quantity, and any other information that would be useful. I use the acetate bath. The prints are washed well, but lack brightness. I admire a nice warm brown tone, but that I am unable to get. Prints have a tendency to be muddy. Of course, sensitising bath is well filtered, and occasionally treated with kaolin, and the toning bath is generally a fortnight old when used. If you can oblige me with a few hints I shall be greatly indebted."—From what our correspondent says, his conditions are such that good tones ought to be produced without difficulty. We therefore suspect that the fault is in the manipulation, or possibly in the paper itself. Probably the toning is carried further than the particular sample of paper will stand. Try removing the prints at a much earlier stage. No addition to the silver bath is necessary beyond occasionally a little kaolin to keep it colourless.

J. L. HART sends us the following communication: "I notice in your 'Answers to Correspondents' one who signs himself 'Puzzled.' Enclosed are two prints which I think equal 'Puzzled's' grievances. I had a batch of prints of 200 cabinets and *cartes-de-visite*, which were treated in the usual manner and left to soak all night. Next morning I was astonished to find every one more or less spotted, as enclosed. At once I condemned the manipulations, and for the time was contented with the idea. To commence, I had the washing dishes used before toning cleansed. The next batch numbered 180, which were very carefully watched through their different processes and left to soak all night, apparently free from spots. In the morning I was disheartened to find them equal to the previous batch. I came to the conclusion hypo was the enemy, so had everything thoroughly cleansed. The next batch turned out all right, so I felt confidently relieved, and concluded I had cured the disease. In the next batch I was again troubled, but only with a few, and those I noticed were from the bottom of tank used for soaking them in. I have analysed my previous working, and come to the conclusion that it is hypo left in the prints through insufficient washing after fixing, previous to allowing them to soak all night. Shall carry out my ideas when I tone to-morrow. If you know my ideas to be wrong kindly write me. Should the spots disappear under my suggested working will again write you. *Re* 'E. J. T.'s' query as to the use of rain-water for washing prints, &c., allow me to make two remarks when using rain-water. First, 'E. J. T.' will find it difficult to precipitate the silver from the first washing water; second, if the prints are allowed to soak all night in the rain-water without previously distilling or filtering it, he will be troubled with a dirty precipitate clinging to the prints and difficult to remove."—We shall be pleased to have the results of our correspondent's experiments. Anent the use of rain-water, if it be pure there will be no difficulty in precipitating the silver from the washing waters. If not, a little nitric or hydrochloric acid will get over the trouble. If there is a deposit on the prints after washing, it shows that the water is contaminated with a large proportion of foreign matter.

A. O. F. asks for a formula for coating plates with for the dusting-on process.—Several formulæ will appear in the forthcoming ALMANAC. The following, however, is a very good one:—Grape sugar, four drachms; gum acacia, six drachms; water, ten ounces; bichromate of potash, three drachms.

HIGH PEAK writes as follows: "Some three years ago I built a new studio, and in my dark room (a large one) I have two windows, one with four panes of ruby, and the other with four panes of yellow. It has been my custom to partially develop at the ruby window, and finish at the yellow; but the other day, when I had put the dish in front of the yellow light, I left it for a moment while I turned to light my pipe, and found the picture completely fogged, and on testing the window by exposing half of a quarter-plate for one minute at about a foot from the glass, I found it flash up in a moment, thus showing that a few seconds would have sufficed to fog the plate. Ought the glass to have deteriorated in so short a time, as the windows face north? Occasionally I have had similar cases lately, but I have attributed it to some extraneous light, or to an overdose of ammonia. Of course, I am aware of several remedies, but I do not want to prevent my looking through the window. Can you recommend any firm, or do you know of any firm, where I can obtain stained glass which will not behave in such an erratic manner? I do not want to block out my view, but I do not want to have to reglaze my sashes every two or three years. Can you suggest any remedy with the present glass?"—It is unusual in our experience to find yellow glass to fade to such an extent in so short a time when exposed to a north aspect, and through four thicknesses, too! As the transparency of the window is still required we see no remedy but reglazing it. But for this we should say supplement the glass with a thickness or two of canary medium. Messrs. Houghton & Sons can possibly supply a more durable glass for the window.

PERPLEXED (Swindon) writes: "Could you enlighten me with regard to the following? I have a desire to enlarge, and by the aid of artificial light. The method I have adopted is this—Between the dark room and the studio I have cut a square hole in the partition, and fixed a camera flush up to the opening. I use the dark slide as the receptacle for the negative I wish to enlarge from, and that fits in its usual place in the camera. The lens I use is of the ordinary quarter-plate type, which, when used for portraiture, gives very good definition. The light used is an ordinary duplex paraffin lamp, with an opal globe, to allow, as I think, of the proper distribution of illumination. That, of course, is placed the studio side of the partition, and within three or four inches from the negative. Now, here comes the failure. When I have arranged all and focussed my enlarged picture, I find that the whole of my picture is not defined properly, say, for instance, as the case was last evening when I tried. The negative being a half-plate, I wish it enlarged to twelve by ten. I get it that size, but the top and bottom are sadly out of focus, the edges of the plate, where the light would leak through in the dark slide, not being visible; but, on the other hand, if I wish to reproduce to the same size as the negative is, I get thorough definition. Now, where does the fault lie?"—In reply: The affair is a very simple one. From what our correspondent says, we think it is not so much a falling off in definition that is the matter as in the lighting. A duplex lamp with an opal globe will not do. Remove the globe and intercept the light by a flat plate of flashed opal, or anything of a similar nature, or by preference by a five-inch condenser, and all will be well. If he adopts the flat opal plate, it will be advisable either to remove the lamp pretty far from it, or then to have three lights, each placed opposite a portion of the negative, half-way between its centre and margin.

OXFORD PHOTOGRAPHIC SOCIETY.—After a successful demonstration of film photography by Mr. Hedley Smith, Mr. J. C. Allan was elected a member.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, December 3, *Collodio-bromide Processes*; December 10, *Experiences with Hydroquinone*.

MESSRS. PRICE, TALBOT & CO., 26, Ludgate-hill, have sent us a sample bottle of a one-solution developer, by which we have developed several transparencies in a nice dark brown colour without stains or fog.

MR. ROBERT SLINGSBY, the inventor of a successful system of flash-light portraiture, is to give practical demonstrations in Marion & Co.'s studio, Soho-square, on Monday and Tuesday next between the hours of four p.m. and eight p.m., to which all interested are invited.

Pearson's Weekly is enterprising. The Editor is supplying gratuitously to lantern exhibitors very beautifully made transparencies containing reprint matter of an amusing nature from the pages of that serial. These, when thrown on the screen during an interval, must afford gratification to the audience. They are crisp and sharp.

LANTERN CATALOGUES.—We have received from Mr. J. H. Steward, optician, Strand, two lantern catalogues, one of these relating to the instrument itself and its numerous appliances, the other to the photographs prepared as transparencies. Both are very full of their respective subjects, the former, in addition, being most copiously illustrated.

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THE BRITISH
JOURNAL OF PHOTOGRAPHY.

No. 1596. Vol. XXXVII.—DECEMBER 5, 1890.

A PHOTOGRAPHERS' PROTECTION ASSOCIATION.

Until quite recently the photographic trade, and the profession generally, were totally unrepresented by any society or association connected with their commercial interests. Some little time back, however, a photographic section was added to the London Chamber of Commerce, and since then an association has been inaugurated in the interests of manufacturers and dealers. It might be mentioned that a few months ago there was a talk of forming an Amateurs' Co-operative Society, under the Limited Liability Act, to supply amateurs with photographic apparatus and material at wholesale prices, but the projectors soon found themselves in somewhat of a dilemma, and the scheme collapsed.

A movement is now on foot to start a Professional Photographers' Protection Society. Whether the project will be successful or not remains to be seen. If such a society be formed on a sound basis, it without doubt will prove of service to all interested in professional photography. There are few trades or professions that have acquired the proportions of photography which have not some recognised trade organization, and why not photography? Certainly there is ample scope for such an association; but it must be limited to what it is possible to achieve, and what is impracticable must not be attempted, or the whole thing will necessarily end in failure. Unfortunately, things most desirable to accomplish in the interests of the profession are just those which are most unlikely to be fulfilled. Amongst these may be enumerated arrangement of prices, number of proofs submitted, rules as to re-sittings, hours of business, or the time that assistants should be employed, and their remuneration, &c.

There is no question whatever that the present ruinous competition is undermining the photographic business; but will any trade combination be able to counteract it, seeing that the public, who are the chief factors in the case, will go where they can get, to their idea, the best value for their money? Brown and Jones may join the association and agree to a scale of charges for their pictures, and may abide by their contract; but they will have no control over Robinson in the same street, who will continue to charge what he chooses. The same will apply to the other points referred to. Therefore, though highly desirable, they should not be attempted, or at least until a greater unanimity exists amongst the craft than we fear will be the case for some time to come. The scheme has been tried under, perhaps, the most favourable circumstances in America, and it failed signally, and so it would if attempted here.

Having pointed out some of the objects it will be useless to attempt, at least for the present, we will indicate a few directions in which concerted action by the profession would not only be of great benefit, but really successful if properly carried out. One is the subject of copyright. The Act on this, it is true, requires amending badly, though, as it stands, in many instances it is all that is necessary if it were enforced. For example, some of the illustrated papers pirate photographs wholesale, and the photographer takes no action, simply because he does not care to incur the risk of fighting large and wealthy firms, though, if he did, he would often recover heavy penalties. The prosecution, however, could be undertaken under the auspices of a Photographers' Protection Society. Such a society would, of course, retain the services of a solicitor, as is done by other trade societies, who would make a speciality of everything pertaining to copyright and similar laws, as well as become conversant with the usages and customs of the profession. The vexed question of the ownership of the negative is frequently cropping up, and the photographer has more than once lost his case through not having the right kind of legal assistance. Disputes often arise as to the quality of materials supplied by dealers and manufacturers. Photographic mounts is a case in point. These, in the interests of the profession, could always be better litigated by an association than by single individuals.

Here is another direction in which concerted action would be useful. Many dealers supply amateurs with small quantities of goods on the same, or even better, terms than those on which the profession are supplied direct by the manufacturer. Again, some houses, that ostensibly work only for the trade, supply enlargements and prints to amateurs, and even the outside public, at the same prices they charge the profession, thus practically underselling their own customers. Now an association could certainly put a check upon this system by agreeing to have no dealings with these houses. If the offending parties found themselves "boycotted" they would quickly learn who were their best customers, and whose trade it was most profitable to cultivate.

We have just said that a movement was on foot to form a Photographers' Protection Association. A meeting was held one day last week at Manchester with this view. It was convened by a circular bearing the names of some eighteen or twenty photographers, principally in the northern counties and one in London. While writing this we have not yet received the expected report of what transpired; but we are informed that about sixty gentlemen assembled, and it was decided that a society should be formed, and that it should be named the "National Society of Professional Photographers." Then it was resolved that those present should put down their names as being willing to join and pay a guinea a-year, and between forty and fifty did so. Next it was proposed, we are told, that

all who had not signed should retire. Whether the proposition was carried or not we are unawere, as our informant then left the room. This proposition was ill-advised, as it showed that the promoters of the scheme are inexperienced in such work as they have undertaken. What man of business would pledge himself to join a society before he knew what were to be its rules, or even, definitely, its objects, and who were to constitute the Executive?

Usually, on the formation of an association or society, the meeting formulates the rules, all present being permitted to take part in their compilation, as well as in the election of the officers. After this is done, each one decides whether he will become a member or not. The proposition made at the meeting, whether it was carried or not, was unfortunate, inasmuch as it indicates a lack of business experience on the part of the promoters which is scarcely likely to add to the popularity of the movement—that is, in its present form.

The notice calling the meeting was, we believe, sent to photographers in all parts of the kingdom, yet only about sixty put in an appearance. This rather tends to show, if there be no other reason, an apathy on the part of the profession which is regrettable. Some, however, of these notices are alleged to have been received only on the day of meeting. However, as we have already said, if a protection society such as indicated be started on a thoroughly business basis it will, no doubt, be well supported by the profession generally, to whom there is no question it will prove very advantageous.

We understand that the next meeting is to be held in Birmingham, under the presidency of Mr. Lafosse of Manchester.

PROFESSIONAL *ESPRIT DE CORPS.*

When we recall the many movements in the commercial world during recent years which have had for their objects the combination of those engaged in various industries, both as capitalists and labourers, with the view of guarding and promoting their respective rights and interests, it is not surprising that photographic manufacturers and dealers should copy the example thus generally set them. It is a reasonable ambition on the part of traders to seek to protect themselves against unscrupulous customers, whose willingness to pay for what they obtain has, unfortunately, to be calculated in the inverse proportion of their eagerness to give orders; while so long as there is no concerted design to force prices up to a higher level than the state of the market justifies, none but good wishes should attend them in their endeavours to regulate the rates of discounts conceded to different classes of buyers. Competition in the photographic trade has of late years been so very keen that the prices of many articles in common use by the fraternity have often been "cut" to an absurd extent, and must have rendered some departments of trading little more profitable than the proverbial operation of "giving change for a shilling." Probably nobody would be sorry if "the demon of cheapness," to quote Mr. Henry Broadhurst, was absolutely exorcised from all branches of the photographic industry, which, as we have more than once regretfully pointed out, is no stranger to the disreputable custom of "sweating." This, however, by the way.

As our headline will indicate to the reader, we are not now concerned to any extent with the subject touched upon in the foregoing paragraph, but rather with photography in its professional phase, and by implication with photographers themselves. Why is it, we ask, that professional photographers who must number many thousands in these islands, have so long held aloof from all ideas of associating for their mutual benefit and protection and the advancement of their profession? We presume there are few photographers who would be content to accept a denial of their right to esteem their calling a "profession" as distinguished from mere retail shopkeeping. Many of them we know call themselves "artists," and artists of any kind do not by any means rank themselves lower in the scale of dignity than purely professional men. But putting that consideration on one side, let us adhere to the statement that professional photographers are totally unorganized for any purpose whatsoever; that they are unprovided with any corporate institution to which they could refer for guidance or direction when occasion arose; that, in brief, they have no authoritative society empowered to act in their name whenever if ever, the necessity for such action appeared.

How do other professions stand in regard to this matter? There is scarcely one that is without an institution of some kind, established by its members, that is not authorised to act in the name of the majority, and sometimes of the whole of them, and to lay down regulations for their guidance in the pursuit of their calling. For example, solicitors are examined, admitted and ruled by the Incorporated Law Society, which also (though here we are open to correction by our legal readers) fixes the scale of charges in vogue. With few exceptions, again, men may not nowadays draw teeth unless they are members of the Dental Society; the medical profession is governed in a similar manner; engineers, chemists, and other classes are also subject to the control of societies which enjoy extensive administrative powers generally derived from Parliament, and to which points of professional practice or dispute can be referred for adjudication or decision. Even the humble plumber sometimes comes to mend your pipes franked with a certificate of competency from the Plumbers' Company, and in the near future, maybe, the architect who designs your house, and the builder who erects it, will each hold a diploma.

Some may remark that they do not see any necessity for photographers to follow the lead of those we have quoted, but such a view, we submit, could only be based upon an imperfect appreciation of the state of things in the ranks of the profession. Readers of this Journal for any length of time can easily call to mind many "burning questions" with which the fraternity is perpetually troubled. Discussions as to the right to the negative; what should constitute a satisfactory "likeness;" the niceties of copyright law; the cutting of prices; troubles between plate makers, card makers, &c., on the one hand, and photographers on the other; the unauthorised use of photographs by the illustrated papers—all these and many other matters of various interest might well supply the staple work of a representative society of photographers, whose laws would be binding over its members, and might obviate costly litigation and profitless disputes. Such a society could also watch over parliamentary and other action affecting the well-being of the profession, and might ultimately formulate a minimum scale of charges for use by its members, as is often done by other societies, besides generally taking in hand all matters concerning the prosperity and advancement of the profession as a whole. If dealers find it necessary to combine for mutual assistance, surely the far larger body upon whom they chiefly depend for support must now and then experience the necessity of protection against the *clientèle* they serve. We

need not say that we are free of any desire to set class against class in this or any other matter, and simply make use of the illustration in order to impart cogency to our argument.

We have imagined the practicability of a society of professional photographers solely in the interests of photographers themselves, who would have everything to gain therefrom. It would doubtless elevate the professional man in the eyes of the public (no mean advantage), and might confer a higher status upon individuals than possibly they now enjoy, while at the same time benefiting photography in general, and giving to professionalism itself a tone and dignity that it does not at present possess.

This aspect of the matter cannot be ignored. Assuming such a suggestion to take effect, what, it might be asked, would constitute qualification for membership? There are, of course, photographers *and* photographers; one man may be an adept at every branch, another only proficient in a single department, a third absolutely dependent upon the skill of his paid assistants for every bit of work that goes out of his studio. Such invidious distinctions would inevitably arise; but if the matter were handled in a proper way we do not think any permanent difficulty would be felt. It would be unwise to set up technical tests, inasmuch as photographic labour is nowadays so minutely divided and subdivided that a "complete" photographer, *i.e.*, one who can start by giving a correct exposure, and then successfully traverse the whole field of development, printing, enlarging, and the innumerable other operations involved, is a somewhat rare individual to meet with. Since the principal of every photographic establishment is responsible to his sitters and employers for the quality of the work produced, and bears either the credit or discredit attaching to it, it would no doubt meet the needs of the case to allow every person engaged in business as a professional photographer a primary qualification for membership.

In conclusion, let us repeat that our suggestions are offered entirely in the interests of photographers themselves. It is for them to move in such a matter if there is a feeling abroad, as we suspect there is, that room exists for a society of the kind we have sketched in outline. It is the age of combinations, and there are few professions so large as photography that have not united for self-help and protection and the aggrandisement of the calling with which they are concerned.

COLLODIO-CHLORIDE FOR LANTERN SLIDES.

For the production of lantern slides by contact printing from negatives of the proper size, perhaps no process is capable of giving such satisfactory results with the expenditure of so little trouble as collodio-chloride emulsion. It is, of course, not suitable for making reductions in the camera on account of its slowness, but on the other hand it presents no greater difficulties than, and requires no different apparatus or manipulations from, those connected with printing on albumenised paper. Moreover, it offers this convenience to amateurs at this period of the year that they may put out their printing frames in the morning before leaving for business with little fear of the printing being overdone on their return home. At the same time, the quality of the results, especially as regards tone, will compare favourably with the best obtainable by other methods.

The reason why this process has not secured greater favour for transparency work is perhaps not far to seek. As ordinarily prepared for the production of paper positives the emulsion is eminently unsuited for use upon glass, but especially for lantern slides, and yet by a little modification it can be adapted perfectly to the latter purpose. The requirements in an emulsion—whether it be collodio-chloride, gelatino-chloride, gelatino-bromide, or even bichromatised gelatine—are quite different when it is to be applied to paper and to glass respectively; if fit for the one purpose it is almost of necessity unsuited for the other. In the first case a film is required containing a minimum quantity of silver salts or colouring matter capable of forming an image full of gradation, and yet transparent enough in the deepest shadows to allow the white light reflected from the paper support to penetrate and give brilliancy. Such an emulsion spread upon glass and printed to the proper depth for a paper print would give an image flat and wanting in vigour. For transparency purposes an emulsion is required possessing far more body in order to make its gradations more pronounced and vigorous; and the image produced by it, if pressed into contact with a sheet of paper, would present a heavy, over-printed appearance, with all gradation and brilliancy utterly lost.

In the case of collodio-chloride as ordinarily prepared for use on paper, the desired result is gained by making an emulsion strongly charged with pyroxyline, with a small proportion of chloride of silver and a large excess of free nitrate of silver and citric acid to supply the organic reaction necessary to give printing vigour. An emulsion of pure chloride of silver devoid of the organic elements would be quite useless for any but development purposes, plain chloride being incapable of darkening under the mere action of light to a sufficient depth to give a rich, vigorous image.

The physical conditions thus rendered necessary in a great measure unfit the preparation for use upon glass, but especially for lantern slides. In the first place the large quantity of crystalline matter present, which in the case of paper is to a large extent absorbed while in the moist condition, has no choice when glass is substituted but to crystallise on the surface of the film of collodion, which in spite of its comparative thickness is wholy inadequate to hold it in its pores. Add to this the fact that this crystalline matter is highly deliquescent, and it may be readily imagined that the difficulties attending the use of such an emulsion upon glass are considerable.

Then, again, the presence of so large an excess of silver nitrate, usually amounting to at least four or five grains to the ounce of emulsion, renders the latter very liable to decompose, and to counteract this defect an otherwise unnecessarily large proportion of citric acid is used. This exerts a further action upon the collodion itself, or rather upon the pyroxyline it contains, causing the emulsion to lose its fluent qualities, and to gradually increase in viscidity, until at last it becomes semi-solid and refuses to flow at all. Accompanying this change a gradually increasing grain or "structure" is developed in the film, which, though in its milder stages not appreciable on paper, is fatal in the case of transparencies.

There are one or two other minor points in which the ordinary preparation of collodio-chloride is unfitted for transparency work. For some reason or other, most probably its easy solubility in alcohol and ether, chloride of calcium is almost invariably employed for "salting" the collodion. Such being the case, it follows as a matter of necessity in the presence of citric acid that citrate of calcium is formed in the emulsion, and though this may be to a large extent dissolved out of the film in fixing, it is impossible to imagine that the lights of the transparency can be as clear at the finish as if no lime had

been present. The opalescence thus caused is of no moment where paper forms the basis of the picture, and hence probably the reason why the calcium salt has never been discarded for one of the less soluble chlorides. Cadmium chloride is almost as soluble as the calcium salt, but it is objectionable on the same score as is also the barium salt, which is further almost insoluble in alcohol, though if it could be employed would leave a less deliquescent film. The chlorides of potassium, ammonium, and sodium form soluble citrates, and so are preferable, and are introduced without difficulty in the proportions requisite for paper emulsion.

The facts having been thus stated in detail, it becomes easy to find a way out of the various difficulties. What is required is an emulsion of a thinner character, that is, containing less pyroxyline and richer in silver chloride. Beyond this, the image to be viewed by transmitted light is less dependent for its brilliancy and depth upon the organic reactions of the emulsion than the image on paper, and consequently the proportions of free silver and of citric acid may be considerably reduced, with the result that the physical difficulties in a measure disappear, or at least come within controllable bounds. There is less crystallisation and "sweating" of the surface, and the tendency to structural markings disappears, and not the least improvement in the conditions is that the emulsion will keep much longer.

So far as we are aware, such an emulsion as we have just described is not, and never has been, a commercial article, but it is a very easy matter indeed for the amateur to prepare it for himself; far easier, indeed, than a collodio-bromide emulsion, as the operations can be conducted in an ordinarily lighted room. The requirements in regard to a specially prepared or "high temperature" pyroxyline are altogether absent, and any ordinarily soluble sample, so long as it dries without opalescence or "structure," will answer every requirement. A supply of the emulsion may be made in half an hour's time that will suffice for many dozens of slides, and the plates require no elaborate preparation previous to coating, nor any special precautions in drying beyond the most ordinary protection against dust and strong light. With regard to the latter point, the conditions are precisely on all fours with sensitised albumen paper.

The following formula may be taken as the basis upon which to work, and will be found to answer perfectly all the requirements for transparency work, though it must be distinctly understood it is not suited for paper or opal pictures. Possibly, if considerably diluted with plain (not chlorised) collodion it might work satisfactorily for those purposes. The quantities are for five ounces of finished emulsion. Take—

Pyroxyline	20	grains.
Chloride of ammonium	16	,,
Ether (methylated)	2½	ounces.
Alcohol	1½	,,

This forms the collodion. The sensitiser is composed of—

Nitrate of silver	60	grains.
Water	½	drachm.
Alcohol	4	drachms.

And the organifier of—

Citric acid	5	grains.
Alcohol	4	drachms.

The following is the method of mixing:—Weigh out the sixteen grains of chloride of ammonium, having previously ascertained that it is perfectly dry, and transfer it to a clean five-ounce bottle by means of a folded strip of paper. Next pour in the ether and alcohol, and shake well until it is dissolved; or the alcohol alone may be added and the bottle placed in water at a temperature of about 150° Fahr., and shaken at intervals until the salt is dissolved. Heat must not be applied after the ether is added, nor must the latter be added until the alcoholic solution has cooled if that method be adopted. If a small glass pestle and mortar be available, the alcohol and chloride may be triturated together until solution is effected, and after transferring the solution to the bottle the mortar must be washed out by pouring a portion of the ether into it before mixing with the alcohol.

The chloride having been dissolved, the twenty grains of pyroxyline are weighed out and pulled into light tufts and pushed into the bottle, when in a few seconds solution will take place. As has been said, any good sample of pyroxyline will do for this purpose, but it will be as well to try first if it answers the requirements. To do this, weigh out, say, three grains and dissolve it in a mixture of two drachms of ether and the same quantity of alcohol. When dissolved, pour a little on to a clean glass plate and drain off the surplus; dry the film at the fire, and examine it carefully for opalescence and grain or structure. A *perfect* sample will be quite invisible when dry, but a very slight departure from the ideal will not be of great moment. For the benefit of those who are unable to procure the proper article, we may mention that Hopkin & Williams supply a sample at one shilling an ounce that answers admirably. It dissolves entirely without sediment, and except for extraneous dust, scarcely requires filtering, and dries perfectly transparent and structureless.

The collodion prepared, the next operation is to sensitise it. Introduce the sixty grains of silver nitrate into a two-ounce test tube and add half a drachm of water. Heat this carefully over a spirit lamp or gas flame until the crystals are dissolved, then having previously measured out four drachms of alcohol, pour a few drops into the silver solution and heat again until it boils. Proceed thus until about half the alcohol has been added, heating cautiously after each addition to prevent the solution chilling and precipitating the silver. As in inexperienced hands heating alcohol over a naked flame is perhaps not an entirely safe operation, a preferable plan will be to have a cup of boiling water at hand, and after each addition of alcohol to plunge the test tube into that for a few seconds. When the silver is thus dissolved and half the alcohol added, pour the solution into the chlorised collodion and shake vigorously for a few moments, then with the remaining two drachms of alcohol, wash out the test tube, dipping it again in the hot water if the silver have crystallised on its sides until all is redissolved, when the contents of the tube are added to the emulsion and the whole well shaken.

The hitherto transparent collodion will now have been converted into a pale, milky-white emulsion, having an orange colour when viewed by transmitted light, but if now poured upon glass it is scarcely less transparent than before sensitising. It must therefore be set aside in a warm place to ripen, with an occasional shaking, in case any of the silver has been precipitated. In half an hour's time after sensitising, the citric acid previously dissolved in half an ounce of alcohol may be added, and after a final shake the emulsion may be left alone. It will be ready for use in from four to six hours, but will be better in twenty-four hours. Even after that lapse of time the film upon glass will appear very thin and transparent, exhibiting a faint orange colour, and quite free from any sign of grain; but if exposed to daylight it will be found to colour vigorously, and if left long enough to become quite opaque.

If properly prepared, this emulsion, when dried upon glass, will show no signs of crystallisation, or, if any, so little as to be scarcely appreciable. The films, too, are very little prone to sweating, though it is always better to coat the plates as short a time before use as possible. If a number must be coated to keep, let them be packed in pairs face to face, with narrow strips of paper or thin card between the edges, and wrapped in half dozens or dozens in tinfoil. It is scarcely necessary to say they should be quite dry and, if possible, still warm when packed. In this way they will keep for a long time.

The emulsion itself will keep for several weeks at least, but if a slight discolouration should take place it is of little moment, as it disappears in fixing. Indeed, usually after a few days the emulsion takes a creamy tint, as also do the plates. No trace, however, remains in the film after fixing.

The working of the emulsion, and especially the toning, will form the subject for another article.

At the Leeds meeting of the British Association a Committee was appointed to report upon the application of photography to the elucidation of meteorological phenomena, and to collect and register photographs of such phenomena. The Secretary, Mr. Arthur W. Clayden, has appealed, in a letter last week, to photographers generally for help in this direction, and asks all who have in their possession negatives of clouds, lightning, hoar-frost, hailstones, or any other meteorological phenomena, or of damage done by whirlwinds, tornadoes, or storms, to communicate with him, addressing letters to *Warleigh, Tulse-hill Park, London, S.W.* The Committee will be grateful for such photographs, and would especially welcome offers of future assistance in the shape of photographs taken in accordance with certain simple instructions which will be supplied on application.

Mr. W. H. Seamore writes to the *Journal of Analytical Chemistry* to describe a new and ingenious mode of testing for iodine founded upon a reaction of the platinic salts mentioned in *Watts' Dictionary of Chemistry* (Vol. III., p. 288). To the solution containing a soluble iodide he adds one or two drops of solution of platinic chloride. As the latter mixes with the liquid, a beautiful red colouration is produced, due to the formation of platinic iodide. In the presence of a large proportion of iodine the solution becomes black, with subsidence of a brownish precipitate. The solution to be tested should be either neutral, or acid with sulphuric acid. The sensitiveness of the test is so great that $\frac{1}{1,000}$ part of iodine is easily seen, and $\frac{1}{40,000}$ part distinctly, though faintly, discernible.

The employment of borax in the pyro developer has been tried, but unsuccessfully. The theory suggesting its use has been that—as with litmus paper it gives an alkaline reaction—it might be used as a substitute for ammonia. This action does not occur, and the borax acts as a retarder instead of an accelerator. The explanation of this apparent paradox is to be found in a paper published in the *Comptes Rendus*. The boric acid of the borax combines with the primary polyatomic alcohols, and certain polyatomic phenols, and gives rise to a variety of boro-conjugated acids. Thus borax added to pyrogallol converts it into a true acid, which reddens litmus. The same happens with tannin and pyrocatechin, so that adding borax is equivalent to adding an acid, the effect of which need not be described; but with the isomers of pyrocatechin, for example, hydroquinone and resorcine, this does not happen, and the addition of borax resembles in effect the addition of an alkali.

As most of the modern practical application of light-producing powers are founded on theoretical considerations, it will not be out of order to describe Professor Langley's latest contribution to the study of light, and the prospects it holds out in the future. Most people are aware that the light we get from our gas burners, or from the brighter electric light, bears a small proportion to what in theory we might justly anticipate. Professor Langley has shown what is the most economical example of light production in the world, and he concludes by saying, "There seems no reason why we are forbidden to hope that we may yet discover a method (since such an one certainly exists, but on a small scale) of obtaining an enormously greater result than we now do from our present ordinary means for producing light." This existing light manufactory that he alludes to, and which produces its light at one four-hundredth part of the cost of a candle flame, and at best an insignificant fraction of the cost of the electric light (which is the most economic light which has yet been devised), is simply and really a very small affair, it being no more than the Cuban fire-fly. The most accurate observations prove that this insect light is accompanied by, approximately, one four-hundredth part of the heat which is ordinarily associated with the radiation of flames of the luminous quality of those experimented with by Professor Langley in making these comparisons.

One of the difficulties attending the use of electricity from cells lies in the waste which is so apt to take place when the battery is not in use: the zinc gets dissolved when no action is required. To a great extent this is due to the impurity of the zinc. Though the elements of the battery be not electrically connected, action goes on between contiguous particles of the dissimilar metals, and ends in the dissolution of the whole. It is, however, stated that M. Cahaigne, of Paris, has brought the refining of zinc by distillation within the limits of commercial requirements, and can deliver chemically pure metal at a price not excessively beyond that of the ordinary commercial product. According to M. L'Hote, chemical expert, this new zinc is not touched by a ten per cent. acid. It is said that the ordinary bichromate battery made with one element of this Cahaigne's zinc could be left in open circuit in the porous jar without being appreciably worn.

THE PHOTOGRAPHOSCOPE.

A novel instrument bearing the above name has just been brought out by Messrs. Perken, Son, & Rayment, who are also its manufacturers. It consists of a stand faced with a frame, as shown in the cut, and has a reservoir behind containing a quantity of, say twenty, mounted photographs, which by turning a nob or handle shown on the right side of the instrument causes the pictures to appear in the opening of the frame in rotation.



The apparatus is very elegant in appearance, and is admirably adapted for the drawing room or library. To professional photographers it should be valuable as a reception-room appliance for the table, as, apart from its elegance as a piece of furniture, it affords means of agreeable diversion to those who are waiting their turn by inspecting one after the other of a large series of prints, and which, being covered up from the dust of the room, are always fresh, more especially as, unlike an ordinary album, the prints cannot be subjected to either friction or handling. While the old-fashioned album may

be allowed to be on the table unopened and uncared for, this apparatus at once attracts attention. The pictures being viewed singly, and in a handsome frame setting, have every chance of their merits being properly appreciated, more so than is the case when several are before the eye of the observer at one time. What is said here of its utility in the studio applies also to the shop window of the dealer.

The Photographoscope is the invention of J. T. Leighton. Its mechanism is ingenious, and, so far as we can see, cannot possibly get out of order. It is to be welcomed as something at once novel, useful, and elegant.

A FLASH-LIGHT DEMONSTRATION.

On Tuesday evening we were present at a highly successful flash-light demonstration given by Mr. Robert Slingsby, of Lincoln, in the studio adjoining the premises of Messrs. Marion & Co., Soho-square.

Mr. Slingsby's system may be briefly described as consisting of a framework with long arms at various adjustable heights, and capable of holding any required number of magnesium flash lamps, which are all ignited simultaneously. Each lamp is shaded by a framed sheet of diaphanous paper in front, while it has a metallic reflector behind. These diffuse and soften the light.

It having been found that the sudden production of a bright flash affects the eyes in some instances and causes them to close, an ingenious system is had recourse to in order to make the exposure of the picture at the commencement of the flash, and have the lens closed before its termination, at which period the eyes may be supposed to be at their worst. The camera-lens is fitted with a Kershaw shutter, which is placed under the liberating influence of a pneumatic tube. To this end a tiny bellows is affixed to the edge of the camera-front, and while, by the pressure of a lever upon the primary wind reservoir, the magnesium powder is being driven simultaneously through the flames of all the flash spirit lamps, the little bellows spoken of is also acted upon by the same air-puff, and thus liberates the shutter of the lens at the instant of the ignition of the charge of magnesium powder, the exposure, as determined by the shutter, having terminated before the cessation of the flash.

By this system there is no limit to the number of lamps that may be simultaneously employed, while there is every facility afforded for arranging them at any height or at any angle that ensures the perfect illumination of the features.

A happy method was adopted for acclimatising the eyes to the sudden strong flash. A slip of magnesium was ignited, and the sitter directed to look at it, when doing so the working lamps were flashed without giving the eyes time to appreciate, as it were, the greater force of their illumination. Some such system as this we know to be adopted in America, where the sitter is sometimes directed to fix his eyes upon a rather powerful lamp flame, and thus by doing so he is in a measure rendered oblivious of the fact that a strong flash takes place during the *séance*.

ARTIST PHOTOGRAPHER: A CLAIM FOR LIBERTY.

[A Communication to the University College Photographic Society.]

You have been good enough to honour me with an invitation to read a paper before your Society, and I am glad to do my mite of assistance at your proceedings, although it is with a fear that the few sketchy ideas which I am about to mention will hardly be worthy of an association of teachers and students of science and art.

The remarks which I am about to address to you relate to a question which has for some year or two perturbed the photographic world, whether with adequate profit or not, those who have followed its perhaps too ample discussion will either have formed already their view, or if not, will in all probality be so fogged by the various statements and arguments *pro* and *con* that they may do anything but bless the day when the various photographic societies and journals first encouraged the discussion of the topic.

You have no doubt already guessed that my subject is the position of the artist photographer.

In recent years a small clique of self-appointed prophets has arisen in photographic circles yclept naturalistic photographers, and one might suppose that it would be correct to assume that if there is any meaning in the name, it should indicate a desire to reproduce nature in its form as it appears to us. It is difficult to ascertain exactly what their tenets are, but, anyhow, it is plain, from what can be ascertained from their writings or examples, that such an assumption would be decidedly incorrect.

This school appears to have had its origin with a gentleman whose lucubrations would intimate a large consumption of works on art criticism, and perhaps a very omnivorous inspection of art examples, without the power of discriminating between the wheat and the chaff, and so jumbling up ideas on art matters, that as a teacher he seems to me to be pretentious and apparently free from technical art knowledge, without which it is impossible for him to estimate the rightful position of the artist photographer.

Let us start our view of the matter from the purely photographic side. When I say the purely photographic side, I mean the position indicated as the result of using optical instruments, apparatus, chemicals, and preparations, all of the highest excellence that science can provide, with full ability to utilise to the utmost all their respective merits. I think I may take the lens as being the most important member of the outfit, and it has ever been the aim of its producers to improve it for various purposes so that it should give the clearest and sharpest definition when used to its utmost advantage; on the other hand, photographers have encouraged such improvement by preferring and readily paying for the objectives which best succeed in accurately registering the most minute definition as result of their use, and so much has this been sought after, that *photographic* as a colloquial term has established itself in all civilised languages as an equivalent for minute exactitude of detail in other things than that to which it originally attached.

As a reproductive science in the foregoing sense, photography has proved of inestimable value to the world, and will continue to be so for purposes of science and the arts generally. For such purposes its exact registration can be depended on only provided its workers are thoroughly conscientious practitioners, fully skilled in making the highest practical use of the best procurable tools. So much for pure photography. Now let us examine the other phase of photography claimed as an art.

It is here that the misapplication of a term has assumed for a vehicle of expression the attributes of such expression. The position of the artist photographer seems to me to be this. He must be as fully informed and as capable in the practice of photography as the reproductive practitioner previously referred to, in fact more so; he ought to study all new processes, especially printing processes, and produce his pictures in that one best suited to his subject. Being well informed in the technics of photography, what is he to do with his apparatus and knowledge? He is to do the same as the painter does with his oil or water colour, or the sculptor with his clay, of the manipulation of which each has technical knowledge; he is to use photography, not as the be all and end all of his study, but simply as a vehicle for the exposition of his artistic powers; it should occupy in his mind no higher position than the other media which he might use for the same purpose. He will have high-class apparatus, and the technical knowledge for making a first-class photograph which he will use with his best capacity, just as he would go to a first-class manufacturer for the best colours and canvases, and use them with brains, with the same ultimate object. He must, having his materials for work and a proper artistic judgment, be left as entirely untrammelled as the artist painter, to produce in his own manner the ultimate outcome of his imagination in the style best adapted to his view of his subject. It is a huge presumption of any man or set of men to come to him and say, "*You shall execute all your pictures with the utmost reproductive exactitude*," or, "*You shall execute all your pictures blurred or out of focus in whole or in part*." Where has any acknowledged art instructor given to the world any such binding axioms?

If the artist is a man whose efforts are likely to be of any worthiness, if he really has any artistic perceptions of any value, he will know that dogmatism in art is absurd and an impertinence, and only to be broached by enthusiasts who have lost their heads over a fad to which they are so far committed that they are bound to *see it through*, however disastrous the end of such pretension may be to themselves.

But unfortunately they have disciples among those who mistake eccentricity for merit, and having really no artistic perception whatever, think that by following the beckoning of some "Sir Oracle" more or less misinformed, they can be manufactured into artists. The true art student quietly pursues his joyful path, while these pretenders to exclusive taste have all, more or less, the *cacoethes scribendi* and *loquendi*, and fill the societies' meetings and the journals with their twaddle, founded chiefly on the perusal of Ruskin and

kindred authors, whose best points they miss in their desire to imitate, at a great distance, a style generally grandly eloquent but frequently deficient in sound reasoning. I often wonder what John Ruskin would say in reply to a demonstration of the views of a naturalistic photographer; my impression is that he would recommend him to attend an elementary art school for a month as a preparation for studying his *Elements of Drawing*.

What do the naturalistics require from the artist photographer? They apparently agree on one point, viz., that excessive hardness of detail is not conducive to artistic effect. Here, with occasional exception, the painter will be generally with them; but they propose to obtain softness by putting the picture wholly or in part out of focus. This is the weak point of their claim for recognition. The fact is, that with all their study of art and art criticism, they have ignored what is generally the principal factor in the production of a picture—colour, and the media with which it is used: whereas the artist photographer is limited to monotint executed by a printed process, they have not perceived that much of what they see exhibited depends for the effect which they wish to secure, not on being painted with varying focus, which no true artist would do, but on the technical training of the artist ensuring the use of his vehicles in such manner that the heavier detail of his picture sinks in, more or less, according to his style or the requirements of the occasion, and that he is able to strengthen or lower the effect of his picture in parts by retouches of colour or other mechanical means. This is a method of proceeding exceedingly difficult for the artist photographer. If retouching a photograph is once allowed, it is impossible to limit the extension of the practice, and such treatment carried to excess would eventually result in what would virtually be a painting.

Nevertheless, there are to the accomplished photographer many legitimate ways of dodging and modifying his results which give him considerable latitude in the manipulation of his pictorial effects. Nor must the facility of improvement by the use of isochromatised plates and tinted screens be forgotten.

The naturalistics having concluded that everything should for their purposes be more or less out of focus, a further discussion has arisen among their disciples as to what limitation is to be put to this out-of-focus system, and it is actually a subject of debate among them whether or not a circle of confusion of one-hundredth of an inch is the allowable limit or not. Shade of Appelles! Only imagine an intention to regulate artistic execution by minute mathematical calculation!

In fact, what the naturalistics want to do for us poor suffering photographers is to establish a fixed style for the worker, in which only he is to exhibit the pictorial exposition of his artistic conceptions. But what should we say of an art critic who picked out the highly finished but occasionally somewhat hard style of Landseer, any one of the varying styles of Turner, the plucky impasto of Constable, the minute execution and delicacy of Meissonier, or the fanciful imaging of a Whistler, and declared that that one he pointed out, and that one only of all these varying styles of execution, is "*the only correct and genuine one—all others are counterfeit. N.B.—See the name on the frame*"? Would such a teacher meet with encouragement elsewhere than in a farce? And yet the naturalistics have received attention from photographers. The object of art is to secure admiration and sympathy. Its factitious regulation by a narrow-minded clique is impossible.

I claim freedom in his work for the artist photographer from these attempts on his liberty of style. If photography is to be used for pictorial purposes, the performer of the work should be left free to adopt his own method for his ultimate object. It would then be that after a time the more able of the artist photographers would gradually form styles each more or less individual, so that it would be possible for a visitor to a photographic exhibition to point to a good picture and say at once, "This is a Smith, or a Jones, or a Jenkins," as the case might be, in the same way that a visitor to the Royal Academy Exhibition can point out a Millais, a Leighton, or a Long. I wish it may in the future truly be said, "By their works ye shall know them."

There has been within the last two or three years a great advance in the manipulation of photography for art purposes, but if the producer of good work is to be trammelled by quack ordinances, then the result will be that, though much good work may continue to be done by lovers of art for its own sake, it will be seen only in the homes of the artists, and will not be sent for public exhibition until there is evidence that the naturalistic craze has ceased to influence the Hanging and Judging Committees.

Art Conception is the property of no set of men, the failure to have received any technical education may in a multiplicity of cases prevent its expression, but we find it permeating "all sorts and conditions of men." The hard-worked mathematician or banker may find relief in picking out beautiful subjects from the glorious scenes of nature, and feel himself refreshed and ennobled by the ideas which his selections may induce. Nor are men of more humble standing, even the illiterate, debarred from the enjoyments of such imagination. Oftentime wandering away from home we meet with a humble labourer, to whom has been vouchsafed the capacity for the mental elimination of the special beauties of his loved country side; this man will show you the most lovely bits, the quaintest prospects for miles round his lowly abode, and his enthusiasm for the beautiful, perhaps roughly expressed, will ensure the artist appreciating in him a brother who truly

> "Finds tongues in trees, books in the running brooks,
> Sermons in stones, and good in everything."

HENRY E. DAVIS.

ON THE REDUCTION OF OVER-PRINTED SILVER PRINTS ON ALBUMENISED PAPER.

AFTER reading an article on this subject in a late issue of this JOURNAL, which for the most part I can fully endorse, especially with regard to the deterioration of colour that takes place in almost all cases, the treated proofs will not bear comparison with the untreated ones in this respect. The plan suggested of using ferricyanide of potassium and hypo as a reducer received a good deal of attention some years ago, and at first seemed to promise well, but it was found, although occasionally unexceptionable prints were made, the percentage of inferior ones made the game not worth the candle, and thus, with every care bestowed upon the process, for some reason or another a thoroughly good print that would bear comparison with untreated ones was the exception, not the rule. That it could sometimes be done there was no doubt, and also there was no doubt about their inferiority taken on the whole, which led to the plan being discontinued. I have found the most reliable dodge for the reduction of silver prints, without otherwise in *any way* affecting their *colour*, is the use of a bath of mercuric chloride, or bichloride as it is generally termed. The prints are toned, fixed, washed, and dried in the usual manner. The too dark ones are placed in a bath composed of three grains each of potassium, bromide, and mercuric chloride to one ounce of water, until the desired reduction takes place—which it will in a few minutes—when they are taken out and well washed. Some nine or ten years since I mentioned the matter at the Photographic Club, and prepared a print then for exhibition mounted side by side with an untreated print, to which it was quite equal in every respect. At the present time they are still equal, both being a little less bright than when they were made, so I think we may consider the permanency is not injuriously affected. I have not made extended experiments in this direction, but if I have a print too dark, I invariably use this plan to reduce it without any fear of the result, as the colour remains inappreciably affected, and a print so treated cannot be distinguished from a proof properly printed in the first instance. I have tried it on both ready-sensitised and home-prepared paper, toned with several different kinds of toning baths, with a satisfactory result. I do not think the strength of the mercuric solution is of much consequence, so long as it is not too strong: and it may be used over and over again until exhausted. EDWARD DUNMORE.

TRADES' UNIONISM AND PHOTOGRAPHY.

IN THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1890 the question of a Trade Union for photographers has been somewhat ably handled in the affirmative by Mr. A. G. Field, of Maidstone, who then anticipated that the past summer would see some important steps taken for the establishment of such a union as he there advocated. Nothing very important seems to have been done, however, beyond an attempt by a section of photographic workers to form a society for the protection of those employed in "process" photography and their collaborateurs the "zinco" engravers.

So far, then, it may be taken that either the photographic *employés* cannot see how such a union is to be successfully carried out, or that they do not desire the protection that such a society may promise. It is to be feared that the reason for non-action lies principally in an appreciation of the difficulties to be overcome. Let us consider what some of these may be.

The very growth of the art may be considered to be a very considerable obstacle. One need not be very old to remember when there was no such business, and it would appear to be an ungracious act for those who are now in it to prevent those who are not from

getting into it; yet, unless something of the kind were done, there would be little use in a Trade Union such as shadowed forth. It is quite certain that the growth of the photographic arts and allied industries has been so rapid that but a comparatively small portion of those employed in them can have come in by the old orthodox way of apprenticeship, and great numbers must have entered the profession who took up photography as amateurs, and many of these are among the highest of its ornaments. It may even be said that, in the main, the non-professional photographers have been those who have raised the art to its present high eminence among the industries of the world, and that at the present time the numbers of amateurs are very far in excess of the professional workers. If any of these lovers of the art choose to offer their services to employers of labour, by what principle of justice can they be kept out? or would their perhaps years of practice give them a qualification which should count in lieu of apprenticeship? Is it to be supposed that any committee of working Trades' Unionists would admit such into union with them? Would they not relegate them to the position of "black legs," and combine against them and those who proposed to employ them? and would they thereby strengthen their position?

Mr. Field would further protect the interests of this class by "practical and theoretical examinations;" but does he think that the apprenticed ones would be likely to acquit themselves always in a satisfactory manner? and if they did not, would he exclude them? Such persons may be very good and clever operators, and yet possess but the very slightest theoretical knowledge of their work. There are many young people who are articled to employers who could teach them nothing beyond the common routine of their business, and if they have not the brains and desire and determination to learn more than their employer can tell them, they may fare but badly when circumstances compel a change; yet a trade society would not be likely to decline the application of such workmen for membership. Considering that the amateur photographer, as a rule, has more time at his disposal for the study of the art than is possessed by the trade-trained worker, is not the latter placed at a disadvantage somewhat when competing with the former, if he should chance to seek to become a professional? In speaking of amateurs, reference is here made to real lovers of the art, to hard workers in it, and not to those who merely "push the button" and hand their plates to the "professional" for development and printing. But in the profession is there not division of labour? Are there not "posers," "dark-room operators," "retouchers," "printers," "spotters," and "mounters?" Are there not "emulsion makers," "coaters," "packers?" Then there are the numerous makers of apparatus; and would they all be "amalgamated" into one society? If they were, would a committee of such determine who shall or shall not be admitted into membership? When photography has ceased to undergo new developments and has settled down into routine modes of working, when it has lost its popularity and is no longer taught as almost a branch of ordinary education, and when the second-hand warehouses become overstocked with lenses, cameras, and other apparatus, then will come a time in which those employed in it may have a better chance of combining to protect their interests from the intrusion of the amateur. So long, however, as it continues to possess the fascination it does as an employment for leisure time, and is brought so prominently forward by the press, by teachers, and by dealers, to the notice of the young, there is little chance for the improvement of the condition of those who rely upon it for a means of livelihood, unless some greater developments are brought about for their benefit, of which there is little sign.

A little while ago the attention of photographers generally was drawn to the photo-engraving and photo-mechanical processes as a likely means of bettering their condition, but those who took advice speedily found that things were no better in that department than any other, and discovered that the home and foreign competition in it is so keen that it is difficult for those who have not carried it on for years to make it pay.

Since the foregoing was written, Mr. Field in a letter to THE BRITISH JOURNAL OF PHOTOGRAPHY points out that the attempts to form a Sectional Society of photo-zincographers have not been quite what they should be. There is evidently a difficulty to overcome in this connexion. Photo-zincography before the era of photo-zinco blocks meant a process exactly the same as photo-lithography, the difference between the two consisting in the difference of surface, stone or zinc, to which the transfer was applied. At present the term is more generally understood to mean the process, or rather processes, employed to produce a raised block by the help of photography applied to a plate of zinc. Herein are almost invariably employed two different classes of workers—the photographer who takes the negatives and prints them upon zinc, and the engraver who rolls up the image in an acid-resisting ink and engraves the block by means of etching. Both these operations are frequently subjected to further division of labour, but they are essentially distinct, and the operations of the one class of worker has nothing in common with the other—they are merely both performed on the same plate.

The engraver's work is more nearly allied to lithography than to photography, as the printing surfaces are rolled up upon the same principle as the lithographer rolls up his printing surface. Furthermore, the zinco engraver is employed upon a large quantity of work that has no connexion whatever with photography, and commonly known as transfer work. How will it be possible, then, for these two distinct classes of workers to unite together for the common object of bettering their condition?

Turning now to the photographer who puts the subject upon the zinc. In times not very remote he was in touch with the rest of his brethren of the camera, but now he is become a distinct operator, who adheres, and very properly too, to the old wet collodion process, which has been practically cast aside in most other branches of the art; thus he is now occupying an almost isolated position among the votaries of the black art, if we may still apply that expression, and may possibly be looked down upon by some as only a sectional workman.

Seeing, then, how great is the diversity of occupations, how variable the amount of skill, and how unequal the remuneration, is there any wonder that there is no feeling of a community of interest sufficiently strong to induce photographic *employés* to form a trade union? To bring all to one level of pay would, in the present state of society, be quite out of the range of practical work; while to attempt to classify the various grades, and determine their respective rates of remuneration, would be a task beset with all kinds of difficulties, for besides that of bringing the employer and employed to both look at things with judicial eyes, there would arise the jealousies between the workers themselves. It is to be feared that photographic *employés* generally are far from having arrived at that judicial state of mind so necessary for looking at social questions with unprejudiced eyes, and until they have, and can do equal justice to their fellow-workers as to themselves, there is little chance of their making a successful effort of bettering their condition by adopting the principles of trades' unionism and putting them into practice. W. D. RICHMOND.

ANOTHER AUTOMATIC PHOTOGRAPHIC MACHINE.

OUR readers will remember that the Automatic Photograph Company was formed in May last in order to acquire and work the English patent, No. 11,354, of 1889, granted to Mr. Isaac Joel, in respect of "an automatic machine for taking and delivering instantaneous photographic portraits in forty-five seconds in exchange for a penny." We now learn from our American contemporaries that a rival invention is there in the field. Thus the *Electrical World* (New York) states that Mr. Matthew J. Steffens has solved the problem of the application of the nickel in the slot principle to automatic photography, and has obtained a patent on the device December 11, 1888, and that he has others pending. The mechanism is operated by two separate and distinct electrical circuits. In securing a photograph, a quarter of a dollar is passed through a slot, and the visitor takes the desired position, and then gives a slight pull to the cord in front of the case, when the shelter in front of the lens of the camera is automatically drawn aside, and the flashing of some magnesium in a brass pan, fired by the heating to incandescence of a platinum wire, throws the necessary lights, and a perfect negative is secured on a plate having a white background and made of flexible celluloid. This part of the operation, the writer says, requires but two seconds of time. The visitor then waits while the plate is rolled over two small wheels and gripped by two rubber tapes, which carry it through the developing, fixing, and washing fluids, and finally pass it through a second aperture or slot a perfect photograph. The entire movement of the second operation is controlled by an electric motor operated by a current from a primary battery. The necessary chemicals are each supplied separately from an air-tight reservoir, and the flow regulated by a dial apparatus to correspond with the temperature of the atmosphere and the strength of the chemicals.

The machine will be placed in drug stores and other places where "slot" machines are found to pay. It is said that this device can be used in securing instantaneous photographs of criminals while they are being booked, and that it will be used by railway companies to prevent improper use of mileage tickets, though the success of this latter application is doubtful. The model of the machine was made by the Franklin Electric Company of Chicago for the inventor, who is a well-known artist of Chicago.

In order to verify the statement of the *Electrical World* the Editor of the *Scientific American* sent the article to the Electric Company who constructed the apparatus to know if it worked satisfactorily, to which the following reply is published:—

"In reply to yours of October 24, the automatic photographic machine was built by our Company for Mr. M. J. Steffens, the inventor. Regarding the merit of the invention, we would say that the first machine, as described in enclosed article, was a success, but the inventor was not satisfied, as the mechanism was too complicated. Our Company has built four different models for the inventor, and the last one, which has just been completed, is very simple, and promises to be a great success. As the patents are not yet issued, we cannot give you a description of the machine, but it seems to work perfectly, day or night. At night or in dark places a magnesium light is used. The inventor controls the magnesium or any artificial light used in automatic photographic machines granted in former patent.

"Pictures taken in daylight are very good, and the way the inventor uses magnesium light now seems as good as can ever be expected. Any one can work the machine, as there are no cords to pull or buttons to press, as the coin does it all. The time required to complete the picture is two and one-half minutes. It is delivered with a metallic medallion-shaped frame, and the entire work is done by the aid of electricity. As perhaps you are aware, Mr. Steffens is also the inventor of an aerial camera, which caused some notice a couple of years since, and we are now constructing for him an improvement on the same. Trials with a small machine proved very successful, showing a distance of twenty two miles distinctly. The camera is attached to a small balloon, is regulated, and the exposing done from the ground by electricity. The negatives are made on celluloid films, and several hundred can be taken at each ascension."

Thus wrote the Franklin Electric Company of Chicago. In how far the two patents may clash with each other we are, without full details, unable to say, but the directors and shareholders of the Automatic Photograph Company will require to keep their eyes upon this rival invention.

—*Invention.*

A CAMERA FOR TAKING CONSECUTIVE PICTURES OF OBJECTS IN MOTION.

'A Communication to the London and Provincial Association.'

As most of us are aware, that both in London and Bath Mr. Friese Greene has been working at this subject for a considerable time, with the object not only to obtain consecutive pictures, but with a view to their subsequent projection upon the screen as lantern slides. He has devised special lanterns for this object, the first of which he exhibited at the Bath Photographic Society, I think, about three years ago. He also proposed to use a camera to take the varied movements and the play of features at the same moment that an operator was talking into a phonograph, and devised an apparatus so that when the sound was reproduced in the phonograph the image of the speaker would change, because the mechanism controlling the phonograph also controlled the changing slides of the lantern. You thus not only hear him talking, but see him also at the same moment moving his lips, &c., as the play of features corresponds with the words spoken into the phonograph.

To-night, however, we have to deal with a special form of camera. I only mention the subject of the unison working of phonograph with the camera, and the reproduction of the two kinds of impression—one due to sound and the other to light—because somewhat recently Mr. Edison has been credited with inventing such a machine, and it is only right that we as Englishmen should look after the laurels due to our own countrymen.

The bands of pictures which Mr Greene has taken show several groups of people coming towards the camera, and others walking in the reverse direction. We first see them becoming larger and larger as they approach, and diminishing in size as they walk further and further away: not only is this the case, but you will find some of the groups of people are walking more rapidly than others, and that they gradually overtake groups in front of them. Then, again, the various movements which constitute the action of walking are depicted, and indeed all rapidly changing movements are caught. In order to do this it is necessary to expose quickly and change band rapidly; five pictures per second is an ordinary rate, but even fifty a second on a clear bright day may be secured, so that all these various movements and combination of movements can be caught by the camera, and then critically examined and studied at leisure. It is unnecessary for me to say that to change the exposed portion of the band for a new area ready for the next picture, set up the shutter ready for exposure, then expose, again draw forward a new portion of the band, and to continue all these operations in their proper order at the rate of five or fifty per second requires special mechanism. When a film or band is drawn forward at this rapid rate it would, if not checked, be in a violent state of vibration, the effect of which is to run the subject into vertical line and break up the detail. Again, it is necessary that the film is held taut, and at, of course, a constant distance from the lens; but that is not all, the film must be taut all the time, if it is to be kept free from vibration; it must not be slack at one moment and taut at another, either when the exposure is made or during the change for the succeeding exposure. And in this lies the novelty of the camera. I employ two drums which pull the film in opposite directions, the upper drum tries to wind the film backward, the lower drum to wind it forward. These drums are geared with spring-work and the two forces are balanced, the consequence is that the film is not only kept stretched, but is held stationary by this balanced differential gearing.

In order, then, to shift the band for a new exposure, I employ a disturbing element in the shape of a displacement roller, which works between the lower front guide roller and the winding-on drum. At the margin of the film two gripping pawls hold the film firmly against the guide rollers, and two pawls prevent the winding-on drum from turning backwards. The film is thus stretched over the upper and lower guide rollers, and passes on to the winding-on drum. Now by raising the displacement roller a fold or gather of the film is formed, the total length of which is equal to that of the picture; but on lowering this roller this fold is gathered up by the winding-on drum; but you will observe that all the time the film is kept taut between the upper and lower guide rollers. Just in this position, when the displacement roller is descending, the shutter opens, and the exposure is made by means of the rotating trigger carried by the shaft. Then the displacement roller ascends, and a new surface is drawn forward; the shutter again opens and closes, and these series of operations continue so long as the handle is turned.

There is one point more to mention, namely, that the pulling forward of the film winds up the spring in the upper drum, and as this spring is geared through the spring axle on the spring axle of the winding-on drum, the force of the two springs are equalised and stored in the lower drum ready for winding on the exposed portion of the film as soon as it is drawn forward by the displacement roller.

F. H. Varley.

NOTES FROM NEWCASTLE.

Nothing important to record in photographic circles hereabouts just now. Business with our best houses continues very brisk, principally in the direction of enlargements. I had begun to think the "club" portrait business was on the decline, and the "thirty-shilling" oil painting almost a thing of the past. From a little I have seen and heard lately, I find this an error of mine, for in spite of peccant canvassers and collectors with vague ideas of *meum et tuum*, the trade flourishes hereabouts at all events. A photographer who does a good enlarging business tells me that twenty a week from one man alone is by no means uncommon, and some of these are of good size and really well painted. I was surprised to hear that many are painted by men whose names figure not infrequently in "fine art exhibitions," who do not disdain to accept a moderate but sufficient sum for colouring a bromide enlargement.

The photographic dealers are doing good business with lanterns and slides; Mawson, Swan, & Morgan have the largest show, and their collection of slides is really superb; but Mr. Watson, also of Grainger-street, has a windowful of good stuff, and no doubt finds it saleable.

I understand that Mr. Hurman in conjunction with Mr. Schumann intend commencing business here, the *locale* being St. Nicholas'-buildings. Doubtless their intentions are in the wholesale direction. The city is well supplied with retailers, seven or eight where five years ago two only were to be found.

An acquaintance of mine, a lecturer at one of the colleges, hunted all over the other day for some one to do a set of slides for him. He could get no one to do the work until I set him on the track of a young amateur friend. Surely one or other of the professionals might make a profit at this.

The meeting of the local society was as usual fully attended. Mr. Pike read a short paper upon the process of printing in platinotype, referring also to platinum toning, and Mr. Auty demonstrated the working of the process, the beautiful selection of prints he brought being much admired. Mr. Pike developed one cold bath print by means of a "spray producer," and there appeared to be some capabilities in this method of development.

Several of our members have visited the Pall Mall Exhibition this year, and all return disappointed. They report their impression that it was not so good as last year's, and that for all-round excellence the local exhibition early in the year "beat it into fits."

Mr. J. P. Gibson, of Hexham, is being troubled with requests for his lecture on the antiquarian features and beauties of Northumberland. I am not at all surprised at this, and hope the numerous applicants will be gratified. The lecture was extremely interesting, and the collection of slides most complete.

A Newcastle gentleman has returned from seeing the *Passion Play* with a full set of photographs. I have been asked as to whether he may safely make from them a set of slides for his own particular use, and for the purpose of a lecture or two. My impression is that he can make them

and use them, but would not be allowed to sell them. Is that right? A man could, I suppose, give a lecture on the *Passion Play* and *hand round* his photographs for the purpose of illustrating his remarks without being liable to prosecution for infringement of copyright. There seems to me to be very little difference between this method and the other, except in the directions of convenience and economy of time. D. D.

Foreign Notes and News.

There seems a good deal of probability that the already much complained of high price of platinum is likely to go up still further, and that with a run, as we hear from St. Petersburg that various companies have bought up all the platinum in the Ural that may be obtained for the next ten years. At the commencement of the present year the price ranged from 2500 to 2700 roubles per Pud (about 35 lbs.). Recently a French electric lighting company has had to pay 12,500 roubles. That this enormous rise, if maintained, will ultimately seriously effect the English photographer there can be but little doubt. The only consolation we can afford him is that the electricians will find themselves in a very similar fix.

It appears that the management of the Marie Theatre in St. Petersburg have attached a photographic *atelier* of their own to the institution in question. Here they insist upon photographing all the actors and actresses who appear in the theatre in the different costumes which they wear in their various *rôles*. A dozen *cartes* are presented to the original, one or more being stored up in the album of the theatre museum. One might think that this new arrangement would not be very agreeable to our professional colleagues on the Neva. The truth is, however, that it makes no difference to them whatever. The exclusive right of photographing all members of the theatrical profession having been granted by Imperial Ukase to the Court photographer, Bergamosko. How truly grateful M. Bergamosko's professional colleagues must feel for the blessings of autocratic government!

We learn that Herr W. Ivens, of Nimwegen, a photographer of considerable repute, and a member of the Berlin Society for the Promotion of Photography, has been nominated Royal Court Photographer to the Court of the Netherlands.

The last number of the *Deutsche Photographen Zeitung* contains an amusing article about a gentleman who has taken up photography for his health! He requires, it seems, excitement, and the story tells how, at any rate, on one occasion he succeeded in obtaining what he wanted. He went out to catch landscapes on expensive Perutz orthochromatic films. After a day's toil he returned to develop and fix, whereupon he found that several films were twice exposed, and others not at all. He then became sufficiently excited!

Dr. J. M. Eder contributes an article of some length to the last *Photographische Correspondenz*, dealing in detail with the question of priority in regard to the invention of orthochromatic photography. A plea seems to have been set up by Herr Scolik in his recent work, reviewed some time ago in our columns, *Die Orthoskiagraphische Photographie*, to the effect that he was the first to employ erythrosine as an optical sensitiser. This question seems now to be finally set at rest by Professor Eder's article, which conclusively establishes his own claims.

This sort of discussion is usually liable to become a little heated, and we believe it was in this connexion that the *Photographische Mittheilungen* (Professor Vogel's organ) described Herr Scolik's former laboratory in Berlin as the "photo-chemical plagiatorium."

Recent researches on erythrosine silver by Herr Gaedicke go to show that it is not unimportant which of the solutions (silver or erythrosine) be poured into the other. The resulting compounds differ in the two cases. When the silver solution is poured into the erythrosine, twenty parts of the latter combine with 8·5 parts of silver nitrate. When the erythrosine is poured into the silver, twenty parts of it combine with seventeen parts of silver nitrate. Since it is of importance to obtain a product as rich as possible in silver, the following procedure may be recommended:—Dissolve seventeen parts of silver nitrate, and pour into a solution of twenty parts of erythrosine; add a solution of seventeen parts more of silver nitrate; stir repeatedly and stand for two hours, after which add a few drops of erythrosine solution.

It appears there are two kinds of Monckhoven's orthochromatic plates in circulation—one kind being sensitised for yellowish green, the other for red. The filters for using with them—for the former yellow, for the latter blue—are supplied by the firm in the form of thin plates which are to be attached to the diaphragms. The yellowish-green sensitive plates have a straw-coloured appearance, and the colouring matter may be extracted with water, when the solution so produced appears yellow by reflected, and green by transmitted, light. Tests made with a screen of the second degree of brightness showed yellow, green, blue, and violet to be correctly reproduced, white being easily distinguishable. The plates are said to keep well, and not to cost more than ordinary plates.

Die Photographie mentions a new dark slide for autotype work. The plate is inserted into the slide in the ordinary way and pressed against the side by means of two wooden pins adjustable by screws. On the opposite side of the plates is placed the net, which may be turned round by means of suitable springs. When the plate has been half exposed the slide is taken out and transferred to the dark room, where the net is turned round 90°, after which the plate is reinserted and the exposure completed.

It appears from the last meeting of the Berlin Photographic Society that considerable improvement has been effected in the incandescent gaslight which most of us have seen attempting a feeble competition with the incandescent electric light. The improvement consists in substituting air saturated with benzene vapour for the gas and introducing it, under considerable pressure, into a Bunsen burner, above which the mineral-impregnated mantle is suspended. The new light is extremely powerful, actinic, and cheap—a light of 100 candles costing under 1*d.* per hour, and appears particularly suited for enlargements, Herr Paul remarking that he found it in every respect superior to the Nezy magnesium lamp. Herr Hügel, the representative of Messrs. Selten & Co., by whom the improved light is brought out, also states that a light of varying colour may be produced according to the substances with which the mantle is impregnated, which circumstance affords a means of obtaining relatively dense reproductions from thin negatives.

Our Editorial Table.

The Photographic Quarterly.

London: Hazell, Watson, & Viney.

No. 5 of Vol. II. of this quarterly contains several articles of interest. In his paper *On Values*, the Hon. J. G. P. Vereker recommends the use of a Claude mirror in which to examine a landscape, so as to ascertain its photographic value. This undoubtedly lowers the tone of the scene, and the mirror (a black glass with a slightly convex surface) ought to be more frequently employed than it is. We have often used for a like purpose a plain piece of glass of a greenish colour, through which we viewed the landscape. An article by Mr. A. Maskell, *On Artistic Focus and the Suppression of the Lens*, is illustrated by a well-executed photogravure, taken by a pinhole one-fiftieth of an inch in diameter, with an exposure of eight minutes. Mr. Ernest Murchison, in his paper, *Photography with an Object*, considers that there ought to be more specialism adopted in photographic work than there is, and he instances Gambier Bolton's zoological pictures as showing the value of perseverance in a special path, this being done in a methodical manner. Articles on Normandy and Iceland are illustrated, and taken altogether the number is a good one.

Mr. William Tylar, Birmingham, has brought out a printing frame which will necessarily prove useful. Its main feature consists in an unequal division of the hinged back, by which a narrow flap is relegated to the duty of retaining the paper in its place at one end while the greater part of the print can be raised from the negative and examined. Having used frames of a similar nature for many years, we can strongly recommend this system, which has hitherto been confined to American productions.

We have before us the latest issues of the *Figaro Illustré* (Messrs. Boussòd, Valadon, & Co.), and have nothing but praise to express, both as regards the photogravure, and the coloured pictures. As regards the former we have a number of pictures describing the various residences (interior and exterior) of Her Majesty the Queen. There are very fine specimens of Balmoral, Windsor, and Osborne in this series, each full of detail and beauty, showing to what a degree of perfection this firm has brought their work. A second series of this class is the life and home of the Shah of Persia, which renders in detail the incidents which make up the day of that potentate with a faithfulness and expression quite equal in every way to the best photograph. The coloured pictures are as ever in the advance. Some months ago a very fine specimen of this work was issued called *Seule au rendezvous*, which for expression and general delicacy of colour is well worthy a place on any wall. Now we have a picture, *Revenant de la rivière*,

which stands forth as a very exceptional specimen of this work. It is very delicate in colour, and is a really pretty picture. There are, of course, many others in the various issues, but these may be said to take the palm.

Much as we feel disposed to speak in favour of the ordinary monthly parts, it is nothing to what we would like to say for the *Christmas Number*, which both for colouring and choice of subject is far in advance of last year's. Numbers of most artistic pictures embellish the work, showing the advantage of combining the art of photogravure and colour printing. There is one picture alone which stamps this work as a first class artistic production called *Charge*, after the picture by Detaille, which is well worthy of a frame. It is full of spirit and generous colour, thoroughly depicting the vigorous touch of the artist.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,022.—"Improvements in Photographic Shutters." G. H. P. BURNE.—*Dated November* 24, 1890.

No. 19,049.—"Improvements in Electric Lighting Appliances for Photographic and other Purposes." F. L. MCDERMID.—*Dated November* 24, 1890.

No. 19,117.—"Improvements in Candle Lamps for use in Photographic Dark Rooms, and for other Uses." H. A. BENHAM and W. H. THOMSON.—*Dated November* 25, 1890.

No. 19,143.—"An Improvement in Hand and other Cameras." Complete specification. W. H. THOMPSON and P. W. HUSBANDS.—*Dated November* 25, 1890.

No. 19,174.—"Improvements in Hand Photographic Cameras." G. HOUGHTON, P. HARGREAVES, and E. SMITH.—*Dated November* 25, 1890.

No. 19,274.—"Improvements in or relating to Regulating Shutters for Photographic Cameras." A. S. NEWMAN.—*Dated November* 26, 1890.

No. 19,327.—"A New or Improved Receptacle for use in Developing or otherwise Treating Photographic Plates Papers, and Films Sensitive to Light." G. R. MUSSON.—*Dated November* 27, 1890.

No. 19,558.—"Improvements in Photographic Dishes." E. S. NORCOMBE.—*Dated November* 28, 1890.

No. 19,602.—"Improvements in the Method of and Apparatus for Producing Photographs, and in Displaying them or the like." A. W. SCOTT.—*Dated November* 28, 1890.

No. 19,650.—"Improvements in Shutters for Photographic Cameras." A. S. NEWMAN and A. L. ADAMS.—*Dated November* 29, 1890.

No. 19,688.—"An Improved Adjustment for Photographic Objectives." Complete specification. E. GUNDLACH.—*Dated November* 29, 1890.

PATENTS COMPLETED.

IMPROVEMENTS IN MEANS OR APPARATUS FOR PRODUCING A FLASH LIGHT, MORE ESPECIALLY APPLICABLE TO PHOTOGRAPHY.

No. 601. THEOPHILUS HORNE REDWOOD, "Bryn Coed," Crescent-road, Chingford, Essex.—*November* 8, 1890.

My invention relates to improvements in means or apparatus for producing a flash light, more especially applicable to photography, but also intended for other uses, such, for example, as the production of stage effects.

In apparatus of this class, as heretofore constructed, magnesium or other suitable powder was projected into the flame of a spirit or other lamp in a concentrated stream, and whilst some of the powder failed to become ignited, the remainder, being in a concentrated form, failed to produce a flash of any considerable area.

Now, according to my invention, I cause the powder to enter the flame in a well separated or diffused condition, and I so arrange the lamp that the complete ignition of the powder is effected.

For this purpose I employ a tray or container for the spirit, or other suitable flame-producing material, and I, by preference, provide this container with a cover or grating of wire gauze or other suitable material, as is well understood.

Starting from the back of, and projecting slightly over the container, and rising vertically above the grating, I arrange a vertical plate or wall of sheet metal, wire gauze, or screening, so that the flame issuing from the grating will be attracted by, and caused to lick, the vertical plate, and thus form a thin wall of fire of considerable area.

If desired, I may employ any other suitable form of lamp in conjunction with the vertical plate in lieu of that form of lamp hereinbefore described.

At a suitable angle to the vertical plate I mount upon a standard a projector consisting of a nozzle, or diffuser, provided with a chamber for the reception of the charge of powder, and I connect this nozzle, or diffuser, by means of a flexible pipe with an india-rubber ball or small bellows, or other suitable air-holding device capable of easy compression.

By suddenly compressing the air holder the powder will be projected from the diffuser, and by reason of the angular position of the diffuser in relation to the vertical plate of the lamp the charge of powder will be distributed over the wall of flame, the vertical plate preventing the escape of unignited particles, and a flash of considerable increased area will thus be produced with but the same expenditure of material as heretofore.

If desired, the powder may be projected upon an intervening deflecting plate, and by that directed into the flame.

The claims are:—1. In an apparatus for producing a flash light the combination of a lamp or burner, a vertical plate or wall located over or adjacent to such burner, and a suitable projector or diffuser for the powder, substantially as herein shown or described. 2. In an apparatus for producing a flash light the combination of a lamp or burner, a vertical plate or wall located over or adjacent to such burner, a suitable projector or diffuser for the powder, and an intervening deflecting plate for directing the powder into the flame, substantially as herein described. 3. In an apparatus for producing a flash light the combination of a lamp or burner, a vertical plate or wall located over or adjacent to such burner, and a suitable projector or diffuser provided with a chamber to contain the charge of powder, substantially as herein shown and described.

IMPROVEMENTS IN AND CONNECTED WITH PHOTOGRAPHIC ENLARGEMENTS.

No. 19,145. MARCUS GUTTENBERG, 232, Oxford-street, Manchester.—*November* 8, 1890.

This invention relates to a novel mirror photo-enlargement or decorating process, whereby photographic, and especially photographic portrait enlargements, coloured or otherwise, can be produced in combination with a mirror background, giving an ornamental and pleasing effect in portrait or landscape photography hitherto unattainable.

In carrying out my invention I make an enlargement of a negative on a transfer of any kind, either transferotype paper or by carbon or other transferring process. The image from the enlargement must be cut out, laid face downwards on the mirror, and the outline of the enlargement be marked thereupon with any desired colour. I then take white or coloured paint or varnish, and paint the surface inside the line, and allow the same to dry. This done, I wet the enlargement perfectly in water, and transfer it to the painted surface in the usual manner. I then strip the transfer paper, which now lies uppermost, away from the painted surface, leaving the film adhering to the said surface, and when dried it is ready for painting, either in oils, water colours, monochrome, or it can be decorated according to taste.

It will be obvious that the portrait or picture may be produced upon the mirror either by photography or painted thereupon by the assistance of photography, say by means of a transparency or negative, either through a lantern or otherwise.

What is claimed is:—1. The improved mirror photo-enlargement process substantially as hereinbefore described. 2. The improved mirror decorating process substantially as and for the purpose hereinbefore described.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 8 ...	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 9 ...	Great Britain	54, Pall Mall East.
,, 9 ...	Newcastle-on-Tyne & N. Counties	Mosley-st. Café, Newcastle-on-Tyne.
,, 9 ...	Derby	Society's Rooms, Derwent-buildings.
,, 9 ...	Bradford	50, Godwin-street.
,, 9 ...	Manchester Amateur	Manchester Athenæum.
,, 9 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 10 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 11 ...	Birkenhead	Hamilton Rooms, Birkenhead.
,, 11 ...	Cheltenham	
,, 11 ...	Manchester Photo. Society	36, George-street.
,, 11 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.
,, 12 ...	Ireland	Royal College of Science, Dublin.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

NOVEMBER 27.—Mr. T. E. Freshwater in the chair.

Mr. F. EVERITT—with reference to a statement made by Mr. J. S. Teape at the preceding meeting that the image formed by intensifying with uranium and ferricyanide dissolved out if left long in the washing water—said that he could not find that the precipitate formed by ferricyanide was soluble, as the water in which it was left did not show by colouration that anything had been dissolved.

Mr. W. E. DEBENHAM said that with substances that were nearly insoluble it did not follow that nothing was dissolved because their presence was not easily detected by observation in the solution, and instanced a case of the kind.

Mr. F. H. VARLEY then read a paper [see page 777] on *The Magazine Camera*, illustrated by diagrams and by long strips of developed negatives taken by Mr. Friese Greene with the instrument. The danger of marking of the film by electrical discharge had been eliminated by using rollers of wood coated with tinfoil.

Mr. FRIESE GREENE said that it was hoped that stereoscopic pictures might be utilised to throw images upon the screen in which the solidity of the subject would be visible to the audience.

Mr. DEBENHAM would like to hear how that could be done. There were at present two methods for producing a stereoscopic effect with lantern pictures; one was to project the two images with coloured light—one, say, with red, and the other with green. The observers had then to be furnished with spectacles corresponding in colour, so that the right eye should look through a glass of the same colour as the image of the right-hand picture, and the left eye of the left-hand picture. The other plan was to throw the right and left pictures alternately in rapid succession on to the screen, and to furnish the spectator with an appliance working synchronously with the lantern shutters, so that during the fraction of a second, whilst the right-hand picture was exhibited, the right eye should be uncovered, and similarly with the left eye. In these cases, however, the images were united in the brain of the observer and not on the screen; in fact, a unison on the screen might be said to be impossible.

Mr. VARLEY agreed that no union of the two dissimilar images of the stereoscope upon the screen was possible, but stated that the method which he and

Mr. Friese Greene proposed to employ was to make the two images appear alternately in very rapid succession. The effect was rather dazzling, but there was some stereoscopic effect.

Mr. EVERITT inquired whether Mr. Varley's apparatus resembled that of Marey, recently described in French correspondence?

Mr. VARLEY was not sufficiently acquainted with Marey's camera to say.

Mr. Greene here showed some prints taken on plates prepared to resemble opal glasses. There had been kaolin mixed with the emulsion to render it semi-opaque.

Mr. DEBENHAM said that some examples of work of this kind had been shown at one of the meetings some years since by Mr. A. J. Brown. He thought Mr. Brown had mixed zinc white with the emulsion.

Mr. J. B. B. WELLINGTON described another method, which consisted of a base of plaster of Paris in gelatine, coated with collodion emulsion.

Mr. A. HADDON asked what was the objection to sulphate of barium in the emulsion?

Mr. GREENE said that he had found baryta cause a stain.

PHOTOGRAPHERS' BENEVOLENT ASSOCIATION.

MEETING held on November 28,—Mr. W. Bedford, Chairman.

Minutes of previous meeting read and confirmed.

Three applications for assistance granted.

Two new members elected—Messrs. J. D. Nassi and Herbert Rapson.

HOLBORN CAMERA CLUB.

NOVEMBER 28.—Lantern night. Mr. T. O. Dear (Vice-President) in the chair.

A large number of members' slides were shown, followed by *A Ramble in and about Columbus, Ohio, with the Columbus Camera Club*. The slides included views in the capital of Ohio and picturesque spots in the vicinity. Among the number were *The City Hall, The Capitol, Franklin's Court House, East Broad-street*, three miles long, &c. There were a number of views of Indian mounds, supposed to belong to a period anterior to the North American Indians, who are now fast disappearing before the white settler, together with a number of portraits of eminent citizens.

Arrangements for December:—December 5, *Alpha Lantern Plates*, the Britannia Works Company; December 12, *Fry's Lantern Plates*, by Mr. E. H. Bayston; December 19, Lantern night.

HACKNEY PHOTOGRAPHIC SOCIETY.

NOVEMBER 27.—The HON. SECRETARY reminded members of the exhibition on December 11, and hoped that the prizes would be distributed by Mr. J. Traill Taylor. The awards in the competition, having been judged by Messrs. J. Traill Taylor and H. P. Robinson, resulted as follows:—"Best picture taken on Society's excursions," Dr. Gerard Smith; second, bronze medal, Mr. W. G. Linsdell. "Best seascape" (prize, Mr. Crouch's donation of a lens), Mr. W. Wesson. "Architecture," silver medal, Dr. Roland Smith; bronze medal, Mr. F. H. Evans. "Beginner's prize," bronze medal, Mr. F. W. Cocks. "Lantern slides, microscopical," Dr. W. A. Kibbler. "Lantern slides, artistic," Mr. J. Carpenter. "Isochromatic prize," given by Messrs. B. J. Edwards & Co., Dr. Gerard and Dr. Roland Smith.

Nearly two hundred pictures were sent in, and sixty-six entries were made. The gold medal, or championship of the Society, was won by Mr. Walter Wesson for a fine picture of *On the Wye*.

There were some good pictures entered. The judges were pleased with the efforts of this young Society.

A subscription was set on foot to purchase a lantern, and was well responded to. It is expected that the new lantern will be ready for use at the exhibition.

The Hon. Secretary presented the Society with a book on the lantern by Chadwick, and the President gave a fine jet.

Some work having been shown by Messrs. Gosling and Dean, the CHAIRMAN (Mr. J. O. Grant) called on Dr. Roland Smith for his demonstration on *Kalliotype Paper*.

The Doctor then proceeded to say that it was very similar in appearance to platinotype paper, but was more under control, as the development could be stopped in any part or at any moment easily. It was fifty per cent. cheaper, or about the same price as silver paper, was quite a permanent process, and prints in about a quarter of the time the silver paper takes. He thought it an advantage in other ways, one of which was it did not want any special way of keeping. It was, however, desirable that the fingers should be kept off it whilst developing as much as possible, on account of stains. The demonstration was then proceeded with, various questions being asked by the members. The process was thought very simple and easy of manipulation. The usual vote of thanks was accorded, to which the Doctor replied.

WEST LONDON PHOTOGRAPHIC SOCIETY.

NOVEMBER 28,—The President (Mr. W. A. Brown) in the chair.

Mr. A. PRINGLE gave an address on *Bromide Printing*. The lecturer, after describing the details of the manufacture of the paper, proceeded to say what a bromide print ought to be. Experience shows that many do not know what constitutes a perfect bromide print. The best test of the quality of a bromide print was that it should look like platino at its best. The great advantage of the process was that whereas a special quality of negative was required for platino and for silver, a negative unprintable by other methods would yield a passable result with bromide. Other advantages were that the process could be worked at night, therefore light and exposure were under perfect command. In regard to exposure no definite rule could be laid down owing to the want of a standard light, but some observations on development might be of some service. Working with a normal developer, a black and white print meant under-exposure, and if the finished print were of a greenish or muddy tone the developer had not time to act properly. Ninety per cent. of failures were due to too rapid development consequent upon over-exposure. The great point to aim at was the control of development. A long exposure tended to yield to softness, and, if carried too far, to fogginess. Chalk and soot meant under-exposure. With a thin negative a sub-normal exposure; if hard, super-normal exposure should be given. A developer strong in iron meant strong blacks. If the print were from a thin negative the exposure should be short and the developer strong, and *vice versâ*. It was hard to find a better developer than ferrous oxalate. Could not speak so well of pyro or of eikonogen, but quinol gave good results. Both the iron and the oxalate solutions should have slight acid reactions. His method of making the developer was as follows:—Before mixing, acidify the water with sulphuric acid, and then add the iron to saturation, but do not boil. The oxalate solution was also to be saturated and acidified with oxalic or acetic acid. As to proportions, for a strong developer, one iron to four oxalate; medium, one to six; a good strength being one to eight. He did not recommend diluting the developer with water, as it engendered graininess. As to the use of free bromide, half a grain of it to the ounce of water was a usual quantity, and he advised that. As to quinol, he recommended Thomas's or any standard formula, but carbonate to caustic as an accelerator. In regard to manipulation, the paper should first be soaked in clean water, sweep over the developer and keep moving, the test of proper exposure being the regular appearance of the image by the time the details show in the high lights: the shadows should be plucky. With rough paper, development should not be carried too far, as the print, when dry, looked darker. Thorough washing should follow the use of the acid bath. It was important to help the hypo alkaline by the addition of a little ammonia, as there was a great tendency for the bath to become acid. If blisters appeared, a little salt in the first washing water would overcome the difficulty. He recommended the use of a squeegee under a rose tap, which would be more efficacious than prolonged soaking in a washer. Mr. Pringle concluded his interesting remarks by practically demonstrating the process, the results being very much admired.

A discussion followed, in which several members took part.

After a vote of thanks had been unanimously accorded to the lecturer, samples of Messrs. Fry & Co.'s plates, bromide paper, and films were distributed.

The next meeting (lantern night) will take place on December 12.

LEICESTER AND LEICESTERSHIRE PHOTOGRAPHIC SOCIETY.

NOVEMBER 26.—A *conversazione* was held by the members of this Society at the Co-operative Hall, High-street, and was well attended. This was the first attempt at anything of this nature by the Society, and the members are to be congratulated on the thorough success of their undertaking. Several of the members showed selections from their work, which, taken as a whole, formed an interesting and artistic exhibition of the various branches of photography. Among the photographs exhibited were those of Mr. G. Bankart, a fine collection of autotype and platinotype prints, of which *The Old Corporal* was specially worthy of note. Mr. T. Scotton, of Derby, showed a number of splendid views in the engine works of the Midland Railway, taken direct on the largest-sized plates manufactured, and a faultless negative of one of the locomotives. Mr. F. G. Pierpoint, in addition to prints, had several exhibits of interest, including transparencies, lantern slides, photographic lamp shades, and sets of apparatus. He also displayed a fine bromide enlargement (40 × 30) of a view near Matlock Bath. An interesting collection of figure studies was displayed by Captain Adcock, of Melton Mowbray. The other exhibitors were Messrs. S. S. Partridge (President), J. T. Cook (Vice-President)—Aristotypes and bromides; B. Ellis, F. Joliffe, Woodcock, J. Porritt—enlargements; A. Wilson, W. Taylor, S. Squire, and Frank Brown. Mr. Weatherhead also placed on view a charming selection of works of art, antiquities, and objects of interest in foreign manufactures, which gave evident pleasure to a constant succession of visitors to his table.

During the evening a lecture was given by Mr. WALTER D. WELFORD on *Hand Camera Work*, illustrated by a large number of slides from instantaneous exposures.

Refreshments were provided, and selections of music were given by a band.

BATH PHOTOGRAPHIC SOCIETY.

NOVEMBER 21.—The usual fortnightly meeting of the Literary and Philosophical Association took the form of a *conversazione*, given under the auspices of the Bath Photographic Society. The large lecture hall was well filled, the company numbering nearly two hundred.

Mr. W. PUMPHREY gave an address on the history of the art. Commencing with the early experiments of Niepce with bitumen of Judea, he traced step by step every important change through twenty years until the discovery of the medium, collodion, 1849. Having dwelt upon the importance of photography at that time, he passed on to the period of rapid dry plate work, which thirty years afterwards became general. The various processes now no longer practised were illustrated by specimens which were placed on the table.

Mr. W. MIDDLETON ASHMAN then described the means by which photographs are obtained. Starting with the assumption that the audience were unacquainted with the technicalities of photography, he referred to the earliest form of image the Italian philosopher, Porta, was able to produce in the sixteenth century, the outcome of which is the well-known camera obscura—a bijou instrument of this class being much used as a view finder for detective and other cameras at the present day. The speaker next explained how a chemically prepared surface was acted upon by the light-forming image entering the dark box or photographic camera; how by subsequent development with suitable reagents, an image composed of varying densities would be built which formed a photographic negative, and from this negative a reverse yielded a positive photograph. The distinction between instantaneous photography and ordinary photography was stated to be relative and the conditions explained. The quality of light was referred to as one of the conditions, and a brilliant light from an instantaneous flash of burning magnesium metal was utilised to photograph the company. Later in the evening Mr. Ashman returned with a most successful transparent photograph of the

audience, which was enlarged by means of the optical lantern and shown upon a twelve foot screen.

Mr. A. F. PERREN explained to the audience what takes place when light acts upon the iron compounds, and how platinum metal under certain conditions is reduced just where it is wanted to form a picture. Having passed round a number of printed and finished specimens of this method of printing, Mr. Perren handed round platinotype paper before and after printing, the latter being next subjected to the influence of a developer—hot potassium oxalate solution. A number of printed pieces of prepared paper were so treated by Mr. Perren also by Messrs. G. F. Powell and H. G. Powell, who assisted in the demonstration.

After tea the lantern was brought into requisition, and numerous pictures were shown.

NOVEMBER 26. Mr. Pumphrey (President) in the chair.

Messrs. Llewelyn Bassett Jolly, Mathew Hill, and F. J. Moody were elected members.

Mr. A. G. BRISTOW addressed the meeting upon the subject of a new printing process termed *Kollotype*. In reply to the Chairman, he disclaimed any responsibility as to the origin of the title. The process was not one suitable for printing right out visibly, but one in which a ferric salt during printing by light became ferrous. Upon the image so formed a subsequent reduction of silver took place, resulting in a photograph of a steel engraving appearance. A number of papers were then handed round bearing a faint image, also the negatives from which the impressions had been made. The papers were next fumed for a few seconds on a silver developing solution, which blackened the shadows and half lights proportionately. These were exhibited also in finished and mounted prints. Mr. Bristow next detailed the necessary *manipulations* of washing the developed prints in ammonia and water to remove the excess of iron and silver present. He then replied to numerous questions relating to the process.

The SECRETARY explained and exhibited the Lewis new form of automatic rocker governed by clockwork, and an adjustable tripod holder sent by the same firm.

Mr. J. E. BUDGE introduced a new lantern carrier for dissolving views. The point of novelty consisted in diffusing the light passing from the objective through a semi-transparent medium, such as leaves of ground glass fixed at suitable distances in front of the lantern and actuated by extending arms at the moment of change, thus obscuring or partially so, the image-forming rays. To illustrate its practicability several transparencies were shown.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

NOVEMBER 26.—The President (Mr. Andrew Pringle) in the chair.

The usual business having been gone through, Mr. PRINGLE read a paper on *Some Cold Processes for Lantern Slide Making*, including dry collodion, wet collodion, and albumen, illustrating the same by oxyhydro light, with a series of slides specially prepared for the occasion, showing great warmth of colour and very high lights, which he considered should always be looked for in a good slide.

The next meeting will be on December 10, at the Pavilion, Station Hotel, Sidcup, Mr. Newman on *Present Tendencies of Photographic Art*. Concluding with a lantern show.

BIRMINGHAM PHOTOGRAPHIC SOCIETY.

THE sixth annual meeting of the above Society was held at the Club Rooms, "Colmore Hotel," on November 27.—Mr. J. B. Stone, J.P., in the chair.

The SECRETARY read the report of the Council.

The CHAIRMAN, in moving the adoption of the report, said that if the Society had only done one thing, viz., placed the photographic survey of Warwickshire on a firm basis, it could certainly congratulate itself. Although at present no definite result was before the public, he understood sufficient progress had been made to justify the holding of an exhibition.

Mr. B. KARLEESE seconded the motion, which was unanimously agreed to.

The following officers were then elected to serve during the coming year:—*President*: Mr. J. B. Stone, J.P., F.L.S., F.G.S., F.R.G.S. *Vice-Presidents*: Messrs. W. Jerome Harrison, F.G.S., E. H. Jaques, and B. Karleese. *Hon. Librarian*: Mr. W. S. Horton. *Hon. Treasurer*: Mr. T. Taylor. *Hon. Secretaries*: Messrs. J. H. Packard and A. J. Lesson.

Mr. SMITH, of the Eastman Company, exhibited and showed work done by the Kodak.

SHEFFIELD PHOTOGRAPHIC SOCIETY.

DECEMBER 2.—Mr. B. J. Taylor in the chair.

Four new members were elected.

Mr. SMITH, of the Eastman Company, explained the Kodak camera, and gave a lecture and practical demonstration of enlarging.

LIVERPOOL AMATEUR PHOTOGRAPHIC ASSOCIATION.

THE twenty-seventh annual meeting was held in the Association's Club Rooms, 3 Lord-street, on Thursday evening, November 27, 1890. The President, Mr. Paul Lange, occupied the chair, and there was a crowded attendance of members.

The following gentlemen were elected members of the Association, viz.:—Messrs. A. Luttenberg, Harold King, Alex. Watt, R. P. Gilbertson, W. Stone, E. L. Marriott, Howard Arnold, M.D., T. S. Pardey, and W. B. Hellar.

The Hon. Secretary's report showed that during the past year the addition to the roll of membership had been the largest in the history of the Association, with the exception of the year when the Club Rooms were opened. Fifteen members had retired from various reasons, an addition of fifty-five new ones had to be recorded, making a total of 274. The success attending the practical demonstrations, of which there had been eleven, was most encouraging, the average attendance being about forty. There had been eleven monthly and three special lantern meetings, also five outdoor excursions, which had been well attended. The report was unanimously adopted.

The Hon. Treasurer's financial statement showed that the total expenses on the year's working had been 224*l.* 4*s.* 11*d.*, the income had been 207*l.* 16*s.* 2*d.*; there was, however, a balance of 36*l.* 18*s.* 11*d.* to the credit of the Association.

After a discussion on some minor points the statement was adopted. The Council submitted the following nominations for officers, &c., for 1891:—

President: Mr. Paul Lange.—*Vice Presidents*: Messrs. William Tomkinson and Joseph Earp.—*Trustees*: Messrs. Paul Lange, Jos. Earp, and A. W. Beer.—*Auditor*: Mr. Arthur Bradbury.—*Librarian*: Mr. J. Macdonald Bell.—*Hon. Treasurer*: Mr. P. H. Phillips.—*Hon. Secretary*: Mr. L. M. Tunstall.—The following to fill the place of retiring members of the Council:—Messrs. A. F. Stanistreet, Henry Lupton, F. B. J. Illingworth, B. Boothroyd.

Although a ballot was taken and six more new names were submitted, the nominations of the Council were elected.

The annual competition for prints, enlargements, and lantern slides, received considerable attention this year, and excellent work was sent in.

The prints and enlargements were adjudicated upon by the following gentlemen, to whom a hearty vote of thanks was unanimously given: Messrs. Jno. Finnie, George E. Thompson, and B. J. Sayce, for prints and enlargements. Geo. Thompson, W. D. Mead, T. Kasth, for lantern slides.

The whole of the slides, 102 in number, were shown in the lantern.

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

A MEETING was held at the "Grand Hotel," Manchester, on Thursday, November 27, 1890.—Mr. R. Slingsby in the chair.

Present—A. Lafosse (Manchester), Warwick Brookes (Manchester), E. A. Myers (Manchester), G. Higginson (Bowdon), J. Birtles (Warrington), N. P. Gregson (Blackburn), J. Storey Davis (Halifax), R. Jennings (Blackburn), Donald MacIver (Leeds), H. Graham Glen (Leeds), H. J. Whittock (Birmingham), Jno. E. Shaw (Huddersfield), D. Bordley (Stratford), F. H. Waley (Doncaster), W. H. Marks (Prestwich), John Grusby (Pendleton), C. Pettingall (Liverpool), Hubert Henry (Hashingden), F. Sharples (Blackburn), Percy Knott (Bolton), H. J. Godbold (St. Leonards), William Gill (Colchester), J. E. Eddison (Barnsley), Frank M. Sutcliffe (Whitby), W. Roxby (Leeds), Robert Broadhead (Leeds), E. Graves (Halifax), Brook Brookes (Bradford), J. H. Ainley (Sheffield), Jameson Brothers (Liverpool), A. Seaman (Chesterfield), J. W. Tattersall (Accrington), Jeffery Dimsdale (Dewsbury), Thos. Heap (Sowerby Bridge), R. Whitehouse (Manchester), J. H. Crosby (Rotherham), D. Batterby (Manchester), and C. P. Richards (Barrow-in-Furness), Hon. Sec.

Mr. Richards read apologies from the following gentlemen, the great majority of whom expressed warm sympathy with the movement and a desire to be enrolled as members:—

Telegrams from Messrs. Elliot (Elliot & Fry, London), Eason (Dalston, London), Sindle Brothers (Swansea), M Lardy (Oswestry), Fall (Baker Street, London), Ramsay (Bridge of Allan), Dickenson (Sheffield), Bara (Ayr).

Letters from Messrs. Chevalier (Tunbridge Wells), McLean (Hunstanton), Phillips (Biggleswade), Barrow (Camborne), Lang-Sims (London), Stuart (Stirling), Hicks (Glasgow), Midwinter (Bristol), Forrest (Pontypridd), Pratt (Greenock), Ford (Lincoln), Dew (Coventry), Weston (London), Marshall (London), Moffat (Edinburgh), McKean (Leith), Fieldwicke (Brighton), Hogg (Kendall), Evans (Swansea), Hart (Ashbourne), Tomlinson (Rochdale), Hoggard (Redcar), Bliss (Grantham), Child (Leeds), Faulkner (Woolwich), Brightwell (Wellington), Middleton (South Shields) Beeket (Saltcoats), Broadhead (Leicester), Walmsley (Liverpool), Hubert (Hackney), J. P. Clarke (Bury St. Edmunds), Pindar (Marsden, Law (Isleworth), Talbot (Hastings), Yeoman (Barnard Castle), Valentine & Sons (Dundee), Foster (Croydon), Laing (Shrewsbury), Turnbull & Sons (Glasgow), Simmonds (London), Bailey (Shrewsbury), Glaisby (York), Partridge (Andover), Robinson (London), O'Shea (Limerick), Norval (Dunfermline), Erwin (Ballymena), Watson (Ripon), Archer Clarke (London), Findlow (Warwick), Berry (Aberdare), Evans (Pwllheli), Fisher (Filey), Clarke (Bethesda), and Byrne (Richmond).

The CHAIRMAN, who was received with applause, made the following remarks:—"Gentlemen, it gives me great pleasure to see such an important gathering as this in response to the invitation I sent out to you throughout the length and breadth of the United Kingdom—an invitation, gentlemen, initiated at a gathering together of a few kindred spirits three weeks ago at the important centre of Leeds, when a number of us met together and discussed the necessity of forming ourselves into an association for the important purpose of looking after the interests of those engaged in the pursuit of the photographic art as a means of livelihood, and also to attempt an improvement of the social status of the members of the profession, that grievances had arisen, and that those matters were only to be met by a combined action on the part of the profession generally in order to effect a remedy of those grievances. A committee was formed, as you are doubtless aware, and the requisite funds were forthcoming to provide the preliminary expenses necessary in announcing to the large body of professional photographers the objects of this meeting. Now, gentlemen, having stated the preliminaries, I shall call on Mr. C. P. Richards to read the minutes of that important meeting, and to submit them for your approval."

The minutes having been read, Mr. Richards said:—

"Gentlemen of the photographic profession, you have not been invited here to assist in the formation of a society antagonistic to the parent Society—the Photographic Society of Great Britain—or any similar society who meet and discuss the progress of the art of photography in its scientific aspect, neither to act as a society for the distribution of medals or awards at exhibitions, but to form yourselves into a powerful combination, so that you can deal in a proper manner with matters appertaining to the business difficulties that have arisen and are likely to arise in the future; and such difficulties are only to be met by a properly constituted association, having a powerful membership and with a good balance at your bankers. The various anomalies which exist in the practice of photography as a business do not exist in other businesses. The publication of manufacturers' price lists, which do not treat the profession with justice—and it is my opinion, and I feel certain it is yours, that manufacturers and dealers would gladly work with you now in this matter to abolish those anomalies. Then, gentlemen, I think that this Association

should be established on a broader basis than first proposed, and that we should invite all those concerned to join with us and make it a national society, and call it, instead of the Professional Photographic association, the National Photographic Association, which would, in my opinion, give it a higher and a nobler title to usefulness, and would take away from it any idea of one-sided selfishness. The *raison d'être* of its existence should be the adjustment of difficulties that arise, and to deal with them as a body, instead of the onus being thrown upon an individual. Take, for instance, gentlemen, the various Copyright Acts which have been before Parliament at one time or another: had the last one of its kind become law it would have been very awkward for the professional portraitist in general. Any intended future Copyright Act should be discussed, and any injurious clause to the detriment of the profession be mitigated by the action of the council of such a society as this.

"Then, again, gentlemen, we have the question of the ownership of the negative now and again cropping up. When I tell you that I once stood as defendant prepared to contest this some fifteen years ago in the Court of Queen's Bench at Westminster, you will admit this question is an important one. Gentlemen, you have again the improvement in the status of the profession, and I feel sure you will agree with me that if a photographic artist could put after his name 'member of the National Photographic Association,' it would stamp him as being a reliable member of the art, and worthy of the patronage of the public. Well, gentlemen, I should suggest that the subscription be not less than one guinea per annum; that you should have a President, Vice-President, and a Council; a Secretary with a salary sufficient to make it worth his while to devote part of his time to the work of the Society; that the meetings of the Council be held quarterly, or as circumstances require, and an annual gathering of the members of the Society should take place at different important centres, in a similar way to other organized societies. At these meetings, matters of interest and papers relating to the business of the profession might be discussed, and the action of the Society agreed upon. This, gentlemen, would bring individual members into closer relationship, and promote a better feeling amongst those engaged in the pursuit of our art. And, again, as we are growing in numbers, the rank-and-file of our assistants are increasing, and the question of suitable hours of labour and of proportionate payment may have to be adjusted to the interests of both employers and assistants. Likewise, gentlemen, you may in some matter ameliorate the very low prices that some work under, and by your recommendation remedy the effects of cutting down prices between rival photographers in the same locality. These are some of the lines of usefulness I have sketched out, and in the event of this Society being successfully carried on, the advice and assistance of its Council would be asked for when any important measure was being brought before Parliament as to how it would be in accord with the feelings of those engaged in the pursuit of the art."

A discussion took place upon the speech, and several resolutions were proposed and carried, amongst which was that the title of the Society, proposed by Mr. Lafosse, seconded by Mr. Whittock, be "The National Association of Professional Photographers."

A Committee of twenty was appointed *seriatim*, and elected to frame rules and bye-laws, and report same to a general meeting to be held in Birmingham early in the ensuing year, the Hon. Secretary to announce the date by advertisement in the photographic journals.

The following gentlemen form the Committee:—Messrs. Slingsby, Lafosse, Richards, Sutcliffe, Warwick Brookes, Whittock, Crosby, MacIver, Gill, Elliott, Fall, Shaw, Gregson, Davis, Whaley, Pettingall, Moffat, Birtles, Eddison, and Barry.

A cordial vote of thanks to the Chairman and Secretary was proposed and responded to, and the proceedings then terminated.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

To the EDITOR.

SIR,—I have received so many letters in reply to the circular I issued calling a meeting in Manchester, I find it impossible to reply to each. May I trespass upon your space to call the attention of those gentlemen who ask for information as to the objects of the Association to the report of the proceedings (a copy of which I enclose for insertion in the current issue), and also to the fact it is proposed to hold a general meeting of the profession at Birmingham early in the ensuing year, of which due notice will be given by advertisement in the photographic journals? At this meeting the Committee appointed will submit a proposed code of rules and bye-laws for the approval or otherwise of the profession. I therefore hope all photographers will make an effort to be present. The need of such an association is evident from the tone of the letters I have already received from all parts of the United Kingdom, and with a combined effort I feel sure the Society can be established upon a firm and permanent basis, and will be of great service to its members.—I am, yours, &c.,

CHAS. P. RICHARDS, *Hon. Sec. pro tem.*

CHEAP RAILWAY TICKETS FOR PHOTOGRAPHERS.

To the EDITOR.

SIR,—I am glad to see that the photographic press organs, the most powerful guardians of our interests we possess, have taken this matter up, and I feel satisfied that with their assistance and with the co-operation of the principal camera clubs the desired end may be obtained. Perhaps the best course to pursue would be to present to the railway companies a petition signed by as many societies as possible in favour of the cheap ticket system, and showing some real grounds for the desired concession. Railway companies are business people, and while they are willing to meet the public they expect some return for all favours granted. It would be desirable to get the number of camera or photographic societies throughout the kingdom, and the total number of their members, with other information that would strengthen our position. The West London Photographic Society would gladly leave the lead in this direction to one of the older societies, if one of them would undertake it, but failing this, would be prepared to undertake the preparation of the petition if the other societies would sign it. A united petition with the Camera Club at its head would carry great weight, and would no doubt succeed in obtaining similar privileges to those now enjoyed by our brothers of the "gentle" art.

Any information on this subject will be gladly received by our Hon. Sec., Mr. John A. Hodges, 87, Chancery-lane, London.—I am, yours, &c.,

W. A. BROWN,
President of the West London Photographic Society.

LOSS OF TONE IN FIXING.

To the EDITOR.

SIR,—I am at a loss to account for Mr. Hargreaves' experience that, after immersion in a bath of chloride of sodium solution, his prints refuse to tone at all.

Captain Abney, in his *Instruction in Photography* (seventh edition, p. 248), says:—"Should prints refuse to tone, either the gold has been exhausted, or else a trace of sodium hyposulphite has been carried into the toning bath by the fingers or other means. A trace of hyposulphite is much more injurious to the prints than a fair quantity of it. Should the toning bath refuse to tone after the addition of gold, it may be presumed that it is contaminated by a trace of sodium hyposulphite." Is it possible this is the cause of the trouble?

It is generally, I think, admitted that prints tone more quickly with the presence of free nitrate, but my experience is that they change more in tone upon passing into the fixing bath than if all the free nitrate has been eliminated. It seems clear that the presence of unchanged chloride is not in any degree necessary or even beneficial *per se* to the toning (for the prints may be fixed first and toned afterwards), but I think the tone is more accurately judged by getting rid of what I would term (if I may be allowed the expression) the false or unstable tone the prints have when they come from the frames. When first printed, the colour is not far from that desired; merely rinse them in water and tone, and they come quickly up to the required shade; but whatever the chemical change, the colour is not permanent against "hypo," but always returns to a redder or warmer shade: hence the necessity for over-toning. If, on the other hand, they are placed in a salt bath they lose the whole of the fictitious purple of printing, and become a bright red; the toning bath has therefore much more work to do to bring up the colour to the same apparent point through the wide range from red to purple, but when the colour *is* obtained the "hypo" bath hardly changes it at all. Abney distinctly lays it down (p. 239) that "with the acetate bath . . . . all the soluble silver salts should be eliminated."

Mr. Hargreaves says, after sensitising, he "blots off and dries." Is this a good plan? Is it not better to drain and hang up to dry, for possibly the blotting off will tend too much to remove free nitrate? however much I advocate the removal of free nitrate before toning, its presence is indispensable in the printing operation. T. F. Hardwick writes: "When rich black tones are desired . . . salt the paper strongly, and use an eighty-grain silver solution; those who are most successful in getting dark tones are quite regardless of expense. . . . Nothing is gained by increasing the proportion of chloride, unless at the same time an addition is made to the quantity of free nitrate. A surface of chloride of silver with only a bare excess of nitrate darkens on exposure, but does not reach the bronzed stage . . . . and when toned is without depth and intensity." Possibly Mr. Hargreaves, who sensitises for himself, has got a very highly salted paper; if so, so much the better if the silver is proportionately increased; but if not, I think lack of tone may be accounted for.

The argentometer is an unreliable instrument for testing the strength of a silver bath, as by it all foreign matter increasing the specific gravity is reckoned as silver; thus, what reads off as a sixty-grain solution may really be much less. The readings also will be quite different in summer and winter. A better way of testing a bath is:—Make a solution of salt, thirty-five grains to the ounce; measure out from your bath 100 minims, and drop the salt solution drop by drop into it, shaking it well after each few drops. When the salt solution ceases to form a precipitate, read off the quantity used. Every minim of salt solution used corresponds with one grain of nitrate of silver per ounce in the bath (Abney, p. 358).

I fear I have sent you an unduly long yarn, but I hope some other correspondent will ventilate a subject that is often a special trouble to beginners, as well as to those more advanced in practice; if not, perhaps you, Mr. Editor, will in the near future favour your readers with some good practical advice.—I am, yours, &c.,

EDWARD J. SMITH.
Park Royd, Halifax, December 2.

To the EDITOR.

SIR,—Will you allow me to reply to your correspondent, Mr. M. Hargreaves, of Chester, *re* toning, &c., for whom, as an old worker myself, I

feel real sympathy. I should think the cause of the trouble is to be found in the toning dish itself, or in some of the dishes used prior to toning. It often happens that the dish becomes cracked and stained, and absorbs whatever is put into it, and so has in itself the elements of mischief. This cause will produce exactly the evils enumerated by Mr. Haugreaves.

I would also suggest that he should cease to blot off the surface silver with blotting paper, and instead simply draw the paper over the edge of the sensitising dish and hang up to drain, putting bits of blotting paper at the bottom tips of the paper to receive the drop or two of silver solution remaining. If he tries a new clean set of dishes, I think his troubles will be over.

I think it helpful, also, to add a very little acetate when strengthening the bath, regularly barring accidents to an odd print now and then. I never lose a single print, and he has an equal right to expect success and to get whatever tone he wishes. I congratulate him on the courage manifested in stating his difficulties, and hope this may help him out of them.—I am, yours, &c.,

T. TOMLINSON.

Clendon Cottage, Trentham-road, Longton, North Staffs., December 2, 1890.

PINHOLE PHOTOGRAPHY.

To the EDITOR.

SIR,—I shall be greatly obliged if your correspondent Mr. Maskell will throw some further light on this subject. In his letter he gives a rule for obtaining the greatest possible degree of sharpness, but the example given in illustration does not appear to agree with the rule. Probably there is some slight misprint which accounts for the difficulty. I shall be glad to know on what optical principle the rule is founded, and what proportion between aperture and focus Mr. Maskell finds best suited for producing artistic work. Any hints from those who have met with success in this branch of photography will be esteemed a favour by—Yours, &c.,

T. E. WOODHOUSE.

Lound House, Fareham, Hants., December 1, 1890.

A NEW SCHOOL OF PHOTOGRAPHIC ART.

To the EDITOR.

SIR,—Mr. Nevil Maskelyne's suggestion for a new school of photographs to be called "Imaginatic" is really inspirational and splendid, putting into pleasantest shade all that has gone before. He goes the whole animal, utterly eschewing the elements of simple naturalism and pinholeism. This latter fancy he should have allowed a little longer run, it has scarcely had a fair show yet; the other is dead. All he has to do now is to get photographers to believe it. To do this I fear he must follow to some extent the lines laid down by his distinguished professors. Perhaps he need not adopt all their methods, but certainly he will not be heard, except by the chosen few, unless he shoots for his own hand.

I dimly remember an old tale or poem of a German king in the long ago who was so vain that he actually believed all that his courtiers told him. To try what lengths of flattery he would stand, they arrayed him in what they called magic robes which they said none but the pure could see. When he rode naked through the town the people hooted him and told him to go home and dress, but he believed his flatterers, and called all those impure who could not see his magic clothes. There were some cowardly who wanted to be thought purer than the rest who pretended to see and admire the gorgeous but non-existent garments, but the great mass of the people saw the imposture and deposed the silly old king for the necessity of unattainable vanity.

Of course, Mr. Maskelyne only expects a temporary success, but would like it truly while it lasts; and he might take a lesson from this little anecdote. History repeats itself. Just as the vain king called those impure who could not see his magic robes, so must our new prophet revile those who cannot see his "imaginatic" pictures. He must call them narrow-minded, pot-creatures, untrained, ignorant, unlearned, frugivorous ones. He must allow full scope to that charm of language which is due possibly to primal instinct, vast egotism, original sin, an overpowering genius for crossedness—or, after all, perhaps only liver. He must fill the vacant spaces of his life with vituperation, and express his preference for going to h—— with W—— rather than to heaven with Raphael. This will show he only means it, and then perhaps he may run his "ism" for a time, for that is the "only method." Such is the opinion of—Yours, &c.,

AN ENTHUSIASTIC DISCIPLE.

THE EAGLE VIGNETTING SET.—Mr. J. H. Reed, 12, St. Peter's-street, Islington, N., is the introducer and maker of this vignetting set. By its agency it is easy to vignette photographs with any desired degree of softness or outline, as it affords facilities for adjusting the vignetting mask with relation to any part of the negative and at any distance from it. This is accomplished by placing in a rebate in front of the printing frame one or any number of card frames, there being ample convenience for holding and adjusting the vignetting mask between any two of them. For printing vignettes in the sun a number of leaflets are provided by which the strong light is softened and diffused. The "set" comprises one hundred and fifty vignetting sheets and a large number of printing sheets and card frames, with scissors, pencil, and rubber cords all fitted neatly into a case. It is well made, and will certainly answer its intended purpose without any possibility of failure.

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange whole-plate sliding-body camera and slide for lens or condenser.—Address, O. SANSOME, 4, South Beach, Blackpool.

Wanted to exchange a view and group lens, 10 × 12, sharp to the edge, for an air-gun.—Address, M. LE TOURNEUX, 189, Regent-road, Salford.

Dallmeyer's 1a portrait in exchange for half-plate Euryscope or whole-plate wide-angle rectilinear.—Address, C. C. WRIGHT, The Studio, Hanwell, W.

Will exchange Talbot & Eamer's detective camera and three whole-plate wet-plate baths and dippers for studio accessory.—Address, W., 147, Newport-street, Bolton.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to "H. GREENWOOD & Co.," 2, York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to "THE EDITOR," 2, York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

John Hornbrough & Son, Edinburgh.—*Photographs of the Marquis of Tweedale and the Marquis of Hartington.*

G. MOON.—E. A. Carnell, Photographer, New Radford, Nottingham, wishes to communicate with you.

J. W. R.—The lenses of Jena glass working with a larger aperture are quicker to that extent than others.

HARROLD (Bedford).—Complaints from local Post Office have been received as to insufficiency of address.

S. BRAY.—The ALMANAC contains more than one article on the subject. From it you will get all the information required.

W. LLOYD.—Quite right. If you purchase the benzoline five gallons at a time you will require a license to store it on the premises.

RETOUCHER.—Certain kinds of alcoholic varnishes may have a ground-glass-like tooth imparted to them by the addition of tartaric acid.

D. DAVIS.—When a pound of water is given in a formula, sixteen ounces are meant. A pint of water contains twenty ounces, or a pound and a quarter.

A. G. E.—Gaslight portraiture may be made a success if you provide a sufficiency of good burners. Neither of those mentioned are to be recommended.

XENO.—Hydroquinone and eikonogen can be used for the development of bromide paper, but ferrous oxalate is what is generally used by professional enlargers.

F. C. QUICK.—It would certainly be possible to stop halation by having a non-actinic substratum to the sensitive layer. We shall give your suggestions due consideration.

J. T. (Brighton).—The best and cheapest vessels for silver wastes are paraffin oil casks. They answer every purpose, and are sold for three or four shillings each. They hold about forty gallons.

G. F. C.—The flash lamp used by Mr. Slingsby, and sold by Marion & Co., fulfils your requirement. Several others also are successfully used. See notices and advertisements in ALMANAC.

ALPHA.—The probability is that a new back lens will be required in order to enable the *carte* objective to cover flatter than it now does. We have no idea what the cost of such alteration would be.

A. A. A.—From what you say, we are inclined to favour your view, that the mounts are the cause of the fading; but, of course, this can only be determined by a series of experiments with the mounts. Better send some to an expert for examination.

R. STEWART.—The fixing of the prints has been dispensed with in this case. Do not forget that merely passing prints through the hypo solution does not necessarily fix them. Remember also that in very cold weather the solvent action of hyposulphite of soda on chloride of silver is much retarded.

RIDER writes: "Will you oblige by saying if you think I should be doing wrong in making lantern slides *for exhibition only*, in the lantern in my window, from published portraits of celebrities, giving in every case the name of the photographer."—Yes, certainly, if without the permission of the publisher.

T. HOWARD asks if the patent for chromotype printing is still in force, as he recently saw that a photographer is claiming on his prospectus that he is the sole licensee for a certain district.—The chromotype patents of Lambert have long since expired, and as the processes are open to all, there can be no "sole licensee."

SUBSCRIBER (Liverpool).—Unless you have special appliances for drying, you will not be able to practise collotype successfully. By the method of working described, good results may be obtained when atmospheric conditions are favourable, but they can never be uniform. You will now know why your results are so "erratic."

P. M. HART.—To make a valid patent for a detective camera, or an instantaneous shutter, in face of all that has been done during the last few years, considerable novelty will be necessary. Better investigate what has been done, and place that result before your patent agent when you instruct him to lodge an application.

A. & G. TAYLOR (Newport, Mon.) write:—"Could you kindly inform us where we could get the most popular designs of studios?"—There are no designs of studios published. Many different forms will be found in our back volumes. Most photographers prefer to design their own studios, so as to suit their requirements or taste.

VACUUM CAPUT.—It is quite a matter of opinion. Try both developers, and adopt that which answers best in your hands. With a solution of sulphate of iron that is saturated at a moderate temperature crystals will be deposited if it be submitted to a colder one. Probably the recent cold has caused some of the salt to crystallise out. The crystals can be redissolved for future use.

PUZZLED writes: "If 'J. L. Hart' will discard the hypo he has been using he will have no further trouble. I procured another sample of hypo, and spots entirely disappeared. I then tried old hypo again with another batch after ten days, and spots were as numerous as ever. I have had no further trouble since using fresh sample. Some impurity or other exists in the hypo, and is the cause of the spots."

J. BOYES.—If you really do as you say, viz., *daily* retouch fifteen to eighteen negatives, some being cabinet heads, in first-class style; all the spotting, from ninety to a hundred prints, burnishing, varnishing negatives, sensitising and cutting up paper—we think that your employer, who is dissatisfied because you do not get through enough work for him, will find some little difficulty in getting your equal.

LUX.—The cause of the fading is the unsuitable pigments which have been used in the painting of the opal. Evidently those employed for softening the shadows had lead as their bases, and the picture has evidently been exposed to sulphuretting agencies, which have caused a blackening of the pigment. Hence what were once the lights have now become dark smudges. We have seen similar effects before, but we do not call to mind any quite so bad as the sample submitted.

B. W. writes: "Are the sensitometer numbers given on the labels of dry plates reliable? I ask the question because I do not find that they always agree. Last week I tested two brands, one was marked 24, and the other 22; but I found that the latter was really far quicker than the former. Instead of showing 24 it was only 21. Is this a common occurrence, or is my experience exceptional?"—When the sensitometer numbers are given they ought to be reliable, but we fear, from letters we sometimes receive, they are not always so.

OLD PHOTOGRAPHER (Manchester).—For photographing engravings, first of all try Mawson & Swan's photo-mechanical plates, which are especially prepared for the purpose. If you still fail in obtaining density, then try intensification by the bromide of copper process, which is much better than that alluded to. We may remind you and other readers that this consists in mixing a solution of bromide of potassium with one of sulphate of copper and applying the mixture to the negative. After washing, a solution of nitrate of silver is poured over the plate.

R. STEWART says that he has recently tried to make some pyroxyline according to the formula published by Hardwich some years ago, but the cotton seemed to dissolve in the acid long before the time given for immersion expired. He further says that he had no means of testing the strength of the acids, but the chemist from whom they were obtained said they were the strongest sold. It is quite clear that the acids were not up to the strength given by Hardwich.—Our correspondent had better repeat the experiment, omitting the water, and if not then successful, stronger sulphuric acid must be obtained.

A YORKSHIREMAN writes: "In the spring the sun was so troublesome in my studio that I was induced by a friend to stipple the glass over with white paint and gold size, and it answered its purpose very well, but now I find the light so slow that I have to give nearly as long an exposure as I used to do with collodion. On examining the print closely I find that it has turned quite yellow. Can you tell me of anything that will remove it? Turpentine, I find, has little or no effect."—A strong solution of caustic potash, caustic soda, or a solution of American potash brushed on the paint will enable it to be removed easily.

R. C. K. says: "A lady lately came and sat for some cabinet portraits as a customer, and as I thought she would make a good specimen for the window, I asked her to give me a sitting for the purpose and I would present her with a copy. She at once acquiesced, and I took a "grand panel" and sent her a proof, with which she was pleased and wrote thanking me for it. Now her husband objects to the picture being exhibited, and threatens me with proceedings if I continue to do so. What is the law on the subject?"—There is no special law on the subject; but if the lady agreed to sit for a specimen, and you fulfilled your part of the contract by giving her a copy, we do not see but that you have the right to show the picture in the window.

OLIVERA writes: "I enclose prints, and would be grateful for information as to the cause of the yellow spots on them. I had a batch of about 300 prints, or more, which were treated in the usual way. The next morning, when nearly dry, I was astonished to find every one more or less spotted as enclosed. I had all dishes and washing tanks thoroughly cleaned, and did the next batch myself, taking great care to prevent the same, but the next morning I was disheartened to find them almost equal to the previous batch. The spots cannot be detected after toning and fixing, but are in full force the next morning. I am puzzled to find the cause, as I cannot think it is due to imperfect fixing or washing."—The spots in question are very similar in appearance to a number of examples we have had sent us lately. With no further details than our correspondents send it is impossible to indicate positively the cause. To all appearance they are due to air bubbles adhering to the prints while they are in the fixing bath. Anyhow, similar spots may be produced in this way.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, December 10, *Hydroquinone Experiences;* December 17, *Photographic Plaything*s.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.—Tuesday next, December 9, at 5A, Pall Mall East, at eight p.m., a paper will be read on *Photography Applied to Astronomy*, by E. W. Maunder, F.R.A.S. A discussion will take place on the suggestions which have been made with regard to the proposed Photographic Institute.

"GREAT THOUGHTS."—The Christmas number of this periodical contains a large collection of articles on various seasonable topics, and is accompanied by a well executed coloured plate—*The Great Healer*, after a painting by Gabriel Max. A series of scientific articles by Grant Allen are among the attractions promised for the new volume commencing in January.

FALLOWFIELD'S "REMEMBRANCER."—Mr. Fallowfield's *Remembrancer and Traveller* has much that will not fail to prove of interest to the photographer. Although only a price list, yet does it contain much other matter calculated to instruct and interest. The "Orderly Photographic Cupboard," of which a cut is given, is a convenient receptacle in which to store developing and other bottles when done with. Flash lamps, lantern materials, and other seasonable goods, together with several photographic and many wood-cut illustrations, find place in the pages of the *Remembrancer*, which is now in its third year.

ANIMAL PHOTOGRAPHY IS LOOKING UP.—Mr. Gambier Bolton, F.Z.S., had the honour of attending at Windsor Castle on Saturday last and exhibiting before Her Majesty the Queen and Her Royal Highness Princess Beatrice his series of animal and bird studies from life, which were highly praised; and Her Majesty was graciously pleased to accept seven large studies in bromide of the lion cub lately presented to her by the Sultan of Sokoto (Africa). His Royal Highness the Duke of Clarence and Avondale has also accepted copies of the photographs of his Indian lion cub and pair of tiger cubs now in the Zoological Society's collection, and has written a very flattering letter of thanks.

SOCIETY OF CHEMICAL INDUSTRY.—The next meeting of the Liverpool Section of the Society will be held in the Theatre of the Chemical Laboratories, University College, on Wednesday next, at seven p.m. The following papers will be read by Fred. Hurter, Ph.D., and V. C. Driffield:—(1) *The Sector and Grease-spot Photometers and their Results;* (2) *The Relation between Photographic Negatives and Positives.* Both papers will be illustrated by diagrams and experiments. *A Reply to Dr. Hurter and Mr. Driffield's Paper on Photochemical Investigations, with Special Reference to the Sector and Grease-spot Photometers*, by Captain W. de W. Abney, C.B., R.E., D.C.L., F.R.S. *Apparatus for the Development of Photographic Plates without the use of a Dark Room*, by Mr. A. Watt.

A REMARKABLE PICTURE.—Under this heading the Philadelphia *Public Ledger* says:—"There has just been placed on exhibition in one of the windows of the store of Messrs. Porter & Coates a remarkable photograph of the *Battlefield of Gettysburg*, which was made by Mr. William H. Rau, of this city, and which is to be sent to France to the Comte de Paris. The picture is in the nature of a panorama from the summit of Little Round Top, and while not the 'largest direct photograph ever taken, is without doubt the largest of its kind ever made in this country, and perhaps anywhere. The remarkable feature of the photograph is the extent of the panorama, the print being made from a single negative, and the view embracing an angle of from 165 to 170 degrees. The photograph, which is eighteen inches wide by forty-eight inches long, was made by Mr. Rau with a camera constructed in this city upon the principle of Mysard's instrument, a French invention, which has been successfully employed (though on a smaller scale) in securing panoramas of the city of Paris. In Mr. Rau's camera a lens of long focus (fifteen inches) was employed, and the extreme angle of view is secured by using a flexible film bent into the shape of a half cylinder, and by revolving the lens upon a pivot so accurately adjusted that the sensitive surface of the film is in the focus of the lens, no matter what its position. The holders, or 'dark slides,' in which the sensitive films are placed, are necessarily flexible, a requisite which added greatly to the difficulty of making the camera. These alone represented an outlay of several hundred dollars. The sensitive films required had to be specially made for Mr. Rau, the largest sizes regularly supplied by the manufacturers being only about half as large. The films were furnished and especially coated by John Carbutt, the Wayne Junction dry plate manufacturer. In addition to these special films, Mr. Rau was obliged to purchase a complete outfit of developing dishes, &c., as well as paper for the production of the positives, and the cards upon which to mount the finished prints, the sizes required being far larger than any which are to be found in the regular photographic supply stocks. The panorama of the Centennial grounds, made by Mr. F. Gutekunst in 1876, while much larger, was made in seven different sections, and the labour of printing and joining these different sections required as much, if not greater, skill than the making of the negatives. Nearly all panoramas heretofore made by means of the camera have been produced in this way, and while the matching of the different sections is easily accomplished, so far as the distant portions of a landscape are concerned, it is practically impossible to match the foregrounds so that the junctures are invisible."

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THE BRITISH

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THE NEGATIVE AFTER FIXING.

There is a tendency amongst many fairly expert photographers to act as though the negative, once out of the fixing solution, no further care was needed, no after alteration of the negative possible. That such is not a proper way to look upon the matter it will be our purpose to show. Fortunately the majority of makers of dry plates have for some time past so altered the process of manufacture that frilling is of far less frequent occurrence than used to be the case, and some plates of high quality are sold upon which it is almost impossible to produce the evil; but, at the same time, it is by no means banished entirely from the possibilities of practice. It is just this particular possibility that should first be provided against after fixing. A plate that frills during development is a defective plate, and should be rejected. The effect is mainly to be seen, if at all, when the negative is placed in the water after removal from the hypo. If the film is not strong enough to stand the osmotic action it gives way; hypo goes out, but more water comes in, and the film lifts, either as frill or blister. We have on other occasions shown how to proceed when such conditions obtain, hence will pass on to further aspects of the subject, reminding our readers that many a good negative is spoiled by turning it over when fixed to thoughtless or unskilled assistants. In warm weather the mere holding a plate in the hand may give rise to a blister or frill at the spot the fingers touch, though all the rest may be perfect. It is worth noting again in this connexion, as a fact too little known, that a plate put to drain from the "hypo" without being set to wash will gradually lose density; and as, when a number of negatives are under treatment at once, it is so often the case that space will not allow of the carrying out of proper routine, it is no unusual thing for a few negatives to be set up on one side to drain while others are being passed through the "fixing." A few minutes, then, of such draining produces no ill effect; but if, through press of work or interruption, a negative be left for an hour or two, a reduction in density is very clearly visible, while if it be neglected till the next day the reduction may be so great as to completely spoil it.

We will suppose that there is risk neither of frill nor overlong draining; there is next to consider the very simple, but not more simple than annoying, problem of how and when to get rid of the waste emulsion that too often is found to smear the back of the negative. Frequently this is not attended to till the negative is dry and ready for printing, at which stage the gelatine has become so fast that rather than go to the trouble of removing it, prints are obtained from the plate as it is, if no important point is covered by the smear. Often no harm accrues, but we have seen negatives broken in the printing frame through uneven pressure caused by a clot of waste emulsion of unusual thickness. If, however, the perfect cleansing of the back is the uniform practice, and at this stage the danger of breaking the plate in the operation intervenes—and, indeed, our article was suggested by the trouble of a gentleman who had broken a very valuable negative (which he had no opportunity of re-taking) by such a misadventure, and he desired our opinion as the mode of repairing it—we hold the most decided opinion as to which is the right time to cleanse the negative. This ought always to be done before the negative is tried. Granted so much, it is but reasonable to suggest that the cleansing should be done before fixing, though this is by no means of paramount importance. Whatever method of cleansing is adopted, an after washing of the plate will be needed, and if there are many under treatment at once, economy of time is gained by reducing the amount of handling each negative must undergo.

As to the particular mode of removing the smears, every photographer will adopt his favourite method. In our own hands, nothing has answered better than Mr. Henderson's plan of rubbing with a pad of cotton wool moistened and dipped in common salt; sufficient friction is obtained, and the gritty particles, being soluble, do not permanently lodge in the film like the whiting, sand, or Brooke's soap, used by many. If alum baths be given the labour will be reduced by removing the gelatine before aluming, if possible. But the proper time for the alum is before, and not after, fixing. The hardening then takes place at a time most suitable for the prevention of blisters or frills, which is the true function of this chemical. It is commonly supposed to be used to get rid of the hypo, but in this regard one question is unanswerable—What becomes of the silver salt which must of necessity accompany the hypo in the fixing bath? Granted, for the sake of argument, the hypo is decomposed into inert salts, what becomes of the silver? There is only one way in which it can behave: it gets thrown down within the substance of the film, there gradually to decompose, or to irretrievably injure the negative if perchance it have to be subjected to after treatment, such as mercurial, intensification, &c. No, a plate should have a thorough washing, and no "chemicalising," as we have heard it termed, to eliminate the hypo.

In conclusion, a word on the amount of washing that is really necessary. Two hours' soaking in a good bulk of water with half a dozen changes will free most negatives from any chemically perceptible trace of this salt. We have conversed with clever amateurs who always give eighteen to twenty

hours' washing. This is needless, and worse than needless, for it is the most complete possible incentive to the loosening of the film.

COLLODIO-CHLORIDE FOR LANTERN SLIDES.

At the close of our article last week we alluded briefly to the necessity of thoroughly drying the plates before packing, but we may here commence our instructions in the use of the emulsion by a few remarks on the subject of coating and drying. With regard to the mere operation of spreading the emulsion over the surface of the glass we need say but little, since, though it may at first present some difficulties to those inexperienced in the use of collodion, a few trials will overcome the trouble. We should recommend the preparation of an ounce or two of plain collodion for the special purpose of practising the coating operation.

With the ordinary collodio-chloride emulsion as prepared for use on paper, one of the chief mechanical troubles when it is applied to glass is the difficulty of securing its adhesion during the work of washing, toning, and fixing. Owing to the thickness of the preparation, and the abnormal "horniness" or contractility of the film caused by the action of the citric acid, it is more than usually prone to leave the glass and sometimes even paper, either during the washing operations or the subsequent drying, unless some special precautions be taken to prevent it. With the modified emulsion we have described there is far less tendency in that direction, though perhaps some little trouble may be encountered at times, and it will, therefore, perhaps, be the preferable plan to provide against this danger in a systematic manner.

Of the methods available, none is equal to the albumen substratum in general efficiency, though it may be a little more troublesome in practice than some of the others. The substratum of indiarubber dissolved in benzole is perhaps more easy of application and dries more rapidly; but it is liable to partial solution by the emulsion, so causing some irregularity in printing. If used at all, it must be very thin, containing not more than two grains of soluble rubber to the ounce of solution. If applied as an edging only to the margins of the plate it may be thicker, but does not answer the purpose so well as when applied over the whole surface. Benzole of the highest degree of rectification should be used, or if that be not obtainable, methylated chloroform may be substituted; the rubber must be the raw "bottle" rubber cut into shreds and not vulcanised, as in that state it is insoluble. The plan of polishing with powdered talc, which answers perfectly for ordinary collodion plates, is practically useless in connexion with this emulsion.

The albumen substratum is prepared by taking the white of an egg, carefully separated from the yolk and germ, and stirring into it from five to ten minims of strong ammonia. When this is thoroughly mixed, five ounces of boiled and cooled rain water are poured in and stirred gently for two or three minutes with a silver fork or strip of glass until perfectly incorporated. If examined at this stage the solution will appear tolerably clear, but carrying a considerable quantity of flocculent matter and filaments in suspension; if passed through ordinary filtering paper it will become perfectly bright and clear, and is ready for use. If instead of *gentle* stirring the mixture of albumen and water be violently shaken or beaten into a froth, the filamental matter will be broken up into so fine a state of division that the liquid will remin opalescent after filtration. If beating is resorted to at all it should be done before the albumen is diluted, the whole being converted into a stiff froth, and then allowed to settle for some hours. The clear liquid is finally drawn off, and carefully mixed with five times its volume of water. The first-described method is, however, the best and simplest.

Before applying the substratum the glass must be thoroughly cleaned with hot soda and water, followed by copious washing, to remove every trace of alkali, and the glasses are then left lying in clean water until wanted. Before albumenising, have ready a quantity of the filtered solution in a measure glass or other lipped vessel, and also a clean bottle fitted with funnel and filter paper to receive the surplus solution after coating the glass. A draining rack, in which to stack the coated plates, will also be necessary. All being ready, take the glasses one by one, and draining off as much water as possible, pour on sufficient albumen to well cover the surface, and after allowing it to flow into each corner of the plate, pour off the surplus into the funnel waiting to receive it. Repeat the process with a fresh quantity of albumen solution, pouring the surplus again into the funnel, and place the plate in the draining rack. Proceed in the same manner until all the plates are coated, or until the stock of filtered solution is exhausted, when the contents of the receiving bottle may be used. In this manner the chances of dust are reduced to a minimum. As the plates when once coated will keep indefinitely if properly stored, it will be well to prepare a stock in one operation, finishing the drying by heat, and packing them in pairs face to face with the albumen surfaces in contact. If only a few be required they may be coated and dried rapidly by heat at a clear fire.

The next operation is that of coating with emulsion, and this, as has been already said, is better performed shortly before the plates are required for use than in batches to be stored. The reason for this is not so much that the emulsion when spread upon glass possesses any inferior keeping qualities, properly so considered, as that it is very difficult to secure absolute protection from damp or moisture; and as the films contain a certain amount of hygroscopic matter as well as free silver salts, which must necessarily crystallise in some form, there is a great risk of uneven markings as well as other injuries to the films should they be softened by damp. It may be remarked that when the plates are albumenised these risks are lessened, as the substratum of albumen forms a bed into which the soluble matters of the emulsion to some extent are absorbed.

The practice to be recommended is to coat and dry the plates singly, applying gentle warmth to ensure perfect desiccation, and then, having also warmed the negative, to bring the two surfaces into contact in the printing frame before they have time to cool. In this manner the additional advantage is gained that there is no risk of extraneous moisture being confined between the two surfaces, and the emulsion is in a sense hermetically sealed from outside influences.

In applying heat, however, to the emulsion films, it must be borne in mind that they differ very materially from gelatino-bromide or collodio-bromide films, inasmuch as these last are free from soluble silver salts, and will consequently bear almost any reasonable degree of heat with impunity. Not so the collodio-chloride film, which, like sensitised albumen paper, is highly charged with free silver in the form of nitrate as well as organic compounds, and these are very readily reduced by the application of a comparatively low heat; therefore, the greatest care must be taken in drying that the temperature employed is not higher than the films will bear, say, to be on the safe

side, not higher than 120° or 130° Fahr. To ensure this it is well to establish some simple form of drying box or cupboard, in which hot water forms the source of heat rather than to dry before a naked fire or in an oven. A plain wooden box with a closed vessel of hot water placed in it will serve all purposes, and ensure the complete drying of the films in a few minutes. It may be observed that the film almost invariably takes a yellowish tint on drying, especially when the emulsion has been kept some time, but this need not be set down as the effect of overheating, as it will entirely disappear in the course of the subsequent operations.

There is one other point to which attention may be called in order to emphasise the importance of perfect dryness both of negative and emulsion films. Our readers are all aware of the danger that attends the employment of imperfectly dried silver paper with gelatine negatives, and the difficulty experienced in eradicating the stains so produced upon the latter. It stands to reason that the collodion emulsion films containing free silver are precisely on all fours with the silver paper so far as the main danger is concerned, and it may even be said that it is intensified by the fact of the objectionable materials being confined between two impervious surfaces of glass, instead of, as in the case of paper, having an absorptive medium on one side. In bringing collodio-chloride films in contact with gelatine negatives the very greatest care should, therefore, be taken to ensure perfect dryness.

On the principle of prevention being better than cure, it is possible to avert this risk of staining by other means, namely, by avoiding actual contact between the two surfaces, either by interposing a sheet of some thin, diaphanous material, such as a sheet of transparent gelatine or celluloid, or perhaps better, a mask of thin paper. The former is the easier plan if a sufficiently thin film can be obtained possessing the necessary transparency and freedom from colour and grain; but we prefer to use one of the black paper masks employed for binding up with the finished slide. The paper of which these are made is so extremely thin that any loss of sharpness resulting from the practice is, as we have had occasion to point out on other occasions, to be imagined rather than to be appreciated, even when the enlarged picture is projected on the screen. Another advantage accruing from the intervention of the mask is that, although the film of collodio-chloride is far tougher than a similar one of collodio-bromide, it is far inferior in the matter of resisting wear and tear than one of gelatine, and consequently the prevention of actual contact removes a slight source of danger.

Coming to the exposure, this may be made in an ordinary printing frame, and will require to be about as long as in the case of ordinary silver paper, if anything perhaps a little less. But unlike a paper print the transparency cannot be so readily examined to watch the progress of the image, unless a special self-registering transparency frame is employed. This consists of an arrangement by which the negative and sensitive plate are fixed firmly in the frame and the moveable back respectively, and the separate parts of the printing frame are made to "register" by means of three or more pins fitting accurately into corresponding holes. Many more or less simple make-shifts will suggest themselves to the ingenious, or after a short experience the progress of the printing may be watched from the back of the glass. The printing should be carried very considerably past the stage at which it looks best as a positive by reflected light, and the density of the image by transmitted light may be judged with a fair degree of approximation by looking through the deepest shadows while the print is in contact with the negative.

After removal from the printing frame the transparency is soaked in water for a few minutes to remove the soluble salts, the water being changed two or three times, as in the case of albumenised paper, and unless the image seem weak from under exposure, a final soaking in weak salt and water will be an advantage in ensuring the total removal or conversion of all the free silver. A slight rinsing to remove the excess of salt puts the print ready for the toning bath.

This may consist of any of the toning solutions usually employed for paper, but it should be slightly less concentrated, and is preferably used cold, or at the normal atmospheric temperature. A very satisfactory bath, however, is composed of—

Chloride of gold	1 grain.
Chloride of sodium	1 „
Acetate of sodium	30 grains.
Water	33 ounces.

Dissolve in hot water and allow it to cool before use, but it behaves better if kept for some hours.

The image after washing will present a more purple colour than is the case with albumen paper; in fact, the tone at this stage is sometimes so beautiful that it seems a pity to try and alter it. Unfortunately, however, if fixed without toning, the colour is changed to an unpleasant foxy hue that necessitates some further treatment in order to render it at all pleasing. Toning with gold after hypo is very difficult—indeed, impossible—with any of the solutions that answer best before fixing, and is only effected—and then in a less satisfactory manner—by means of a much stronger bath of gold and sulphocyanide of ammonium. The preliminary wash of chloride of sodium, however, has the advantage, in addition to neutralising the last traces of free silver, of giving a redder tone to the image, and consequently renders the progress of the toning operation more easy to follow. If desired, a strong salt solution may be applied for the special purpose of reddening the image. The presence of salt in the toning bath itself has a tendency in the same direction, and the colour produced by the combined action of gold and salt suffers less subsequent change in the fixing bath than when the salt is absent.

In any case the action of the toning bath must be carried further than the colour that is required, but it is scarcely possible to lay down any definite rule in this respect, as so much depends upon the precise treatment, and whether salt is employed or not. But it is an easy matter to note the effect produced under particular conditions, and to act accordingly in future.

The fixing is performed in a weak solution of hypo, not more than two or three ounces to the pint of water. If a greater strength is employed there is every probability that the tone will be spoilt. Allow the fixing solution to act for some time after the lights become transparent, and then wash thoroughly for a minute or two under the tap, and finish with a soak for a few minutes in warm water.

If preferred, the image after thorough washing and immersion in salt and water may be fixed without gold toning, and after a very thorough washing to remove the hypo, toned by other means, such as sulphide of ammonium or potassium, which give very pleasing tones. But, on the whole, the gold method is preferable.

In finishing, let the plates dry spontaneously, as if heat be applied there is a strong tendency on the part of the collodion film to leave the glass.

The slides produced by this process will compare favourably in quality with any, and if the method from our detailed description seem a troublesome one, we can only recommend a trial. We have purposely dwelt in detail on the various parts of the process because it is one that has been neglected, possibly from a want of acquaintance with the conditions requisite to success, and we have endeavoured to state those conditions.

A few weeks back, when commenting on the fact that photography was not utilised in the production of Christmas and New Year's cards to the extent it might be, we mentioned that when it was used summer pictures were those generally depicted, and not what would be more seasonable—winter scenes. This, as we said, might possibly be accounted for from the circumstance that the occasions for obtaining them were not very frequent. Since then, however, photographers in all parts of the kingdom have had plenty of opportunities of taking them, and several we know have fully availed themselves of these. Although there was not time to get the pictures into the wholesale trade for this season, some have done so in local retail trade—that is, amongst local stationers—and with the result, we are told, that they are in good demand.

The light has been unusually bad of late for printing, but this has not militated against the production of the above class of pictures, as they are are usually printed—or should be, whether they be on opal glass or on paper—by the bromide process and artificial light. Cold or black tones are far more suitable for snow effects than are the warm ones of albumen paper, quite apart from the advantages of rapidity of production. We have before us some charming snow pictures on very rough paper which seems to yield even a more artistic result than the smooth.

The recent severe weather, which has enabled a large number of valuable negatives to be secured, has nevertheless proved a serious inconvenience to many photographers—frozen water supply and burst pipes to wit. These may, however, generally be avoided by a little timely precaution. If pipes in exposed situations be covered with a little straw and two or three thicknesses of old felt carpet they will seldom freeze. Sometimes the service pipe from the main is laid very near the surface of the ground; when this is the case a few inches of stable manure laid over will afford a perfect protection. If the taps be left so that the water just dribbles, to keep the water in motion through the pipes, there is little fear of its freezing. Pipes rarely freeze during daytime when the water is in constant use. At night it may be avoided by emptying the pipes. This may be done by plugging the pipe in the cistern with a piece of tube reaching above the level of the water, and then opening all the taps. If the plug were a solid one the pipes would remain full, inasmuch as there would be no air vent to allow of the water escaping.

The once popular fallacy that pipes burst with the thaw still prevails with some people, and in quarters, too, where it would be least expected. Our readers, however, know that the burst takes place in the freezing; therefore, when a pipe gets frozen, it should be carefully examined throughout its length. Any fracture will then be detected, and a plumber can be sent for to do the necessary repair. While the frost lasts there is little difficulty in obtaining the services of the plumber, but when the thaw sets in the case is generally very different, as many know to their cost.

Now that the majority of amateurs will be putting—if they have not already put—away their apparatus for the winter season, a few words on its storage may not be out of place. A little thought or care when putting the things away would often save a deal of trouble and annoyance when they have again to be taken into use. If even the best of apparatus be stored in a damp place it will suffer, though not, of course, to the same extent as that of inferior quality; therefore care should be taken that the apparatus, however good, should be put where damp cannot reach it. Not only should it be stored in a dry place, but the precaution should be taken that it is perfectly free from moisture at the time it is put away, otherwise the bellows may suffer. Leather, for example, is very prone to mildew, and if the bellows be at all damp when closed up, it will often be found covered with mould when unpacked, although it may have been kept in a tolerably dry place. Some of the cheaper kinds of cameras, which are made of unseasoned wood, may suffer almost, or quite, as much by being stored in an abnormally dry place as in a damp one. Instead of expanding and warping, the wood will contract and split, and often separate at the joints.

It is a wise precaution to pack the cases containing the camera and slides in a sheet of brown paper, so as to keep dust out. Dust seems to penetrate everywhere, and when once it finds its way into the camera and slides, it is very troublesome to thoroughly eradicate. Many amateurs often find themselves much troubled with pinholes in their negatives from this cause at the commencement of the season Instantaneous shutters which have been lubricated with oil ought to be thoroughly cleansed with benzole, for during the period of repose the oil may oxidise, and then it becomes difficult to remove from the more delicate parts of the mechanism. If, after cleaning, fresh oil is applied, it should be pure almond oil or, better still, watchmakers' oil. What is sold as olive oil should be avoided, as it is usually largely adulterated with cotton seed oil or nut oil, which are drying oils, and quickly become oxidised.

The two English amateurs who were arrested at Nancy a short time since, did not, it appears, get off with so little inconvenience as was first reported. A later account says that they were arrested on the charge of taking photographs in the vicinity of a fort, and were therefore suspected of being spies. However, on proof by their credentials that they were not, they were let off with a merely nominal fine. We have on many occasions cautioned photographic tourists on the Continent of the inconvenience they subject themselves to if they incautiously take photographs in the proximity of a fort, even if the fort cannot be seen from the point of view. It should be borne in mind that the term "near," or "in the vicinity of," often has a very elastic meaning with an over-officious underling on the Continent.

In reply to questions recently put in the House of Commons, Sir M. H. Beach said it was his determination to give effect to the recommendation of the Select Committee on Merchandise Marks as to the prosecution of offenders against the Act, but the precise method of doing so was still under consideration. The law is openly infringed with regard to several articles connected with photography. Foreign-made lenses, for example, have the names of English dealers put upon them without any indication whatever that they were made abroad. The same with chemicals; they are labelled with the name of the seller without any indication that they are of foreign origin. In many branches of trade the Act is strictly complied with. For example, in the watch, cutlery, and printing trades the Act is fully conformed to, and the goods marked according to their place of origin. Foreign lenses and chemicals may be quite as good as English, but the law says that they are not to be sold as of home manufacture. Now, it appears, the Board of Trade intend to take vigorous action against offenders, so as to put a stop to the practice.

Anent our recent remarks on the fugitiveness of some of the pigments used in printing inks at the present time, and in some of the presentation pictures of the illustrated papers in particular, a colour printer, who is also an amateur photographer, writes that it is not the printer but the publisher who is to blame in the matter. He says that publishers demand and will have these brilliant and glowing colours, because they take best with the public. The ink makers, on the other hand, cannot get the necessary brilliancy without resorting to fugitive pigments of the coal-tar series—hence the deterioration of so much of the present chromo work. If the old-fashioned colours,

with a trifle less brilliancy, were permissible there would be no complaint of instability in modern colour prints. After all, it appears to be simply a question of demand and supply. It is to be hoped, however, that photo-mechanical printers will avoid the use of unstable pigments as much as possible.

THE LATE COSMO INNES BURTON.

We deeply regret that we have to announce the death of a promising young scientist who is well known to our readers as a contributor to these pages.

Only a few months ago Mr. Cosmo Innes Burton, B.Sc., F.R.S.E., F.R.C.S., called upon us to say good-bye previous to his departure for an appointment as professor in the Polytechnic Institution, Shanghai, China, and it was arranged that after settling down to the duties of his new situation he was to contribute occasional letters in the capacity of our special correspondent in that place.

His death is recorded as having taken place at Shanghai on October 31, at the early age of twenty-eight.

Mr Cosmo I. Burton was the younger son of the late Mr. John Hill Burton, of Edinburgh, and the brother of Professor W. K. Burton, of Tokio, Japan. He was an able, talented, and promising young man, and we much lament his decease.

ANALYSIS OF COMMERCIAL GELATINE PLATES.

The subject of the nature and proportions of the emulsified silver haloids of commerce not long since mooted in the editorial columns is perhaps one that does not possess a large amount of attraction for the majority of photographers, although there are not many among them who would not ultimately reap some benefit of a direct kind if the constant experiments of which modern gelatine plates are the basis were carried on by the light of a clearer knowledge of their precise composition. We do not want to go beyond Waterhouse's very able articles on reversal by thio-carbamides to realise the advantage such a knowledge would have placed in the author's hands. The trade designations of commercial plates are never of much use to the conscientious experimentalist, except, maybe, in affording him an idea of their approximate sensitiveness. It is quite likely that the action of the thio-carbamides, or, to select another instance, of solutions of the dyes of the rosin group, upon silver bromide films containing, say, five per cent. of iodide, differs materially from that induced on the pure bromide alone, so that many obscurities must be created by this paucity of information, and the need of further enlightenment be appreciable.

In taking it for granted that it would be very convenient if the experimenters could easily acquire an intimate acquaintance with the composition of the films they were using, two questions seem to me to rise immediately, namely, what would be the simplest mode of analysis giving qualitative and quantitative results? and, what determinations would be necessary for orthochromatic reversing, developing, and allied experiments? I will endeavour to outline a method of analysis which may be found of service in both respects, preliminary to which I will reply to my second question point by point.

Commercial gelatine plates have been brought to so high a degree of excellence that not only is there no inducement for an ordinary amateur to prepare his own emulsion, but even scientific men, some of whose names are not quite unrelated to the practical advancement of gelatine emulsion in its earlier days, invariably prefer, when they have important photographic investigations or experiments on hand, to purchase their plates of some reputable maker. It would have been thought that the safer course for a scrupulous student to take would be to make his own emulsion, so that he could know just exactly of what his sensitised films consisted, and could add to the statistics of his results accordingly, but we never find this done. The fact of it is that plate making, before a constancy of success is obtained, requires an intolerable deal of what Cicero told an interlocutor gave him his powers of oratory, and modern men of science have something else to do besides practising emulsion making.

The gelatine plates nowadays made for exposure in the camera presumably do not contain silver nitrate in excess, while we can further be confident that the alkaline nitrates formed by double decomposition have also been absolutely removed; therefore, we may consider testing for the presence of these salts a superfluous operation. The amount of gelatine on the plates is rarely of the first importance in most photographic experiments, consequently its determination would serve no practical purpose. We are left then with the task of arriving at the quantity of silver bromide either alone or in the presence of iodide contained in the films. Chloride is never present in negative emulsions.

Now, everybody knows that the presence of silver iodide in a film can at once be detected by the yellow tint which the plates present when viewed in daylight. If plates of different brands and of various rapidities are compared in this manner we can mark the distinction between the films of pure bromide and those containing iodide. We shall also notice that some of the iodide plates contain considerably more of that haloid of silver than others, and that the preponderance is not always on the side of the slow plate. It is not often that photographic experimenters want to know how much silver bromide a commercial film contains, so that on the present occasion we will confine ourselves to a consideration of the method suggested for ascertaining the proportion of iodide to bromide present in a given batch of emulsion.

The first thing to do will be to get a quantity of the batch tested in a liquid state, and in order to secure it, it will of course be necessary to strip a few films, since we cannot expect the plate makers "to oblige" in the matter. The stripping can be done by soaking the plates in water for an hour and lifting the edges of the films, when they will "peel" from the supports. I believe that the average quantity of gelatine emulsion required for coating a whole-plate is a fluid drachm, so that if four whole-plates or their equivalent are stripped, we shall get about half an ounce of emulsion, which will be plenty for our purpose. When the films have been collected, they should be placed in a bottle and dissolved in a small quantity of water by the aid of heat, a couple of ounces of strong nitric acid added, and the mixture allowed to digest over heat for a few hours. At the end of that time the haloids will be precipitated at the bottom of the vessel.

The supernatant liquid should now be decanted and the precipitate repeatedly washed in warm distilled water and all excess of moisture carefully drained off. If an ounce or two of ammonia, fully up to the theoretical strength and without admixture of water, be now introduced to the bottle and the precipitate well stirred in it, the silver bromide will pass into solution, while the iodide will be thrown down, inasmuch as strong ammonia, while easily dissolving the bromide, will not attack the iodide. I repeat *strong* ammonia; diluted below fort ·880 it is correspondingly feeble in its action, and therefore imperfect in its solvent powers. Preserve the decanted liquid for subsequent treatment, and having washed the iodide, pass it into an evaporating basin, dry over a good heat, and very carefully weigh it.

Into the liquid holding the dissolved bromide a solution of bromide of potassium should next be poured, when the silver in the form of bromide will be reprecipitated, the finer particles taking some time to subside. The strength of the bromide solution is immaterial so long as a sufficient quantity of it is used to produce complete precipitation. To test for this latter, a portion of the clear liquid should be treated with bromide solution; if the liquid remains perfectly clear it holds no more silver in suspension. The reprecipitated bromide should finally be washed, dried, and accurately weighed in the same manner as the iodide. A little arithmetical calculation will now give the percentage proportions of iodide to bromide in the emulsion.

The foregoing is possibly not the most elaborate and correct method that could be devised for the purpose, but I think it would be found reliable enough for all practical purposes. In my hands it has borne out the theoretical composition of a given batch of emulsion with sufficient closeness to entitle it to be ranked as a fairly correct method; but I submit it in a suggestive shape so as to discount any inference that I look upon it as incapable of improvement.

Alcohol in an emulsion can be detected by treating a small quantity of it with sulphuric acid, when the characteristic odour of ether will be given off. The amount present is never large, so that distillation in order to get at the precise quantity is really unnecessary. It is improbable that antiseptics are added to modern emulsions, hence it is needless to test for them. The slight excess of soluble bromide present is of no importance in any treatment which the unexposed films may receive.

THOMAS BEDDING.

PHOTOGRAPHERS' EYESIGHT.

Does practical photographic work unduly try the eyes; and, if so, what precautions can be taken to preserve the eyesight from unnecessary strain?—First of all, the sudden transition from a dark room into full daylight should be avoided, for if the eyes are predisposed to weakness, this will help to develop it, and it is therefore wise to so arrange the position of the dark room that the operator has to come

into a moderately lighted room or partition before the full light of day has to be faced. If from the structural form of the building this is not possible, the photographer should not neglect to put on a pair of medium-tinted (neutral) *pince nez*, or spectacles, the former being best, as they can be dropped after being worn a few minutes, the silk cord round the neck preventing harm coming to them. If the operator is short or long-sighted, the necessary or most comfortable power can be worked on the tinted glass. The great thing to avoid is any *severe* muscular or optical change. Nature has endowed the healthy eye with a natural automatic diaphragm to contract or enlarge according to the amount of light, but it will in time revolt against a continuation of sudden strains caused by the constant alternative use of the eyes in strong light (such as one oftentimes gets in the studio) and then in the dark room. The absence of this adjustment is iritis.

Fumes and Ventilation.—There is no doubt that the eyes of some people are very much affected by fumes, and it is therefore of great moment that the dark room should be properly ventilated, and as so many places, such as bath rooms, are utilised by amateurs as dark rooms which only have a window for a ventilator, it follows that if this is blocked up to exclude the light, the vapour of ammonia and kindred volatile chemicals, as well as fumes from paraffin lamps when used, cause the eyes to water and smart.

Weak Sight.—If the eyes have any difficulty in seeing small print, or when retouching, painting, &c., a suitable convex or other glass should be resorted to, and each eye should be tested separately on test types, or, if possible, with a good optometer, so that the focus of the eye may be determined and the amount of accommodation or natural adjustment shown. The right time to take to glasses may be known when, after reading or working for one or two hours in a reasonably bright artificial light, the smaller types used in reference books, such as brilliant or pearl, cannot be easily read, or the figures in a "Bradshaw" or other timetable having small print and figures are difficult to make out.

Over-sightedness (*Hypermatropia*) is often confused with ordinary old or weak sight, but it is quite distinct, for convex glasses improve distant vision as well as near by shortening the focus of the eye to that of normal vision, so that there is not so much muscular effort necessary to accommodate the sight to different distances, and in the majority of cases the same power answers for all purposes, whereas with presbyopic or old sight the distant objects cannot be seen with the reading glasses.

Optometric Tests.—By the optometers constructed on the plan of Dr. Smee, and since improved by various oculists and opticians, normal sight can be verified by the definite numbers down the scale that the letters can be read, and the near and far point of vision shows the focus and amount of accommodation. Generally, it is three and a half to nine when using the standard magnifying lens at the ends of scale to bring the readings down to a reasonable limit. If the eye is short-sighted, the range is then two to four, two and a half to six, or three to seven, according to the degree of myopia. If hypermatropic, the eye will see from four to fifteen, and even further; and in some cases the near point will be almost normal, while the distant point is near the bottom of the scales (100). This shows an excess of accommodation which, if allowed to be exercised, causes considerable fatigue, whereas, with the use of properly selected cover glasses the focus and range of vision is reduced to the normal, and hence the exertion on the muscular power of the eye-glasses.

Weak Sight.—The optometric range for old sight varies from four and a half to ten or eight to thirty, and with very old people, forty or sixty to eighty or a hundred. With short sight, where the near point of vision (by the unaided eye) is beyond seven inches focus, no serious trouble or difficulty is experienced in reading or working; but if the book or object has to be brought nearer than this, then concave glasses (even if of low power) should be used. It goes without saying that persons who are decidedly short-sighted, when once they realise what they lose by not seeing properly, and are well fitted, will use glasses from choice; but I have met people that have lived to past the age of middle life and have *never* seen clearly beyond a yard or two from their face, and notwithstanding it was demonstrated what they lost, it required considerable persuasion to get them to take to the use of glasses regularly.

Astigmatism.—A great number of people suffer from this defect of vision caused by the lens of the eye being elongated in one direction, or not giving equal refraction in all meridians. It is detected by not being able to see radiating lines equally distinct, and is most troublesome when combined with weak or short sight. If no ordinary concave or convex lens gives the required assistance and corrects the defect, cylindrical glasses should be tried, and revolved in front of the eye (or the ordinary glasses worn) until one of the necessary degrees is found to make all the radiating lines equally distinct.

Binocular Vision.—If the eyes are of different focus, or have different refractive power, the effort to see an object with both eyes will be considerable, especially when within a distance of fourteen inches; and the consequence is that either one eye by habit ceases to work with any vitality, or else considerable effort is made to see, more especially when tired. If on looking through a stereoscope or binocular glass the objects are blurred or double, extra care should be taken to test the sight, especially if it is previously proved that the instrument is in correct optical centre. Sometimes it is impossible to get binocular or stereoscopic vision with instruments on account of the width between the eyes not agreeing with or being suitable to the width between the optical instrument, hence this matter should not be lost sight of. For instance, I have had on several occasions to fit binoculars to persons only two and a quarter inches between the pupils, and at other times as wide as two and three-quarters; and it will be readily understood that the ordinary width binocular field and opera glasses, and some stereoscopes (without lateral width adjustment), will not satisfactorily answer in either case, and so special instruments have to be made. Besides this, if the two eyes are different in focus, or require correction for astigmatism, stereoscopic effect will not be possible without considerable effort. Therefore I say to all photographers have your sight tested if in any difficulty or doubt, and get the proper lenses fitted for the particular work you require to do just in the same way as you select a wide-angle or long-focus landscape lens, according to the amount of subject or distance of the view you wish to include when photographing.

Magnifying Lenses.—So long as they are used with judgment, there is no doubt they strengthen the visual power of the sight, for watchmakers are rarely troubled with any defect except a little short-sightedness; but when using magnifying lenses for retouching or miniatures, care must be taken that they are large enough for both eyes to see comfortably through the lens, and that the focus is not too short for the diameter to produce distortion. Enough, I trust, has here been touched upon to show that eyesight is distinctly a photographic subject.

G. R. Baker.

NOTES FROM SCOTLAND.

Edinburgh Photographic Exhibition Lectures.

The second of this course, inaugurated by the Council of the Edinburgh Photographic Society, held in the Exhibition Galleries, was taken by Professor James Hunter, F.R.C.S.E., F.R.S.E., &c., the subject being *Photographic Optics*. The audience was a very large one. He referred to the close relationship between mathematics and optics, certain results being impossible without perfect calculations and measurements. This, although known, had only been carried into practice within a very short period, perhaps twelve or fourteen years ago at the utmost. He then proceeded, and by the aid of a series of perfectly drawn large diagrams he explained, among other things, rules which he called infallible for finding the various foci of lenses of every form, simple and compound, and gave an exhaustive description of the principles of every form of photographic lens used in practice, taking as the type a globular ball, showing that between spherical aberration and the sharpness or flatness of an image the best that could be done was done in the way of compromise or equalisation of errors.

At present he believed we had as perfect photographic lenses as we could ever hope to have; in fact, they were better than the most of the other apparatus in use. In speaking of lens making or using to produce what was called artistic effect, while not decrying this, he pointed out that a photograph was *per se* distinct from a picture, and the power of rendering extreme minuteness was a high, if not the highest, merit, and thus of the utmost value; and finished a profoundly educative lecture by stating that while it was almost as impossible to make a perfect lens with glass alone as it was to attempt to square the circle, discover the secret of perpetual motion, or any other impossible thing, yet in mathematical theory it was possible to make a perfect lens, and he showed a diagram of such an instrument constructed with glass and water, or some other fluid, which he might possibly work out some day.

He then proceeded to illustrate by means of the optical lantern and limelight to show the various kinds of distortion and aberration, and the value of the diaphragm or stop, and its proper place as varying with every kind of lens, and its power of curing or preventing these

errors of projection, taking a globular water bottle as the typical form and going on to the more perfect forms of lens.

One of the Vice-Presidents, Mr. Bashford, proposed a vote of thanks to the lecturer, which was awarded by acclamation, thus bringing this most instructive demonstration to a close.

Vice-President Dr. Drinkwater took up the third of the series, *Chemistry in a Dark Room*, during which, by means of the limelight illustrations, he exhibited the action of splitting up the rays of the spectrum—the effects of the more actinic upon a sensitive surface, its development and fixation. In a very beautiful experiment he exhibited and explained the action of electrical force, and hazarded the opinion, from the similarity of effects produced, that the development of the latent image might prove to be one of the forms of action of that force. Mr. Hume conducted these most delicate demonstrations without a hitch, and received the thanks of the meeting, as did Dr. Drinkwater.

These lectures are proving a great success, and are adding materially to the deserved success of the show.

The judges or jurors have met and agreed on the awards, but while I write they have not been published, but are likely to be before your next issue.

In two of your contemporaries there are several errors in their articles on the exhibition. One, for instance, ascribes one of the early calotypes, showing the construction of the world-famous Scott Monument, with its scaffolding, &c., 1844-5, to Sir John Herschel, instead of to the true artist, D. O. Hill, Royal Scottish Academician, and for upwards of twenty years Secretary to that body. He has left examples of photographic work of as early as 1839-40, many of which are in exhibition.

Another instance is a rather slighting one in another contemporary to the inventor of the first, if it is not even now the best, portable camera. That gentleman, who is an architect of the highest reputation and one of our oldest amateur photographers, is addressed as Colonel Kinnear, and is one of the five jurors whose awards are anxiously waited for.

A very ingenious and perfectly new method of curing the evils of halation was communicated at its last meeting to the Society by its Treasurer, Mr. J. MacLachlan, which he calls a compensation printing method. A print is first taken, and printed not too deeply; this is then placed as a mask in front of the negative, thus compelling, as it were, the negative to print equally through the halated portions. The examples leave nothing to be desired.

A great museum bazaar is being held in the great area of the Waverley Market for a benevolent object in connexion with the brethren which has a slight photographic interest. Mr. Ayton, one of the more prominent of the exhibitors in the Edinburgh Photographic Society's Exhibition, has arranged with the North British Railway, which is immediately adjoining, to have the use of their installation of the electric light, and has fitted up a couple of arc lights of 1000 candle power in a temporary studio. The light is screened off and modified for the sitters by a curtain of *papier manieré*, or Whatman's paper I presume. He has been extremely successful both with the results and the members, who for the novelty of the thing have been doing good unawares.

W. H. Davies.

THE JURY OF THE NEXT INTERNATIONAL EXHIBITION AT VIENNA.

Sooner than was expected the jury of this exhibition has been formed. Hitherto no exhibition has been able to show a jury like this. Artists of the first rank, free from every prejudice, have declared themselves ready to serve it, and exercise the office which is by no means free from trouble. By these means the exhibition acquires an importance unsuspected before. Europe, it is to be hoped, will induce her best men to help to carry out the ideal thought on which the exhibition is founded. This is all the more to be hoped because probably she is destined to take the highest place there. Now we add a few words as to each member of the jury.

Hans von Angeli, Professor at the Imperial and Royal Academy of Fine Arts, Vienna, a celebrated painter, whose name is as well known in England as on the Continent.

Edm. Hellmer, a sculptor renowned for works for the House of Parliament at Vienna, for his Beethoven and other works.

Julius Hoyer, Professor at the Imperial and Royal Academy of Arts in Vienna, a great painter, who is now engaged in executing a commission to decorate the walls and ceiling of the Historical Art Museum with frescoes.

K. Kasparek, Professor at the School of Art Industry, Vienna. Recently the city of Vienna entrusted him with the difficult task of painting for the new Town Hall a picture representing the Corpus Christi procession, and containing portraits of the Emperor and a great number of those about him.

Augustus Schaeffer, Director of the Imperial Picture Gallery, Vienna, who, in his own department, landscape painting, enjoys a reputation not inferior to that of the others.

Fritz Luckardt, Professor, to whom was given the task of selecting the members of the jury, and whose efforts have succeeded in inducing the celebrated artists here named to agree to serve. He has declared his readiness to take part in the labours of the jury as a photographic expert, and to draw up the report.

EDINBURGH PHOTOGRAPHIC EXHIBITION.—III.

(*From a Correspondent.*)

Examining the strictly scientific specimens in Class XI. in the first instance, we have some fine examples of astronomical work in Mr. M'Kean's frame of three views of the eclipse of June, 1890, in which, from the cloudy nature of the sky, the effects are pictorially well rendered. A fine enlargement of the half moon, by Messrs. Tunny & Co., is very sharp and full of detail, and will fully repay examination; as will also that by Mr. W. Hume (No. 72); while Mr. Peck's (the City Astronomer) varied examples range from a series of nine views of the various phases of the total eclipse of January, 1888, to one which claims to be the largest direct photograph of the moon ever taken by telescope. It measures above 9·5 inches diameter. The palm must be given in this section to C. Piazzi Smyth, LL.D., for his extremely large and well-defined views of the two extremes, the invisible ends of the spectrum. They are hung rather high, but ought to be transposed in order to be in their relative positions; at present they are reversed. Two frames from the Scottish Meteorological Society (Nos. 817, 822) are filled with well-executed and impressive views of cloud scenery, as seen from the top of Ben Nevis, and of the Observatory itself in its usual shape and covered with various depths of snow. They will repay close examination, conveying, as they do, the difficulties under which our weather forecasts are observed and formulated.

Among those of purely geological interest, No. 69 (*Geological Formations in Roxburghshire*) and No. 134 (*Cape Wrath*), as well as those of the same class of highland scenery in Ross-shire and Sutherlandshire by R. Lunn, well repay examination; and a series of small experimental model views of the manner in which, by thrusts on softened material, mountains may be formed, is exhibited by Mr. Cadell, and should be studied by geologists.

There are many photo-micrographic examples, and from their size and clearness as wall exhibits, those of Mr. J. Leadbeater (Nos. 875-80) will command attention more than the general exhibits of that class, which require a special training to compare and criticise, and many of which show exceedingly good examples of the definition necessary to this class of work, among which may be particularised those by Andrew Pringle in gelatino-bromide (No. 71), specimens of pathology and entomology by F. W. Mills (Nos. 980-1), which show exceedingly fine definition from the mere photographic point of view, as also does No. 970, by G. Kidston; but in pictures of this class, made for the scientist as these are, in a public exhibition such as this is, would it not be doing a service to give in each case the number of times of enlargement, either in diameters or areas, or both, that each example had been extended or magnified? especially is this needful at the present time from the educational point of view, a point the promoters wish to keep strictly to, when the outside public want to know all about bacilli and such like "varmints," which we never can see or form ideas of, save through the works of such micrographists as exhibit here, and show at a glance the weary work of months and years. Through this or some such recognition can they ever hope to reap their merited reward.

A number of examples of the new diazotype process are scattered through the galleries, and seem to show its capabilities for some kinds of decorative work if they should prove to be more permanent than most of the dye products of that class.

In vitreous enamels, Class XVIII., the exhibition is a limited show. Nos. 55 and 56, by Tunny & Co. are very fine, as also is the only other frame of four examples (No. 64) by H. P. Robinson, which looks like an old acquaintance. In one of the cases in the Historical Section will be seen a group done by Mr. A. L. Henderson in 1870, in which are two well-known secretaries of the Society, both of whom had a good deal to do with getting up the last exhibition. It can only be the costliness which prevents the much greater extension of this, one of the most beautiful, as it is the most durable, examples of photographic work.

In what has got the name of process work there are some fine examples, and several by local artists in photogravure will court close study—notably No. 874, which shows the skill of Mr. Balmain in photographs from nature, and in which there is delicate work and fine feeling; in No. 473, this being a copy from a picture, the rendering is stronger in effect, but very true to the subject matter of the artist. Messrs. W. J. Annan & Son have several fine portraits after Sir Henry Raeburn, executed in their special method, which follows closely upon the work of their predecessors, the engravers, Walker, &c., and which is not only right, but laudable in a case of this kind. It is a pity some one could not have essayed a trial for this exhibition, by some of the modes of photo-engraving, of the portrait of the national poet, Robert Burns, in the

National Gallery (next door). There are plenty of copies of it, several engravings, and but one photograph—that by the late Mr. Dallas, which is facsimile in size, but not so true in colour as it could now be made.

The Autotype Company, among their exhibits, show a number of fine examples of different styles in this section, all of unimpeachable quality. Several reproductions and photo-etchings by Mr. L. Colls, from Miss Julia Cameron's work, give a vigorous rendering of her peculiar style of work, which has now become historical. Dr. P. H. Emerson's *East Anglian Life*, *Norfolk Broads and Rivers*, and *Field and Fen*, are also in strong evidence of the same class of loose rendering, of the *pros* and *cons* of which we have had so much discussion recently, and which is not yet at an end; but a simple question may be asked about those pictures, and that life in the fen country: Why is there such a superabundance of haze and mist or fog in the reproduction of it? Is it in the country itself, in its air or atmosphere, or is it only in the head, the hand, and the works of its never-tiring reproducer?

A beautifully finished series of photo-lithographs in black and white as well as parti-colour are sent by Messrs. Waterston & Co., of which latter—the facsimile examples of bookbindings—No. 286 is exceedingly fine. In photo-zincography Messrs. H. J. Mitchell & Co. show a frame of very good examples, among which, being more of a photographic nature than several of them, are four reproductions of cattle by Reid, of Wishaw, which are very tenderly brought out. While on this part of the subject, in turning over one of the Society's albums I notice that two at least of the photo-lithographs done by the late Mr. Ramage, of Messrs. W. Nelson & Sons, and which were very perfect examples of that kind of work done over thirty years ago, are irreparably damaged, they having been printed on enamelled or faced paper, which has given way to the friction caused by moving about and turning them over, and so has utterly destroyed the beauty of the impressions, leaving only a ghost of their former selves.

I noticed in our issue of Nov. 28 the display of the *Graphic* Company, Class XIX., which is interesting and instructive, showing as it does the various stages by which they secure the extreme rapidity of result necessary for the production of a daily illustrated paper, and the stages that lead up to it. To examine their collective exhibit, begin at No. 236, *A Matinée*, which is a small oil picture in monochrome of a girl dancing to her dolls, and is the only painted picture (save in the Historical Section) in the exhibition. Its examination should be followed by No. 1016, which is a photograph on a wood block (L. G. Manton) of that picture, and ready for the wood engraver. The remainder of the display will be found on the table under the archway in the South Octagon, and comprises negatives of drawings from the recent accident on the Great Western Railway at Taunton, accompanied by the bitten drawings on the zinc or type metal mounted type high, then the *papier maché* mould of the page of the paper, the section of cylinder in stereotype metal fitted for printing, and a page of the printed paper of November 13—a day before the opening on the 14th.

In this Class XIX., or that of photo-mechanical work, why there should be such a desire to become possessor of a new name when the process is practically the same has always been a puzzle.

There is no practical difference between either the processes or the results of the auto, the helio, or the photogravure; and this same process has three or four other names. Is it not possible to agree on one only as in the greater art, as mezzo or aquatint, or line or stipple, expressing the kind and quality of engravings?

The exquisite results achieved by the Autotype Company in such portraits as those after Pettie and Onless (Nos. 883–888) need bear little competition from any kind of hand engraving. The same may be said of the reproduction of Constable's *Cornfield*, which, however, could be improved by judicious handwork or printing, inasmuch as it does give anything like the true colour scale of the original, but in all other respects it renders into monochrome a most difficult subject. In Coll's frame of nine prints (No. 883) a process work, called intaglio reproduction, is another example. What does the name imply? for the results show three or four different shades and kinds of prints; but they are all worth notice. Collotypes are not in great numbers, nor is the Woodbury, the most original process of reproduction since photography began.

If the meaning attached to Class XVII. is clear to the Society—"Reproduction of pictures by any process not mechanical"—it is insufficiently clear to most readers, but seeing that nothing is said of photographic copies from pictures in oil or water colours, this is probably what has been intended, and of this class there are but few in the exhibition, Mr. F. Hollyer being the principal. Those examples from Burne-Jones and Rossetti being essentially difficult are good specimens most admirably managed.

What class in the classes our fellow-creatures of the bi or quadru-pedal formation may come under is not clear, but on entering the galleries the enlarged pictures of animals, wild and tame, by Mr. Gambier Bolton, assert their presence alike by their prominent position and the excellence of their representation. Where all are good it is difficult to particularise, but from the difficulty of catching them alive, the zebras, the polar bear, and the bison may be selected. The British wild bull seems, from its markings, to be of the Chillingham variety, judging by the spots on the near fore leg, such spots are rarely, if ever, seen on those in Cadzow Forest. The latter sept of the breed came very nearly to an end during the cattle plague of about twenty years ago, when the entire herd was striken down to a solitary cow, which was saved, and happening to be in calf, which proved to be a bull, the strain was thus preserved. The one branch of the family has pink or flesh-coloured points, the other black. A bromide enlargement by Mr. MacGlashan (No. 209)—*A Kyloe*—looks wild and fierce enough to be a direct descendant of the original breed.

The Autotype Company has a large carbon enlargement of Mr. Bolton's—*A Couching Lion* (Class XVII., No. 188)—which is very effective and almost faultless. Mr. Bremner, in four excellent India landscapes (No. 271) has several good examples of the draught buffalo in progress of loading, unloading, and at rest, and A. Williamson's *Wapiti Stag* (No. 38) exhibits the surety of his shot with camera as well as rifle. *At the Kennels* (No. 457) shows a couple of small views of the hounds with whipper-in, and Mr. Galletly's snap-shot (No. 608) at the *Swans on Duddingston Lock* deserve a note, but *The Moor-hen* (No. 640) can only be seen in the title and action of the figures in a fine landscape by H. P. Robinson.

Charles Reid's two frames of purely animal subjects (Nos. 598 and 618) are remarkably fine, alike from their diversity of subject and tasteful selection; they will be hard to beat anywhere.

There are also many of the landscape studies which owe much of their beauty to the cattle with which they are enriched, but they will be better noticed under their own class.

Among the lantern slides there are also a number of good animal studies, of which may be mentioned those of Messrs. J. Dore, J. Pilkethley, J. G. Potter, and J. E. Austin, which will be better seen, studied, and understood when tried in the lantern at one of the demonstrations to be held for the purpose.

"A change came o'er the spirit of our dream." In 1876 silver printing was the great feature of the exhibition; carbon certainly looking as if it would take the place of a considerable rival in the near future. But this is all changed. Platinotype, then in its very babyhood, scarce breathing, so to speak, and that so weakly that we thought it might last a little, but that it was sure to die out; instead of that, in these fourteen years it has grown with such activity and strength that it holds as its own about one-third of the total number of pictures at the present exhibition, silver being represented by not more than one-fifth of the exhibits, even when the Obernetter, aristotype, and matt silver are included with it. Carbon does not represent more than one-tenth, and there is far more bromide work shown than carbon.

At a glance it will be seen that the new mediums and processes have been making considerable headway. The coldness of tone in the usual platinotype has retarded it somewhat from a commercial point of view, although all artists are charmed with the matt and dull black and grey appearance which renders them so like engravings. Warm tones, however, have been introduced to some extent, so that to those who considered the cold tone a drawback, the fault so far has been removed. The only point where the platinotypes will not compete with silver is where a glossy surface is demanded; and there is a large proportion of the photographers' clients who still believe in a bright surface, and "will have none of your dull, flat pictures."

The mixing of the different classes of exhibits all over the place has been a subject of some talk and dissatisfaction; certainly it is a pity, but after going over the whole of the rooms two or three times, and taking into consideration the general effect of the walls as they stand finished, it seems to me that some such mixture was unavoidable. It certainly would have been a very patchy affair had each class been kept by itself, where in lots of cases frames and shapes could not have been fitted anyhow.

The general effect is good, and it is the judges, I fancy, that will be most inconvenienced by the spreading out. This has, however, been made as easy as possible under the adverse circumstances, as the Executive have had all the pictures legibly marked, each the class to which they belong.

The first picture noted in the catalogue is *At the Dawn*, by Mr. Hume. It is shown to illustrate Professor Charles' experiment—which he made in a course of lectures to his students in 1780—producing a silhouette in white on a black ground, the medium being a sheet of white paper soaked in a solution of chloride of silver, but having no fixing agent, it fled on exposure to light. This picture of Mr. Hume's gives a good idea of the finished result, but does not convey to the tyro the experiment half so well as the pictures used in the illustration of this subject where the sitter is seen and the head shadow is shown black on the white paper during exposure. In this North Room Mr. Gambier Bolton makes a fine show of his animal pictures, there being a series of some twenty frames, and, to the visitor, possessing the advantages of being pretty nearly hung together. To those of us who heard Mr. Bolton, at Chester, describe the trials and difficulties attendant on this class of photography, we cannot but wonder at the high grade of proficiency that he has attained, judging from the fine productions here exhibited. *The Zebras* (96) and *Roused* (97) specially attracted our attention; but every picture in his exhibit has some special points of its own, showing how much at home Mr. Bolton must be photographing all sorts and conditions of animals, especially when he himself tells us that none of his pictures (as a rule) are produced by instantaneous shots, but that the average exposure is from one to two seconds. But he also tells us that he has made as many as fifty exposures before he has obtained a result to his satisfaction.

However, it was not "love's labour lost," for the warrant of wonderful success is to be seen on these walls.

Rejlander's works are one of the most prominent features in this room. His pictures have always been ranked amongst the finest artistic photographic productions, and such a goodly collection of the master's work as we have gathered together here is of itself worth coming a long way to see. The most prominent picture in the set is *The Two Ways of Life*, a picture that since the day of its introduction up to the present time has been considered one of the most finished pieces of artistic photography, both as regards conception and execution. In this masterpiece he portrays a youth being guided by Wisdom and Experience on to Industry and a happy future, whilst another youth is being led by the Dissipations of Life which tread the paths of Idleness, Drunkenness, and Murder. With a lot of negatives combined to tell such a story, and produce such an effect as commends itself to all who see it, is surely the work of a master hand.

A good example of Mrs. Julia Cameron's work will be found, No. 46—*A Head of Herschel*. I saw it noted the other day that some of this lady's negatives had been so worked up that the pictures taken from them were past recognition. This picture has no such defect, all the face markings being clearly indicated.

No. 67 is a picture of some interest, being an enlarged photograph of Daguerre, sent by William Long.

No 92, an enlargment of Fox Talbot by Moffat, Edinburgh. It is noted as having been taken in 1861, and that that was the only time he ever sat for his photograph. It is a good picture.

This exhibition contains a much larger proportion of big work than is usual in photographic shows, both direct and enlarged. We mean work shown by photographers themselves, and less of the professional enlarger element. This is an adventure showing progress, and most of these pictures are shown by first-rate men, such as Crooke, Moffat, Ayton, Sawyer, Wane, Turney, Wane & Allan, Warnerke, &c., all of whose exhibits are bound to secure the attention of the less advanced workers who from good example wish to learn.

Mr. Crooke's show is large and all over fine. Amongst his pictures is a set of eight, from Nos. 378 to 385. The set of "Judges" we would call them, beginning with Wellwood and finishing with Robertson. The variety of pose here introduced is a perfect study. It looks as if each position had been attained without effort and unconsciously, producing the most artistic results, being so natural that art is hidden. There is also something new in framing here. The pictures are framed to the edge without margin, the frame itself being a black moulding with narrow fancy gold edge next the picture, giving to them an old-world artistic effect very pleasing and unique in its way. Another picture of note is—

No. 389 (*M. Paderewski*).—This is a large head, in platinotype, printed in a rich warm tone, seemingly untouched. The play of light is beautifully managed, and this picture certainly stands out as one of the features of the exhibition. We are inclined to think, however, that a little more detail shown at the back of the subject's head would have been an advantage, but suppose that the darkness is the artist carrying out his own idea, rather than that the very dark part is due to under-exposure in the negative.

Mr. Crooke also shows his *Convention Group* (No. 372), which at a glance one sees what a fine work of art it is. The blending of the picturesque with the primary object for which the picture was taken, viz., the group, was an inspiration, and the production a work of art. When one remembers that this picture was produced with but one plate exposed, the high nature of the results are very marked.

Mr. Ayton's pictures are the next exhibit, close by, and the work he shows, which is no mean quantity, speaks well for his artistic ability. He exhibits a series of cabinet portraits (No. 397), which, by the way, are hung far too low to do them justice, either from the exhibitor's or the visitor's point of view. One does not care to remain long on one's knees to look at photographs. These cabinet portraits, both as regards arrangement and lighting, are excellent. They are printed in platinotype.

No. 402 (*Miss M. Bartlett*), by the same artist, is an example on opal of a large size, in carbon of a rich brown tone—a charming picture. And the group alongside of it—No. 403 (*Grandchildren of the late Professor Ballantyne*)—is also an opal enlargement of considerable dimensions; we should think that it is about 16 × 24, or thereby. This picture shows delicate finesse in the arrangement. Many more of Mr. Ayton's pictures are to be seen in this room. All of them, large and small, are telling and attractive pictures.

No. 422.—A bromide print by Tunny & Co., named the *Cockenzie Fish*, is a study of a village scene carefully worked out, technically, very perfect and quite free from the black shadows without detail so often to be found in bromide work.

No. 440.—*Blowing Bubbles*.—A platinotype by the well-known artist, Marshall Wane. This artistic picture represents a girl sitting on a bank looking at the soap bubbles which she has just blown floating in the air. However, this is but one picture out of many shown in this exhibition produced by the same careful hand, all of which are unquestionably fine work and adding to them the productions of Wane & Allan, shown in three separate lots, and the work of Mr. Allan who conducts the Ayr business we have quite a series of photographs, attractive and telling, showing the subscription well carried out.

Mr. John Moffat shows a collection of pictures which for grace of pose and lighting of the subject are all that could be desired. One of the highest artistic examples is No. 483, *Mrs. Argyle Robertson*. It is one of the largest pictures in the exhibition. It is printed in carbon of a rich, warm tone, every line of the composition is harmonious, and to the looker-on produces an emotional rather than a critical feeling, which is a sure sign of more than technical excellence. Then No. 486, *Three little girls at a Cottage Window*—carbon on opal. This picture also possesses exquisite delicacy and beauty, perhaps rather too much worked up, but it is very charming for all that. Moffat's collected exhibit is sure to create its own share of attention, it is so strikingly observable.

The Autotype Company, who stand to the forefront as the representatives of the carbon process and carbon productions, are here well represented. All their work, as might be expected, is of the highest class, and no one can make a careful study of their productions without feeling that in the hands of the photographer here stands, despite all competition, one of the best permanent processes yet existing, in spite of the many others that cluster round.

Our Editorial Table.

The Strand Magazine.

Offices: Burleigh-street, Strand.

The first number of this much talked-of magazine is before us. If subsequent numbers are equal to this one then assuredly the *Strand Magazine* has come to stay. It seems to be run on the lines of well-known American magazines, such as *Harper's Monthly*, being profusely illustrated with really well-executed engravings, and at half their price. In the series of portraits of celebrities we have in some cases portraits from childhood up to date. Of Rev. C. H. Spurgeon thus we have four, the earliest when twenty-one years of age; three of Professor Blackie, one showing the boy at five years, the latest the veteran at eighty. Tennyson, two; Ellen Terry, four; Henry Irving, four; Algernon C. Swinburne, two; Sir John Lubbock, three; and H. Rider Haggard, four, ranging in his case from ages three to thirty-four.

The literary portion is of a high order of merit. It opens with a description, historical and pictorial, of the Strand, followed by articles of an attractive and instructive nature. With this number is presented a copy in colour of a humorous Royal Academy picture, 26 × 18 inches.

Common Insects as seen through the Microscope.

London: Newton & Co., 3, Fleet-street.

This pamphlet of eighteen pages is intended as an accompaniment to a set of thirty-seven micro-photographs made by Mr. T. E. Freshwater, and prepared as lantern slides by Messrs. Newton & Co. Mr. Freshwater, being an *habitué* of the various London photographic clubs and societies, knows well the requirements of a high-class lantern slide, so that this element in the series may be assumed to be all that is required. The present *brochure* forms a popular descriptive lecture quite devoid of terms hard to be understood, but from which much useful knowledge of the habits of many of our small and often unloved fellow-beings may be derived.

A Camera Plumb Indicator.



Some individuals, but some only, can at a glance tell whether their camera is placed level or not. In the interests of the many who are not thus gifted, the Thornton-Picard Manufacturing Company have prepared a neat little plumb indicator, which when screwed on the camera, shows at a glance whether or not it is placed level. From the adjoining cut, it will be seen that it consists of a pendant of flat brass suspended freely by a screw at the top and preserving always a vertical position. When the bottom point of this pendant is opposite to a mark on the base plate, then is the camera level. The price is so low as to obviate the necessity of any one making it for himself.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 19,658.—"Improvements in Photographic Films." Communicated by G. Eastman. Complete specification. A. J. Boult.—*Dated December* 2, 1890.

No. 19,672.—"Improved Photographic Baths." Communicated by C. Monnier. H. H. Lake.—*Dated December* 2, 1890.

No. 19,714.—"Improved Focussing Attachment for Photographic Instru-

ments." Communicated by F. Quimby. J. P. Bayly.—*Dated December* 3, 1890.

No. 19,733.—"Improvements in and connected with Flash Lamps for Photographic Purposes." R. Slingsby.—*Dated December* 3, 1890.

No. 19,738.—"Improvements in Photographic Cameras." C. H. Baines.—*Dated December* 3, 1890.

No. 19,797.—"Improvements relating to the Removal of Photographic Plates from Storing Boxes into Exposing Frames." R. Engelhorn.—*Dated December* 4, 1890.

No. 19,907.—"'The Harwood' Detective Hand Camera." P. J. Harrington and V. W. Wood.—*Dated December* 6, 1890.

No. 19,933.—"Improvements in the Manufacture of Lamps or Lanterns for Photographic Purposes." J. B. Brooks.—*Dated December* 6, 1890.

No. 19,934.—"Improvements in the Manufacture of Boxes and Frames for Holding and Suspending Glasses, Negatives, Cards, Plates, and the like, for Photographic Purposes." J. B. Brooks.—*Dated December* 6, 1890.

No. 19,935.—"Improvements in the Manufacture of Bath Levers for Photographic Purposes." J. B. Brooks.—*Dated December* 6, 1890.

PATENTS COMPLETED.

Improvements in and Connected with Photographic Cameras.

No. 1203. David Carter, 15, Gerrard-street, Warwick; Warwickshire.—*November* 15, 1890.

He places sensitive plates in the upper part of an arrangement like the ordinary plate-box, but deeper (either in the grooves direct), in which case they would have to be backed with an opaque material or by preference into sheaths, and after exposure by one motion, dropping from the upper part to the lower out of the rays of light.

Improvements in the Production and Representation of Instantaneous Photographic Pictures.

No. 12,921. Wordsworth Donisthorpe, 32, Pembridge-villas, Bayswater, Middlesex, and William Carr Crofts, Westminster-chambers, 7, Victoria-street, Westminster.—*November* 15, 1890.

This invention has for its object improvements in the production and representation of instantaneous photographic pictures.

The pictures are produced upon a sensitive film or surface carried by a long roll of paper or other material.

The roll is continuously unwound from one drum and wound upon another, and in its passage a series of images are successively thrown upon it by a photographic lens. A screen is provided between the lens and the exposed sensitive surface. This screen travels out of the way to permit the image to fall on the sensitive surface, and covers the lens again as soon as the exposure is complete. These operations take place with regularity, and, usually, great rapidity, so that several pictures are taken in each second during the time that the apparatus remains at work, which will be for many successive seconds, indeed, for any length of time which may be desired. The scene selected for photographic presentation will be one of constant movement: for example, a street scene, so that each picture will differ slightly from the preceding and succeeding pictures.

The camera may be arranged in the following manner:—In the fore part is the lens, and immediately behind the lens the screen which regulates the instantaneous exposures. This screen may be an endless band passing around pulleys, and travelling at high velocity. In the band there are two perforations or apertures, and twice in each rotation of the band these perforations coincide, and the light is then able to pass from the lens through the perforations on to the sensitive surface. The lens forms the scene upon the sensitive surface. The focus is accurately adjusted before commencing the operation by the aid of a slide, on which there is a focussing glass and guide rollers, over which the continuous sensitive paper or material passes.

The screen and the winding apparatus are so geared together that the sensitive surface travels the distance necessary to separate the pictures between one exposure and another. In place of the travelling perforated belt a disc perforated with a narrow slit and driven by bevil wheels may serve the purpose. After the pictures have been taken the roll is removed from the camera and the pictures upon it are developed in the ordinary manner. From this continuous band of negative pictures a similar band of positive pictures is produced and rendered transparent by the application of vaseline or vaseline oil, or by any other suitable process.

For the exhibition of the pictures a lanthorn similar to the ordinary magic lanthorn (or if a non-transparent positive band is used, then a lanthorn similar to the opaque magic lanthorn) is employed, in which a brilliant intermittent electric light is provided. The lanthorn is provided with condensing and focussing lenses by the aid of which the light, after having passed through the transparent positive pictures, is focussed upon a screen. Each picture is thus exhibited only by one flash of the intermittent light, for the band of pictures travels on, and by the time the next flash occurs another picture is in place. Thus several pictures are exhibited upon the screen in each second of time throughout the whole period of exhibition, which will usually be approximately the same as that occupied in taking the pictures. The change from picture to picture and the flashing of the light is so rapid (about seven flashes per second) as not to be discerned by the eye, and the appearance on the screen is that of a picture in which the animate and other objects exhibited are in movement. In order that the flash may synchronise accurately with the picture in position, contact pieces are provided upon the travelling band, and by the passage of these the flashes are determined. Or a continuous light, electric or other, may be used and the recurring flashes obtained by a perforated screen travelling at high velocity as in the camera above described, the coincidence of the flashes with the centre of each successive picture being ensured by increasing or diminishing the speed of the travelling band of pictures by an arrangement for the insertion or withdrawal of a tapering driving drum or other appropriate means.

An Improved Holder for Adjusting Limelight Jets in Optical Lanterns and the like.

No. 18,453. Henry Staniforth, 62, Fitzwilliam-street, Sheffield, Yorkshire.—*November* 15, 1890.

For the raising and lowering, adjusting and centring, limelight jets in optical lanterns and the like I construct a screw thread, with appliances for the clamping of the jet holder on to a brass plate or stage, working horizontally upon guides at each side. Attached to the lower part of the screw thread is fixed a brass wheel with a corresponding screw thread, which is inserted into a slot below, so that by revolving the wheel the brass plate or stage holding the jet clamps is raised or lowered.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 16 ...	North London	Wellington Hall, Islington, N.
,, 16 ...	Glasgow & West of Scotland Am.	180, West Regent-street, Glasgow.
,, 16 ...	Bolton Club	The Studio, Chancery-lane, Bolton.
,, 17 ...	Bristol and W. of Eng. Amateur	Queen's Hotel, Clifton.
,, 17 ...	Bury	
,, 17 ...	Hyde	
,, 17 ...	Manchester Camera Club	Victoria Hotel.
,, 17 ...	Edinburgh Photo. Club.....	5, St. Andrew-square.
,, 17 ...	Photographic Club	Anderton's Hotel, Fleet-street, E.C.
,, 18 ...	London and Provincial	Masons Hall Tavern, Basinghall-st.

PHOTOGRAPHIC SOCIETY OF GREAT BRITAIN.

December 9.—Ordinary meeting.—The President (Mr. J. Glaisher, F.R.S.) in the chair.

It had been announced that a paper on *Photography applied to Astronomy*, by E. W. Maunder, F.R.A.S., would be read; but a difficulty having been raised as to the use of limelight in the gallery during the period of the Water Colour Society's Exhibition, and the paper requiring the use of the optical lantern for illustration, it had been decided to defer the reading of it until the January meeting, which would be held in the Society's new premises at 50, Great Russell-street.

The Treasurer (Mr. W. S. Bird) then gave some details concerning these premises, and a discussion took place as to the hours as to which they should be available for the use of the members, and it was eventually decided that they should be open daily from two till half-past nine, except during the month of August, when they will be closed for vacation. The ordinary and technical meetings will generally be held there, but for special occasions, when large gatherings are anticipated, the Gallery in Pall Mall in present use will be available. The Treasurer also mentioned that as there was now room for a library and collection of things interesting to photographers, the Premises Committee were prepared to accept gifts of books and such articles as would form the nucleus of a photographic museum.

Mr. Leon Warnerke wished to direct attention to the fact that the Society was in receipt of a portion only of the periodical photographic literature of France and Germany, and suggested that arrangements should be made for a more complete supply.

Mr. T. Sebastian Davis suggested that a collection should also be made of historical photographs.

The Treasurer said that the members had before them in the current number of their Society's journal some propositions with regard to the Photographic Institute. These proposals included a large scheme and a smaller one. The large scheme he looked upon as belonging to the future, but as one to which the Society might act as nursing mother. There was a probability that if the practicability of the Institute and its utility could be sufficiently demonstrated, it would be largely aided from the funds of City Corporations, but it would be well in the first instance to obtain the opinion of societies and trades engaged in photography to see what funds would be contributed by them. He felt that to start with any chance of success they must begin at home. If they found sufficient support the Institute would be a most valuable one. At Berlin the State aided a Photographic Institute, but here we must help ourselves.

Mr. T. Samuel moved that the project be submitted in the form of a circular letter to the different provincial societies, to elicit the opinions of the photographic public generally on the schemes submitted by the Committee.

Mr. A. Chapman Jones, in seconding the motion, said that it seemed to him that if there was to be an institution, there were a great many societies that might be expected to help—not such societies as partook chiefly of the social character, but those of a more scientific bent.

Mr. W. Bedford thought they should not be much influenced by the amount which they would be likely to get in this way; photography was certainly an art and science that should receive aid from some of the accumulated wealth of the City bodies. He thought they could not look to societies for very much material assistance.

The motion was then carried.

The following were elected members:—Messrs. J. E. Austin, L. C. Bennett, B. Yorke Bevan, Louis M. Biden, Shapoor N. Bhedwar, F. C. Cembrano, L. E. Clift, H. Cooper, J. H. Craigie, Captain H. Curties, J. C. Douglas, D. T. English, F. M. Gowar, C. F. Hayward, S. G. Johnson, W. F. Kimberley, Major H. G. Kemhardt, Lieutenant W. G. Leslie, A. Maskell, L. Mitchell, H. Sandiland, E. Scamell, E. Spencer, J. Wiltshire, L. E. Westrop, H. H. Schultz-Young; and Mesdames W. P. Arnott and E. G. Wrigley.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 4.—Mr. E. Clifton in the chair.

Mr. A. MACKIE said that he had been making experiments with a view to throw some light on the cause of the transparent spots which sometimes appeared in collodio-bromide plates. In the spots which appeared on gelatine plates he had always been able to find a nucleus. With collodion emulsion the case was somewhat different. He had an emulsion that gave spots freely, and on reading a plate and sprinkling dust on it the spots showed themselves wherever the dust had fallen. Another emulsion showed no spots even where powder had been sprinkled upon the film before drying. He thought it possible that where spots did not occur the emulsion contained only plain bromide, whilst that which gave spots under dust had not been well washed.

Mr. GREEN, of the firm of Green, Cross, & Bevan, then explained the action of their primuline printing process, which Mr. Bevan demonstrated by developing prints on tissues that had been previously sensitised and exposed to light under fern leaves and other objects capable of yielding artistic patterns. Mr. Green said that all other photographic processes, except perhaps the bitumen process, depended upon the fact that inorganic compounds were decomposed by light, but in this case there was a new departure in the decomposition of an organic compound. Primuline was a substance that possessed the property of dyeing without a mordant, and it was very convenient for dyeing fabrics in the manner called ingrain. When the fabric dyed with primuline was treated with a solution of nitrous acid, the primuline became converted into a diazotised compound. A piece of cotton fabric containing diazo-primuline passed into solutions of various substances took various colours. Resorcine gave deep orange, another solution produced crimson, and another purple. The action of light was to decompose the diazo-compounds, and render them incapable of being acted upon by these solutions, which therefore acted as developers by changing the colour where the substances had been protected from the light. Under the light the orange colour of diazo-primuline became changed to pale yellow, so that it was possible to judge of the printing by the colour before development. To fix and finish the pictures it was in all cases only necessary to wash the fabrics. The purple developed images changed, however, by washing to a dingy brown, but a weak solution of permanganate and sulphuric acid restored the purple colour. There remained a yellow effect in the undeveloped parts which was not objectionable in some cases, but it could be rendered by subsequent treatment with various dyes. A sample was shown in which the ground was thus changed into a pale, delicate green. For such purposes as copying engineers' plans, it was hoped that, to some extent, it would supersede the blue process, over which it had the great advantage of being more sensitive, so that prints were more quickly obtained by it. The action of light decomposed the sensitive compound, and rendered it incapable of uniting with phenols and amines. If a gelatine plate prepared with the diazo-primuline was exposed to light and placed in water, bubbles of nitrogen gas were given out. An examination had been made to determine the amount of gas evolved, and they had found that the amount was exactly what they had calculated on the assumption that the azo compound was decomposed. They had also found that the diazo-compound of primuline in collon was a great deal more sensitive than in gelatine. Wool and silk were less sensitive than cotton, but more so than gelatine. They had come to the conclusion that the compound was somewhat more sensitive than ordinary chromo-paper. It had been observed that in nearly all cases the pattern was slightly stronger on the back of the fabric than on the front. It was therefore evident that yellow light was active on the compound, as what reached the underside of the fabric must have passed through the strongly-coloured material. They had also printed through a glass of so deep a yellow that no effect was produced on a piece of chromate paper exposed under the same glass. They had exposed the material to the spectrum and found that the effect was very much towards the red end, and they had been able to photograph the D lines. The maximum action was a little to the right of the blue hydrogen line in the region of the blue-green, and extended further towards the red than to the violet. The developed image might be decomposed and restored to the original condition, either to appear coloured of the same or of another colour. A piece of cotton fabric, developed in resorcine, was passed into a bath of hydrosulphite of soda, and the photographic image disappeared, but a true hydrosulphite prepared with zinc powder and hydrochloric acid. By the action of this substance the image was restored. The yellow being not destroyed in the nitrous acid solution, the diazo compound was reformed, and the image was redeveloped with a substance producing another colour.

Mr. E. F. DIMMER inquired whether much washing was required.

Mr. BEVAN replied that it was not; a few minutes sufficed.

The CHAIRMAN inquired whether the materials for the process were commercially obtainable.

Mr. BEVAN replied that it was intended shortly to supply complete sets of materials.

Mr. A. CLAUDET asked that the process was called "the" diazotype process. Was there not another diazotype process of earlier introduction?

Mr. BEVAN said that there was another process by Fox, and indicated some of the points of difference between the two. Fox's was a negative and this a positive process.

Mr. W. E. DURNHAM said that photographers commonly called albumen printing the positive printing process, and it was so described in the books. Fox's process (using albumenised paper in order to bring a positive image from a negative, for he had no primuline dyeing to call it a negative process.

Mr. CLAUDET said in that case another name of description would be better.

The CHAIRMAN suggested that Messrs. Green, Cross, & Bevan's process might be called a direct positive process.

Mr. GREEN accepted the suggestion.

An inquiry was made as to whether black images could be produced.

Mr. BEVAN said that they had not yet succeeded in getting black. He had obtained a colour that subsequently developed a black image, but he found it gave a deep blue, a sample of which he produced.

Some members considered the colour of the sample to be rather neutral, or even a little blue, and that it resembled in colour ordinary writing ink diluted, or, as some thought, rather dark ink.

Mr. MACKIE inquired whether there was any possibility of getting the ground white.

Mr. BEVAN thought that there was a very good chance of getting it.

Mr. J. J. SMITH inquired whether bleaching agents, such as peroxide of hydrogen, had been tried.

Mr. BEVAN said that that and everything they had tried had as much effect upon the image as upon the yellow ground.

Mr. W. H. HARRISON inquired as to whether there was any danger of explosion with the diazo compounds of primuline.

Mr. GREEN said that diazo compounds of low molecular weight were very explosive, but as the molecular weight increased they became less so. The diazo compound of primuline was of high molecular weight, and when formed in the fabric was quite free from danger. Diazo-benzine, although so explosive, was not more sensitive to light than diazo-primuline.

Mr. HARRISON inquired whether diazo-primuline in a dry state was liable to explode by friction.

Mr. GREEN said that, so far as he had found, it was not.

Mr. HARRISON inquired whether it became explosive in combination with organic matter.

Mr. GREEN replied that it was conceivable that it might.

Mr. A. HADDON inquired what strength of solution it was desirable to use.

Mr. GREEN said that the strength might be much varied, but one per cent. might be taken as a useful basis for the primuline. The time of immersion of the fabric depended upon the strength of the primuline. The action of the nitrous acid was to produce the insoluble diazo compound. One per cent. of nitrite in the solution was strong enough, and sufficient acid should be added to produce a distinctly sour taste; a small excess over the calculated quantity was best.

A vote of thanks to the demonstrators was given, and it was announced that the 18th would be the last night of meeting at the present premises, after which the meetings would be held at Champion's Hotel, in Aldersgate-street.

NORTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 2.—General Meeting.—Mr. A. Mackie in the chair.

Mr. W. BISHOP exhibited and described his newly constructed stereoscopic hand camera, fitted with the simple but admirable shutter fully described in THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1891.

The PRESIDENT (Mr. J. Traill Taylor) then read a paper on the *Relations of Art to Photography*. Foregrounds, horizon, lighting, choice of subjects, posing, grouping, perspective, clouds, &c., were all fully and admirably dealt with, each point being well illustrated by a large number of beautiful photographs which the lecturer had brought with him.

Mr. W. T. COVENTON exhibited several beautiful stereoscopic transparencies by Ferrier, which were greatly admired, as were also some specimens exhibited by Mr. Bishop, taken in his new camera.

A discussion then took place, in which several members took part.

HOLBORN CAMERA CLUB.

DECEMBER 3.—Mr. T. O. Dear (Vice-President) in the chair.

Mr. EVANS and Mr. MORTIMER were elected members of the Club.

Mr. JOHN HARRISON demonstrated the method of making lantern slides on Alpha plates. He called attention to the great latitude of exposure. He had also brought with him a new lantern plate giving cold tones which the Britannia Works Company hoped to place on the market before long. He also showed the new and improved Paillard lantern camera. He then exposed three plates from different negatives at a distance of six inches from the gas, giving an exposure of two, one and a half, and one minute. All gave excellent results, being afterwards toned in the usual toning bath having both. He then used the new lantern plates, placing the frame eighteen inches from the gas and giving an exposure of twenty seconds; these plates turned out well, using the hydroquinone developer formula as set out on the backs of the Alford dry plates.

Tuesday (Friday), *Fog's Lantern Plates*: Mr. Thompson.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 5.—Mr. J. W. Edwards in the chair.

Discussion on *Photographic Lenses*, by the PRESIDENT, some valuable hints and illustrations being given for the improvement of negatives.

Mr. M. EDGER attended and explained his flash lamps, taking a negative of the members, which on being developed with the "Lavender" developer turned out successfully, the marvel being that so small a lamp could give out such a powerful light.

LIVERPOOL UNIVERSITY COLLEGE PHOTOGRAPHIC SOCIETY.

Attention to the rules of the above Society membership is confined to those connected with the College either as students or as members of the staff. This restriction has considerably limited the usefulness of the Society, which has always had as its primary object the promotion of the study of the science of photography.

Some of the most interesting papers read before the Society have, from time to time, been considered by non-members, and it has for some time past been considered very desirable for the Society to widen its sphere of action. With this object in view the Committee approached the Council of the Liverpool Physical Society as to the possibility of establishing a photographic section of that Society which should devote itself to the science of photography. The proposal met with universal approval, and at the annual meeting of the Physical Society, held on Monday, October 27, Professor O. J. Lodge, D.Sc., LL.D., F.R.S. (President), in the chair, the proposition was carried into

effect. The section is to have its own Chairman and Secretary, and Dr. Ferdinand Hunter has been elected to the former office. The meetings will commence in January with an opening address from the Chairman. It is to be hoped that by the amalgamation of the two societies a further impetus will be given to the study of photographic science, for it is hardly necessary to say that the photographic section of the Physical Society has the entire support of all the members of the Liverpool University College Photographic Society, whilst the Physical Society in itself includes many active workers in the subject, amongst them Mr. Isaac Robers, F.R.S., and Mr. Higgs, who has been so successful in the photographing of the solar spectrum.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

DECEMBER 1,—Mr. S. Wells (President) in the chair.

The following members were elected:—Messrs. Zalasinski, Marsden, and Geo. Turner.

Mr. BURROWS gave notice of motion that the sons of members under eighteen years of age be admitted as members at a reduced subscription.

Mr. H. M. SMITH, of the Eastman Company, then gave his practical demonstration on *Bromide Enlarging*, and secured a splendid enlargement. Mr. Smith also exhibited a No. 5 folding camera, which was explained, and all acknowledged its excellence, both for portability and use as an ordinary camera.

TORQUAY PHOTOGRAPHIC SOCIETY.

DECEMBER 2,—Mr. E. Vivian, M.A., F.G.S. (President), in the chair.

A lecture was given by Mr. R. C. Reade, entitled, *A Talk about the Forth Bridge*. Several instantaneous photographs, showing the bridge in course of construction, were exhibited by the aid of limelight by Mr. W. M. Baynes.

DUNDEE AND EAST OF SCOTLAND PHOTOGRAPHIC ASSOCIATION.

DECEMBER 4,—Mr. J. D. Cox (President) in the chair.

The principal business of the evening was a lantern-slide competition, in which thirteen members took part, each contributing a set of six slides. The competition was decided by the votes of the members present. On the voting papers being scrutinised the following were declared the prize winners:—First, H. S. Wybrants; second, D. Ireland; third, A. Stewart.

A number of slides by the members, and a series of fifty from the Paisley Photographic Society, were then exhibited.

Messrs. Lowdon, Reform-street, sent for exhibition a set illustrating the Stanley expedition for the relief of Emin Pasha.

EDINBURGH PHOTOGRAPHIC SOCIETY.

DECEMBER 3,—Mr. H. J. Blanc (the President) in the chair.

The PRESIDENT, in giving an account of the progress of the exhibition, remarked that they would all be pleased to hear of its satisfactory progress. All the visitors had but one opinion as to its great interest and educational value. The Council had arranged, in consequence of the great success of the Friday evening lectures, to hold another on each Tuesday, which would also be illustrated with demonstrations and optical lantern views.

Mr. J. MACGLASHAN then read a paper on *A Method of Correcting the Extreme Contrasts and Halation which Sometimes Occurred when Taking Negatives, especially of Interiors*. He might call it "A Compensating Printing Method." A rather light print is first taken from the negative and washed and fixed in the usual manner—toning was immaterial. When dry, this is used as a mask in front of the negative for all the succeeding proofs, and although necessarily taking a longer time to print, yet by the arrangement the halation and contrasts were completely cured, the light and dark portions of the mask compensating the same portions of the negative. In the course of the discussion which ensued,

Mr. G. G. MITCHELL stated that he had had from Mr. Macglashan several examples, and was highly pleased, as every one must be, with the results.

Mr. J. KEAN thought the idea would be of great use to professional as well as amateur workers, and remarked that it was like all other good things—so simple when explained that the wonder was no one had thought of it before.

Mr. J. M. TURNBULL, while acknowledging the value of the idea, thought the same thing could be done by making a transparency from the negative and using that as the mask. He thought the printing would be quickened in this way.

Several other gentlemen having spoken,

The CHAIRMAN summed up, and remarked that the method would be a great acquisition to all those who, like himself, delighted in taking interiors, many negatives of which suffered from this almost unavoidable cause, but he would now, by Mr. Macglashan's method, be able to get a perfectly clear print from negatives which he had hitherto considered useless.

Mr. Macglashan was awarded the thanks of the meeting. The paper was accompanied with illustrations.

Mr. A. H. BAIRD thereafter brought before the meeting and described Malloch's method of etching on glass through a prepared ground, after which the meeting adjourned.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

AT the opening meeting of this Association for the session Mr. WILLIAM LANG, jun. (President) gave the following address:—

GENTLEMEN,—Before touching upon more general matters, my first duty is to return you my warmest thanks for your renewed confidence in me in having so spontaneously and generously continued me in the highest office which it is in the power of this Association to bestow. It is now more than five years since I became your President, and it is most satisfactory and gratifying to myself that the Glasgow Photographic Association, one of the oldest societies in the kingdom, finds itself at the present moment in a state of flourishing activity. Our membership is now continually being added to, and I see no reason why we should not be still stronger numerically. One of your office bearers remarked to me the other day that he could not understand why such and such an one engaged in photography commercially did not countenance our work as an association by becoming members. My reply was, let them alone, our duty as an association is to keep going on in the even tenor of our way, by bringing before the Society all matters appertaining to photography, whether they may bear on the scientific or on the art side of the question; by the exhibition of novelties as they appear from time to time in the photographic world; by keeping ourselves posted in the work of our contemporaries, and bringing forward their published results. Surely all this, if it be continued in, as I hold it has been for the last few years, will ultimately awaken interest and sympathy in those who perhaps may hold aloof from us, and by-and-by unsolicited and unasked they will join our ranks. I feel a certain pity for the superior individual who, when spoken to as to his becoming a member of the Glasgow Photographic Association, gives answer in tones which are intended to convey loftiness and superiority—"I do not believe in associations." I think, gentlemen, such an one with views so biased—and shall I also add so small?—would not be any credit to us, therefore I say let him alone. Then, again, I would like to refer to another phase of indifference to the work done by us as an association, and here we have to find fault with the action of certain actual members, those who pay their subscriptions but who never honour us with their presence. We want the subscriptions certainly, but we would like the subscriber himself, sometimes at all events. I offer these criticisms, gentlemen, in no unfriendly spirit. I do so because I think all should contribute their little to the furthering of the aims and purposes of our Association; and I do not for my part see how members who are conspicuous always by their absence can be said truly to promote the said aims and purposes. Before I pass on to the consideration of topics more photographic than what these are, I would simply in a word wish to congratulate you on the Council which has just been appointed. I feel sure that they are what may be termed a true working Council. The remarks I have made with reference to the non-attendance of the ordinary members would surely apply in still stronger force to members of Council. Last year two members were, from some cause or other, made members of Council who never once attended a single Council meeting. This is not as it should be. I therefore look forward to increased help this session, for from what I know of each one of the members of the Council they all have that interest in the affairs of the Association which is absolutely necessary for its present and future welfare. We all know that a certain game of cards can be played with a dummy, but I have yet to learn how the affairs of a society can be managed on similar lines.

As you are aware, those who practise photography may be broadly classed as amateurs and professionals. The Glasgow Photographic Association, as you know, embraces both sections; there is therefore need that both interests be provided for. The Council returned contains, I think, a happy admixture of both elements. Some may think that the millennium cannot be bar off—that is, the photographic millennium—when the lion and the lamb thus come together; but the true spirit which should imbue all of us, be he amateur or be he professional, is the advancement and development of that ever-wonderful and fascinating art-science of ours, now known and practised over the whole civilised world.

A sign of the times of the great interest which is everywhere evoked by photography may be cited in the great number of exhibitions which take place one after the other in the various centres of Great Britain. There was the Crystal Palace Show in the spring; another one was held in the Drapers' Hall, London, in the month of June; Newcastle had a most interesting and exhaustive exhibition; while there has been but recently opened in the Scottish National Art Galleries in Edinburgh one which promises to be a success all round. The annual Pall Mall collection has, as usual, been held in the customary place. Then, again, in the People's Palace being presently formed in the east end of our own town there will be a photographic collection which should command attention.

The Photographic Convention of the United Kingdom held their fifth meeting in Chester during the month of June, Mr. C. H. Bothamley, of Leeds, being the President. The gathering was a success in every way. Perhaps the most notable or most ambitious attempt was a magazine camera, brought forward by Friese Greene, to take ten photographs a second of the various phases of motion by simply turning a handle; these, when recombined and projected on a screen, show again the original motion. An important contribution was also given by an honorary member, Mr. Andrew Pringle, on *Photo-Micrography*. I was not able to be present myself at Chester, but our Association had a good representative in Mr. Mason. The next meeting is to be held in Bath, which may be denominated classic ground, for Fox Talbot lived in its vicinity, and many of the subjects to be found there have been secured by the illustrious pioneer.

I do not know that anything very startling has been brought forward during the six months which form our recess. Perhaps the primuline process may be cited as the most original contribution to photography during that period. As we had at our meeting last month specimens of the colours produced by this method of light printing, I need not enlarge on the subject. Colour photography is always cropping up now and again. The most recent contributor to this vexed question was an Hungarian, Herr Verescz, but experts who have seen the results assert that no real advance has been made on what was done many years ago by Becquerel, Niépce de St. Victor, and others.

Hand-camera work has really been the principal rage during the past season. I fancy it must have been a good time for the plate maker. Plates have been spoiled indiscriminately, and the amateur has fired away at all "sorts and conditions" of subjects, whether they happened to be sufficiently lighted or not. We have heard a good deal of the part played by the detective camera in the politics of Ireland; how that a picture was secured in open court of one of the witnesses under the very nose, so to speak, of the presiding magistrate. I have here for your inspection some enlargements of Kodak pictures illustrative of shadowing. I am not sure but that the indiscriminate use of this handy

instrument (I see that I have perpetrated a joke without meaning it) may lead to muddled. A picture in the periodical *Punch* of November 8 will bring the issue better to you than anything else. The letterpress going with the picture is as follows:—"From a lady's letter. Yes, dear, there was only one thing that spoiled my trip in Scotland, and that was Nellie's meanness. Fancy, while I was making an innocent inquiry of one of the guards at Holyrood she actually 'snapped' me off with that horrid Kodak camera of hers and sent the picture to Jack, and you can't think how disagreeable he has been ever since. Nellie and I don't speak now."

I leave the picture in question with me, which can be studied afterwards.

Photography is entering more and more into the every-day occurrences of our ordinary life. Take any of the prominent illustrated papers and a good percentage of the pictures shown will be found to be produced by some of the photo-block processes. I was very much impressed with an exhibit in the Edinburgh Exhibition forwarded by the proprietors of the *Daily Graphic*. First of all there was the original sketch by the artist with the negative taken therefrom, then the type block which in turn had been prepared from same and the corresponding composition mould, and, finally, the cylindrical form the actual printing surface had been made to assume. The issue depicted was that of the Christmas Number, and the illustrations had appeared in the number for the day preceding that of the opening of the exhibition. In our own town colleges, as most of you are aware a photo-mechanical method, is being more or less developed—I speak advisedly when I say that I know of work being turned out equal to what is done on the Continent, which was originally the home of collotype.

I may with advantage, I think, refer to the literature of photography, which has greatly multiplied of late. While the two oldest journals in the country—The British Journal of Photography and the Photographic News—have reached their thirty-seventh and thirty-fourth volume respectively (the contents of one now constituting a valuable work of reference), the interest in everything appertaining to photography is now so great that publishers are found entering the field with new ventures, and each one is trying his best to give the fullest possible value at the minimum of cost. Within Photography, the Practical Photographer, Photographic Amateur, &c. The latter is a well-printed penny worth; each number contains an excellent collotype, which I don't think could possibly be produced at the price.

In Mr. Sharp's magazine the Review of Reviews, a new departure was inaugurated in the number for the month of August. A reproduction of the most important photographs which have appeared during the preceding month is now given in each issue. Photographs of the latter are frequent add to the interest of this chronicling of the photographic of the month. Here again we find photography lending a helping hand, for the reproductions are invariably photographic blocks. In the August number already referred to, portraits of Mrs. Langtry, Millais and Leighton are given. In the September number, portraits of the Duchess of Teck and Princess Victoria, and the Bishop of Wakefield appear. In October, Cardinal Sylva Tarouca and several portraits of the Chief Australasian Premiers. What are figured; while the most recent, that of November, contains two reproductions of portraits and eight distinctive views of the recent Temperance trade demonstration by Mr. Hartley, the principal of Fellowfield & Co., with his "Faith" lined above.

A monthly art collection has recently been issued under the title of *Sun Artists*. It has now reached its fifth number, and the photographic productions of such men as Gale, H. P. Robinson, Lyd Sawyer, Robinson, are reproduced in photogravure. The last number is devoted to the work done by the late Mrs. Julia Cameron.

Then, again, there has been running for some time a publication appearing monthly, published by Cassell's, and entitled *Cabinet Portrait Gallery*. With each number there is given a Woodburytype Construction are given of celebrities of the day with appropriate letterpress. I have the number published with me this morning, and you can inspect them afterwards. A very interesting work, by Wright, of London, having as title *The Romance of Photography*, appeared not long ago. It appeals, however, more directly to those interested in the history of our art. Some portraits are therein reproduced of the pioneers of photography that I have not seen anywhere else, notably Archer, Reade, Bernard, Cockburn, &c.; they are collotype, and although somewhat small, convey a great deal. The book is here for your inspection.

Enough has been said to show how very active on all sides we find photographic literature extending. Surely this is a testimony, if testimony be needed, that our art is advancing by leaps and by bounds, that it is in very deed becoming part and parcel of the daily life. As an Association it is our high privilege to take part in the general advancement of photography which we see going on all around us. We surely would not be true to the purposes and aims of this Association of ours if we did not feel—if each one of us did not feel—a glowing enthusiasm for that art which may truly be said to have wrought wonders in the past, and which I may safely venture to affirm has a still greater future before it. The possibilities of photography are in no sense to be limited and confined, and he would be a bold man who would assert that the highest pinnacle of photographic discovery and photographic utility has now been reached. I think the lines of exhortation in the well-known poem of Longfellow appeal no less strongly to us as a corporate body than they do to the individual—

> "Let us then be up and doing,
> With a heart for any fate,
> still achieving, still pursuing,
> learn to labour and to wait."

We are pleased to learn that the unpleasantness, relating to card mounts, between the well-known photographer, Mr. Vandyke, of Liverpool, and the London firm of Messrs. Marion & Co., and which resulted in an important lawsuit reported in these pages, has been amicably settled; so that we shall hear no more of it.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

NATIONAL ASSOCIATION OF PROFESSIONAL PHOTOGRAPHERS.

To the EDITOR.

SIR,—In the report of the meeting of the above Association in last week's issue I find I am credited with part of the speech delivered by Mr. Slingsby. As I have no wish to detract from the merits of that excellent speech, please insert this disclaimer; and I would also like to point out, a printer's error has made Mr. H. J. Whitlock, the well-known photographer of New-street, Birmingham, into Mr. Whittock.—I am, yours, &c., CHAS. P. RICHARDS, *Hon. Sec. pro tem.*

Cavendish Studio, Barrow-in-Furness, December 9, 1890.

PHOTOGRAPHIC ARTISTS' AND ASSISTANTS' UNION.

To the EDITOR.

SIR,—I will not trouble you nor your readers with a long reply to the able but pessimistic article on "Trade Unionism" which appeared in your last issue: suffice it to draw attention to a few points of interest therein. Your contributor says that examinations do not always qualify, and that the qualification of apprenticeship is now seldom available. This is true, and he might have added that "specimens" are a fraud; that the receipt of a high wage is not always a guarantee of efficiency; that testimonials lie; and that "all earthly hopes are dust and ashes." But I advise him not to give way to despair. Other unions ensure competence to a great extent by requiring that every applicant shall have received the market rate for good labour. We shall do the same thing among others.

The growth of the business necessitating continuous subdivision of labour, Mr. Richmond imagines that no union of general utility to the workers in the business is possible. On the contrary, wherever unions in sections of trades exist at present contrenial efforts are being made to cause the unions of other sections to amalgamate, or at least to federate. It is found to be an advantage and not a weakness to have all branches of a trade at one in their demands and actions. Do we think it right to have an army composed entirely of cavalry, or of artillery, or of infantry?

Mr. Richmond instances about a dozen chief divisions of our business, and he might have mentioned thirty; but the number of divisions will not affect their organization. As proof of this I may cite the divisions of trade included in the Amalgamated Society of Engineers:—Smiths, fitters, turners, pattern makers, millwrights, planers, slotters, and borers, mechanical draughtsmen, brass finishers, coppersmiths employed in engineering, machine joiners, shipsmiths. The trade of a millwright and a machine joiner is as much that of a carpenter as of an engineer, and a pattern maker is a wood worker. Iron, brass, copper, and woodwork are united in the strongest trade organization in the world.

Concerning the Photo-Engravers' Union, I wish it the best of luck, and believe it will succeed. Personal feelings have no influence with me in the struggle for unity. I have every hope that when our photographic union is finally floated the photo-engraving sections will recognise the advisability of joining our amalgamation.

Mr. Richmond says that in connexion with our movement nothing of any moment appears to have been done. (I am speaking without his article, so that I am open to correction.) The proverb has it that appearances are deceptive. Very much so in this case: for in July a meeting was held of delegates from a few London studios which declared in favour of the formation of a union. As we could not put our finger on any man or men willing to take up the work of the branches and general organization, we took refuge in a proposal of one of the gentlemen present to form a labour registry as a first step. He said he had a means at his disposal to ensure its success. We dispersed, and waited some time for this "means," but it never came to hand. Our disappointment was great when he informed us that he had to confess his scheme impracticable. We are now going to make up for this delay by taking up the work with redoubled energy at a public meeting on Wednesday, January 21, 1891 (eight p.m.), at the Polytechnic Institute, Regent-street, London, W., Mr. Thomas Bolas, F.C.S., F.I.C. (late of the *Photographic News* and *Photographic Review*), in the chair. I now make an urgent appeal to every class of photographic workers, without exception, to attend this meeting, and to cause others to attend it.

Delegates from the trade unions of clerks, lithographic artists, photographic engravers, photographic cabinet makers, &c. will speak to the practicability of unionism in highly skilled occupations. Our proposal has received written expressions of sympathy from Captain Abney, Mr. Redmond Barratt, Messrs. the Editors of *Photography* and the *Practical Photographer*, and other lights of the art.

Men who want to help us in this work, which will, of course, be uphill, but which will soon be successful, can do so in a very practical way. Our movement will find the same obstacle in its way as before; that is to say, the want of men who will act as branch secretaries. We have no definite promises in this direction. We are confident of success if we can but

direct applicants to secretaries in their districts ready and anxious to instruct them in unionism and enrol them in our union, and to urge on wavereers, doubters, and questioners the advantages and the practical nature of unionism. Our system of work will obviate dangers to branch officers arising from their prominence in the movement. The system of organizing and the secretarial duties will be communicated to all who respond to my appeal for branch help. Response "to be effective must be immediate," as the newspapers say.

Help in the distribution of bills (which I will send on application as soon as printed) announcing the meeting at the Polytechnic will be appreciated by—Yours, &c., ARTHUR FIELD.

Maidstone.

SPOTS ON PRINTS.

To the EDITOR.

SIR,—I have noticed in the JOURNAL lately several correspondents are troubled with spots in silver prints appearing on the morning after the prints are washed. I have also been troubled in the same manner, and after trying many remedies without success, I found that the hypo was used excessively strong. If your correspondents will try a ten per cent. solution (one pound of hypo to the gallon of water), I think they will find their trouble removed.—I am, yours, &c.,

99, *High-street, Portsmouth, December* 9, 1889. HARRY SYMONDS.

THE CLAUDE LORAINE MIRROR.

To the EDITOR.

SIR,—I was glad to see in your notice of the *Photographic Quarterly* last week that you bring forward the utility of the Claude Loraine Mirror in landscape photography. During the Birmingham Convention in 1888 I showed and explained the use of the mirror to several of the members, and in the last volume of the *International Annual* I wrote as follows:—"For the landscape photographer a Claude Loraine mirror is a most useful article in enabling one to select and compose a view. These mirrors are made of black plate glass ground to a curve, and are used by French artists."—I am, yours, &c., WILLIAMS R. KENNAN.

35, *Dame-street, Dublin, December* 8, 1890.

LOWER TRAVELLING FARES FOR PHOTOGRAPHERS.

To the EDITOR.

SIR,—I am glad to see that the West London Photographic Society is making a move in the right direction of lower fares for "tourist photographers" (by which I conclude is meant amateurs). It is only right that amateurs should have the same privileges as those now enjoyed by anglers. At the same time we cannot expect railway companies to grant a lower rate to all photographers, amateur and professional. For this reason I think societies should be formed, the members of which should be *bond fide* amateurs, viz., men who take up photography solely as a pleasure, and do not sell their work.

A man now considers himself an amateur (although he sells his work) so long as he has not a shop, and has not any rates, taxes, or insurance to pay. This man, I think, would be more correctly called shamateur, or amateur-professional, and should not be allowed the privileges enjoyed by amateurs, as he injures both amateurs and professionals—the former by selling photographs of places he has obtained permission to photograph, thereby preventing permission being given in future to others for fear they should be one of the "selling amateurs," and the latter by selling his work at a cheaper rate than the professional can afford to do. If a man wants to sell his work by all means let him do it, but he has no business in our amateur societies, and has no right to the name of amateur. He should be regarded as an enemy by both amateurs and professionals.—I am, yours, &c., AN AMATEUR.

Hanley, Staffs., December 8, 1890.

PRINTING FRAMES WITH UNEQUALLY DIVIDED BACKS.

To the EDITOR.

SIR,—Under the heading of "Our Editorial Table" in last week's issue of your very popular JOURNAL, we observe a notice of a printing frame said to have been brought out by Mr. William Tylar of Birmingham, the main feature of which consists in an unequal division of the hinged back. We may mention that all our printing frames have been made on this principle for the past six years, and we know one or two other houses who have also constructed their printing frames on the same plan for some time past. We send one of our printing frames herewith that you may compare it with Mr. Tylar's.—We are, yours, &c., Ross & Co.

142, *New Bond-street, London, W., December* 10, 1890.

[The frame received with the above is an exceedingly well-made one in every respect, and certainly bears out all Messrs. Ross & Co. can possibly claim for it.—ED.]

FRENCH CORRESPONDENCE.

(From our own Correspondent.)

Natural Colours, a Canard from the Far East—M. Léon Vidal's Lecture at Lyons—Paris Photo Club—Photographic Assistants—THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC *for* 1891—*Meeting of the Photographic Society of France (M. Janssen takes the Presidency)—On the Forthcoming Photographic Congress—A New Panoramic Camera—A Demand for the Bust of Daguerre—A very Interesting Communication from M. Balagny on Hydroquinone Development—A Modified Formula—Detective Cameras—Lantern Exhibition.*

GREAT excitement has been caused in France by a note in one of the principal newspapers announcing that a Japanese chemist had discovered a means of fixing the colours of the camera. This will certainly, if true, be the most wonderful discovery of the nineteenth century. We must wait patiently the confirmation of this good news; but if we are to wait as long as the length of the name of the happy discoverer, which is composed of forty-two letters, it will be too long a time for our impatience to welcome such a *desideratum*.

M. Léon Vidal, whose efforts to popularise orthoscopic preparations are well known, gave a lecture on the 15th of last November, at Lyons, to a numerous audience, on photographic colouration, explained the different dodges employed to obtain polychromic impressions, by typography, collography, photoglyptic, and by engraved plates. As to natural colours, said M. Vidal, it is very possible that their reproduction will still remain a *desideratum*.

The above-mentioned Club held their monthly meeting on the 12th of November last. Many presentations were made, among which was a novelty—that of a photographic apparatus in the shape of a necktie. The lens represents a gold pin in the centre. Six or eight negatives can be taken about an inch square. A rapid shutter is adjusted with a pneumatic ball. The series of proofs made with this apparatus were very good. M. Block is the inventor. A very pleasant evening was spent with dissolving views.

The above-mentioned club of Paris has just opened its exhibition of amateur work, which is very praiseworthy. Prizes will be given. The judges have been chosen from among the most influential members of the Photographic Society of France.

A great deal of dissatisfaction is exhibited in France, in that the photographic profession require protection against their assistants. The latter are unfortunately very ignorant, but, however, claim heavy salaries. A photographer requires a printer, one presents himself, so much per month is agreed upon. Alas! the master soon perceives that the printer knows little of the business. Nevertheless, by law the master must give him eight days' notice, and allow him two hours per day to seek another situation; and in giving a testimonial, the master must be careful indeed not to say a word against the fellow's capacity, simply stating the day he entered and the date of his exit.

Some time ago La Chambre Syndicale de la Photographie organized a series of examinations, and gave diplomas of competence to photographic operators and assistants who presented themselves, but I believe few gained the diploma, and others would not submit to the ordeal. It would be well for photographers not to accept an assistant without being in possession of his certificate of capacity.

THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC for 1891 has just arrived. My compliments to the Editor. What an immense amount of useful information got together in so short a time! Really it is wonderful! The progress of photography may be traced by its literature. I have before me an ALMANAC of 1872—only eighteen years old. What a difference in size! If at that period the Editor had time to spare, it may be doubted if he reposes upon a bed of roses at the present time, so as to keep, as he does, equal to the spirit of the times.

The Photographic Society of France held their December meeting on Friday evening last. M. Davanne introduced M. Janssen, the celebrated astronomer, who had been elected as President at the last meeting of the Society. M. Davanne, in a few well-chosen words, informed the members of the service that M. Janssen had always granted to the adepts of the black art; how photography, thanks to him, had obtained a firm footing in scientific establishments, &c.

M. JANSSEN replied, thanking the members for the honour done him, &c. He said that he had always a foresight of the usefulness of photography for scientific observations, and especially for astronomy; mentioned the magnificent results obtained by Messrs. Henry at the Paris Observatory; gave it as his opinion that ere long more wonderful things would be brought to light by its agency, and that the wonderful progress the art had made since its discovery which did not go back to more than three-quarters of a century, was not so extraordinary, as it was based on the power of light, the most rapid, the most wonderful, and the most useful power here below.

Mr. Warnerke, from London, and M. Blockhouse, from Brussels, being present, were invited to take seats beside the President. These gentlemen, being members of the Permanent Commission of the Photographic Congress, had come to Paris in order to arrange for the forthcoming Congress to be held at Brussels. It being international, the photographic societies and associations of England would do well to vote for and nominate delegates entrusted to represent the photographic community at the next Congress to be held at Brussels. This not having been done at the last Congress held in Paris during the exhibition, the work of that Congress did not receive the unanimous support and the consideration it would have received had England sent delegates to express their views on the subjects under discussion. The Congress, however, worked faithfully and well, as can be seen by the report of M. Pector, of which I spoke in my last.

M. Londe presented a panoramic camera invented by M. Damoizeau, a very pretty and well-made machine, clockwork movement to work the rollers, which can accommodate five or six yards of sensitive film. Will panoramic cameras obtain success? that is the question, when we consider the very few occasions to employ them, and the difficulty to be experienced, viz., one part of the view being properly illuminated, the other being in a false light. When obtained, to see the view rightly it ought to be pasted in a drum-like apparatus, in the

centre of which the observer ought to stand. M. Londe presented the photo-necktie of which I spoke as presented to the Paris Camera Club.

M. Mercier made a communication on a rapid process to analyse silver baths (will be sent in my next).

M. Farrel presented a camera stand, in which he had contrived a system of hooks so as to fit the three legs on to the top, so that the latter should remain flat for convenience in packing.

Professor Stebbing laid before the Society a letter from Mr. A. F. Taylor, Secretary of the Ealing Photographic Society, requesting a donation of the bust of Daguerre. The Society will have the pleasure to grant and send it on in a few days.

M. Balagny then gave a very interesting and complete explanation of a modified formula of the hydroquinone development which he gave to the Society in July, 1889, and which was published in The British Journal of Photography. I may truly say that this presentation was the chief cause of the success which hydroquinone has obtained in France, and M. Balagny has the honour of being its introducer into France. M. Balagny began his discourse in the following words:—More than two years have passed away since I pointed out to the members of our Society what I thought the best means to be employed to develop negatives by hydroquinone. It may truly be said that since that time this developer has made its way, and that at the present day the greater number of photographers and amateurs employ it to the exclusion of every other. It may be said that the appearance of this reagent gave rise to a new industry, in that as it could be preserved a long time, it was been offered to the public like quack medicines—now liquid, as a powder, as lozenges, and as pills. The chemists as well as the druggists found their interest in composing a secret developer, and as one could obtain powders to make soda-water, with the same ease one could go to a colour merchant's and purchase a packet or box of some extraordinary developer: naturally the buyer was kept in ignorance of its composition. By such means photography was soon learned, no lessons were required, and if the number of persons who dabbled in photography became numerous, it was to the detriment of that art.

Certainly the standard of photography went down rapidly at that time. The same intelligence did not direct it as formerly, when amateurs made it a point of honour to create a style of their own. It is to this happy period, which I cannot believe to have been lost for ever, that all our endeavours should be given in order to draw amateurs' attention to artistic work, from which they have unhappily been drawn away by the attractions of the instantaneous process.

It is impossible that we should wish the photographic art to be solely mechanical, but nothing can prevent us from endeavouring to learn to master the process of development, in order, if possible, to render the latter automatic, so I imagine that we have sufficient to do in the judicious choice of the subject, the artistic position to give it, and the obtaining of the clichés, without stretching our imaginations to the extreme in the development of the negative.

Such hesitations were natural when we employed pyrogallic acid; that is why I and many others abandoned its use, because greater security could be obtained by hydroquinone, and whose qualities we discovered by many experiments. Nevertheless, we soon perceived that a modification of our first formula was necessary. The reason that we did not give the Society the advantage of our experiments until this evening is that we did not wish to fight against the numerous developers put on the markets, which, like comets, no sooner did they appear than they vanished, deserted by the operator, being found wanting.

It was necessary to allow public opinion to judge of the merits of each, and we ourselves completed time to wait and to find something superior to what we had already developed. During two years we have employed the modified formula, which we shall give the Society this evening. It is our duty to say here that during the silence of the month of July, 1889, one of the members of the Photographic Society of France gave us a formula not very dissimilar to our own, and we are happy, indeed, that we are of the same opinion, but his results appeared to differ essentially from our own, which we will give in detail.

First of all, why do we change from our first method and formula?

Because we discovered in practice two obstacles. The first was that the hard harshness of a negative, and was only to be thrown away. This was traced to the employment of carbonate of soda in the preparation of the bath.

The second obstacle in the way of the employment of the first formula was that as soon as the solution got a little old, although it developed very well, the image had a tendency to intensify a little too much the blacks of the clichés.

In seeking the reason of this harshness, we traced its cause to the carbonate of soda, part of the latter salt being employed in the solution of the hydroquinone; whereas by employing one of the fixed alkalies, viz., caustic potash, in its lieu and stead, a softness was communicated to the negative, as well as an amount of energy hitherto unknown. A certain number of photographers becoming aware of this property began to compare solutions, which were sold under different names, and with which amateurs had their negatives *fond-voyes* and not developed.

These are the reasons why we adopted a modification of our first formula, and chose caustic potash in the composition of our modified developing solutions.

We will now occupy ourselves with the composition of the baths. We may say before hand that for the future we shall have two, one containing the hydroquinone and the other the alkali.

SOLUTION A.

Water	1000 c.c.
Sulphite of soda	250 grammes.

Boil the water and dissolve the sodic salt, then add—

Hydroquinone	20 grammes.

Shake or stir until completely dissolved.

When the solution is cooled down put it into a glass bottle and cork down.

SOLUTION B.

Water	900 c.c.
Caustic potash	100 grammes.

When dissolved add the following solution, which is easier to be made when heat is applied—

Water	100 c.c.
Yellow ferrocyanide of potassium	10 grammes.

(This solution gives softness and preserves the whites).

It is necessary to have in stock a third solution made as follows:—

SOLUTION C.

Water	100 c.c.
Bromide of potassium	10 grammes.

The solution of bromide is only employed with a new bath.

To develop an instantaneous half-plate take—

Solution A	80 c.c.
Water	40 ,,
Solution C	1 ,,

The plate is placed on the bottom of a glass tray and the above solution poured upon it. Allow it to remain upon the plate about half a minute.

The glass measure employed to measure out the above solution being now empty, pour into it 2 c.c. of solution B, then empty the contents of the tray upon it and flood the plate again. Allow a few seconds to elapse, then take 2 c.c. more of B and act in the same manner, and so on until the image begins to appear. As soon as the image is faintly seen the addition of the alkali must cease, except when only the high lights alone show themselves and the half tones will not appear, then and only then must more alkali (solution B) be added, and by 2 c.c. each time. If sufficient exposure has been given sooner or later the half tones will appear.

It is desirable that the details come out quickly, so that the *cliché* remains brilliant.

M. Balagny then entered into a description of how a camera and its dark slides should be manufactured in order to prevent fog, even in full sun. As such cameras can now be obtained, I will refrain from following M. Balagny for want of space.

At last M. Balagny returned to his subject. As soon as the whole of the details of the clichés have appeared the development is stopped by carefully washing the plates. Here comes in, said he, a question which occupies, and has occupied, amateurs and others for a very long time; it is the yellow tint which the negatives sometimes take. We repeat what we have already said on the subject, that this tint only presents itself in the hyposulphite of soda solution, and only when the film has an alkaline reaction.

If we acidulate the film in stopping the negative in an acid bath the yellow tint will no more be seen. We recommended a year ago citric acid for this purpose, but we have abandoned it since, as we found that it softened the gelatine of the negative. We now employ tartaric acid (25 grammes for 1000 c.c. of water). After development the *clichés* is well washed, then steeped in the acid solution for half a minute. Since we have employed tartaric acid we have never had a failure; therefore we do not hesitate in saying that this acid is a preventive of the hydroquinone stain. After the immersion of the negative in the acid bath it is well washed, then the fixing takes place in a twenty per cent. solution of hyposulphite of soda.

Composition of a new bath for exposed negatives:—

Water	80 c.c.
Solution A	40 ,,
,, C	4 ,,

The same manner of working must be followed as for instantaneous negatives.

When a certain number of negatives have been developed the bath is said to be old, but it can be used over and over again in this wise:—

Old solution	100 c.c.
Solution A	25 ,,

The same manner of working as described for instantaneous work, such as adding the alkali by 2 c.c. at a time.

It is wise to fill up the bottle containing the old bath and to cork it well.

A number of detective cameras were presented, but offered no particular interest.

The meeting was closed by a lantern exhibition, in which was shown the coloration of silk, microbes, and other micro-photographical preparations obtained by Messrs. Lumière, of Lyons.

Exchange Column.

Pair of lanterns, oxyhydrogen light apparatus complete, including sixty-feet cylinder, in exchange for value.—Address, Wyles, Southport.

I will exchange limelight lantern, mahogany body, four-inch condenser, portrait lens, in new condition, for a good biunial lantern. Cash adjustment. Address, C. S. Leonard, 75, Dale-street, Batley Carr, Yorkshire.

Will exchange Ross No. 2 Universal lens and C.-D.-V. studio camera with repeating back for a modern light-pattern 12 × 10 camera with double-slides; must be by a good maker.—Address, T. Waterman, Photographer, &c., Shanklin, Isle of Wight.

Wanted, photographic studio made in sections, or tenants' fixture preferred, and accessories, will give in exchange a Rudge convertible tandem tricycle in excellent order and condition, with lamp and all accessories complete.—Address, A. D., Clarke, Paulton, Rugby.

Wanted, quarter-plate portrait lens, half-plate camera, and a Ross' No. 2 Universal in exchange for cabinet portrait lens, whole-plate Lancaster's International lens, or magic lantern with four-inch condensers. Cash adjustment up to 5*l.* for Ross' lens.—Address, W. R. Fairey, Harrold, Bedford.

Mr. E. Schuman, who is resigning his position as cashier to Messrs. Mawson & Swan, Mosley-street, Newcastle, was on Tuesday, the 2nd inst., the recipient of a handsome timepiece, the gift of the *employés* of the above firm, as a token of the esteem in which he is held by them.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for* "*Answers*" *and* "*Exchanges*," *must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:—

A. G. Gibson, Penzance.—*Photograph of J. G. Moyle, M.R.C.S.*

T. STOKOE.—Thanks.

G. M.—Article received all right.

THOS. TOMLINSON.—Kindly communicate.

DENZIL IBBETSON (Gujranwala).—Received with thanks.

HOT ROLLING PRESS.—One hot rolling press will do as well as another for unmounted prints.

H. W. A.—1. Precipitate the gold with protosulphate of iron.—2. No.—3. The price ought to suit you.—4. We cannot tell unless we knew the nature of the process.

DENIS R. THOMPSON.—1. There is no handbook on the collodion transfer process.—2. Avoid any process that gives great density, for in collodion transfers density confers an unpleasant heaviness.

A. C.—Use one or two sheets of ground glass between the light and the negative, or, perhaps, one sheet and a piece of blue glass. For a reflector, an ordinary tin one, such as supplied with the lamps, will answer.

D. E. A.—The sheet of paper sent is decidedly faulty. The streaks are due to the albumen running in lines when suspended for drying. As the defects exist in unsensitised paper, they cannot, of course, be avoided in the sensitising.

PUZZLED (Coventry).—The answer referred to applied to something totally different from what you surmise. No good would result from analysing the sample of hyposulphite of soda you send, there being so many different makes in the market.

C. W. PAYNE.—1. Boil a little longer.—2. Good soluble gelatine, with just enough bichromate of potash not to crystallise when dry. For etching, employ dilute nitric acid. The zinc plates may be obtained from any dealer in lithographic materials.

SUBSCRIBER (Glasgow).—It does not follow because the interior of the mounts is of a different material from that of which the outside is composed that the boards are unfit for use. All mounts are made with an inferior material for the middles unless they are the best "Bristol boards," which are exceedingly expensive.

C. P.—If you can only obtain light from the south in the studio you propose to build it had better be glazed with ground glass. The proportions, thirty-one feet by twelve, will do very well. At the end the sitter is placed the eaves may be about eight feet from the floor, and the ridge, say, thirteen; the other end may be as high as convenient.

J. C. MILBURNE inquires: "1. Is a certificate of registration given at Stationers' Hall for each photograph sent there to obtain copyright?—2. Is it necessary to title photographs so sent?—3. Is Stationers' Hall available to the public for copyright search?"—In reply: 1. Not unless specially paid for.—2. Not necessary, but better to do so.—3. Yes.

W. A. asks our opinion of a certain dealer's lenses, as they are advertised at about a third of the price of those of the leading opticians, and he says if they are as good he will purchase one.—As we have never seen any of the lenses mentioned, we, of course, can give no opinion on their merits. Anyhow, we should advise our correspondent, seeing they are such low-priced instruments, to arrange for a trial before purchasing.

LENS.—1. The letter "*f*" means the focus of the lens, and *f*-16 means that the aperture in the stop is a sixteenth of the focus.—2. A symmetrical lens means one in which the front and back are similar in form and focus. These may be either wide or narrow angle, according to the covering power.—3. For obtaining vertical lines in a building, or in copying, it is necessary that the plate be in quite a vertical position when the exposure is made.

WM. JINKINS says: "I see in the JOURNAL of November 21, in answer to a correspondent, "Positive," a receipt for cold varnish—dammar resin and benzol: will you kindly let me know what quantity of resin should I put to one pint of benzol, and you will oblige?"—A definite formula is difficult to give, inasmuch as samples of dammar vary. The best plan is to make a tolerably thick solution in the first instance and then thin it down to the required consistence.

ANTIPODEAN.—Thanks for the pictures; they are quite on a par with English work, the portraits especially. The landscapes, if produced here, would have had clouds printed in, which would have enhanced them a little pictorially. When the sky in nature is cloudless, then if it be slightly toned, so as to destroy its excessive whiteness, it will add to the artistic merit of the picture. What you term the "naturalistic fad" has acquired but exceedingly small proportions here. We shall be pleased to hear from you at any time.

K. C. writes: "Mr. Stuart in his letter of the 10th of November, and published in your issue of the 14th ult., states that he has found out the cause of blistering of silver prints, and that now he never has a blister with any kind of paper. Will he kindly favour us with his method of treating prints, and so save to many the annoyance and great loss entailed by these abominable blisters? I am sure all amateurs will be very glad of the information, and I know it will save many a big D being used."—Our correspondent will find Mr. Stuart's method fully described on pp. 618 and 619 of our ALMANAC for 1890.

MISS BRASEL (Biarritz).—No articles on the subject mentioned have previously appeared in this JOURNAL. Every amateur, on the hints we gave, can extemporise an apparatus with such materials as come most readily to hand.

SUBSCRIBER (Rome).—All the crystals of eikonogen in our possession, with the exception of some received quite recently from Marion & Co., have become dark in colour, even those in original packages just opened. But, although discoloured, it has not to any great extent lost its developing powers. We are not prepared at present to assign a cause for the discolouring. It is gratifying, however, to know that the problem has been successfully investigated by the manufacturers, and that this drawback may now be said to be becoming a thing of the past.

VARNA writes: "Having ordered a small quantity of sensitised paper per Book Post, the dealer writes me, 'The Postal authorities refuse to forward these photographic papers per Book Post, the package has therefore been despatched by Parcel Post.' Surely this must be an error or an innovation, because I have before now received bromide, &c., papers from the United Kingdom by Book Post. From this end any such papers or negatives can be despatched per Book Post, and also many things per Sample Post which the British Postal authorities refuse to accept unless as parcels."—According to the regulations of the Post Office, all Book Post parcels must have the ends left open. It is manifest that it would never do to transmit sensitive paper under these conditions; hence the dealer sent it *safely* packed.

MESSRS. TEAR & SON send us the following communication:—'We have just noticed your report of Mr. Slingsby's demonstration of the working of his "flash-light" arrangement. As we are engaged to give a similar exhibition we are anxious to state that the practice of using a piece of magnesium ribbon to initiate the eyes of the sitter has been adopted by our firm for some time. On our visit to the demonstration on the 1st inst. (Monday) no ribbon was used in our presence by Mr. Slingsby, and we were not aware of any artist adopting this method until we read your to-day's JOURNAL.—Mr. Moule, who was the first to use a sudden light in taking portraits, always focussed his sitters by a strong gas flame placed in close proximity to the eyes of the sitter, so that the pupil might become accustomed to a brilliant light.

T. ROSS says: "1. Lately I have been troubled by my plates becoming marked if left in the slides for any length of time, and after careful examination I feel satisfied that the marking is caused by the leather which forms the hinge. I should therefore esteem it a great favour if you will inform me through your JOURNAL what is the best thing to do with the slides in order to overcome the evil.—2. I have a wooden dish in which I fix my prints, and though it was perfectly water-tight when first made, about four months ago, I find it now leaks, and thought of trying paraffin wax to make it waterproof, but did not know if the wax would answer, owing to the wood being saturated with the hypo. Your advice on this matter will also be greatly esteemed."—In reply: 1. No doubt. Get the present hinges replaced with an inert material, which the camera maker can now supply.—2. Paraffin wax will answer perfectly, but it will be necessary to get the "hypo" out of the wood before its application. This can be done by soaking the vessel in water.

PHOTOGRAPHIC CLUB.—Subject for discussion, Wednesday, December 17, *Photographic Playthings*. December 24, No meeting. December 31, Lantern night.

LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.—December 18. Ordinary meeting, which will be the *last meeting* at "Masons' Hall Tavern." January 1, 1891, Opening meeting at the new quarters, at the "Champion Hotel," Aldersgate-street, close to the General Post Office. Visitors invited.

CAMERA CLUB NOTICES.—Monday, December 15, Dark room closed from this date, dismantling for removal. Members requested to remove on or before this day all property from lockers, &c. Thursday, December 18, at a quarter to six p.m., General meeting to consider alteration of rules. See notice enclosed with *Journal*. No meetings will be arranged for between December 18 and January 8. No smoking concert on January 5. Further announcements in January *Journal*.

EXPLOSION OF AN OXYGEN GAUGE.—On Monday last, before Mr. Justice Denman and a special jury, Mr. Joshua Dyson, who resides at Rochdale and is the proprietor of a diorama and public entertainment, sued the Brin's Oxygen Company to recover damages for personal injuries sustained under somewhat peculiar circumstances. The plaintiff, it appeared, had purchased of the defendants two steel cylinders for holding compressed oxygen and hydrogen gases, and a tubular gauge for testing the pressure of the gas. In the course of testing, the gauge gave way and exploded, with the result that the plaintiff was struck in the face by a piece of metal, and was so badly injured that he lost the sight of one eye, and the other eye was so injured that he was in danger of losing that also. The plaintiff's case was that the tube was made of bad material, that the workmanship was defective, and that the gauge was unfit for the use for which it was intended.—The defendants, who obtained the gauge from a firm of gauge-makers, denied that there was any defect in its manufacture, or that it was made negligently, or that there was any negligence on their part.—The jury found for the plaintiff, and judgment was given for 325*l*., the amount of damages agreed upon between the parties.

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THE BRITISH

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AN EIKONOGEN DEVELOPING POWDER.

From a very early period in photography, when as yet the wet collodion process held sway, developing powders have been known. By this term we mean a finely pulverised mixture of the active and qualifying agents comprising a proper working developer, kept in a state of readiness for being dissolved in water whenever required.

The advantages of a developing powder of this nature, more especially to the tourist or travelling photographer, need not be descanted on, as they are sufficiently obvious.

The latest of the developers of the class referred to is one as yet better known in France, or, perhaps more correctly, in the vicinity of Paris, than it is in this country, and is designated *graphol*, which may be broadly translated as "complete developer," from the nature and balancing of its various constituents. In that concerning which we are now writing the active agent is eikonogen, and some time since it formed the theme of a paper communicated to the French Photographic Society by M. P. Mercier. Besides eikonogen, *this* graphol contains borax, carbonate of lithium, a little sugar of milk, and probably other things. It is in the form of a white, dry powder, and through the courtesy of M. Lehmann, of Levallois-Perret, Seine, we have been afforded an opportunity of testing its merits.

Having dissolved some of it in water in the proportion of one drachm to two and a half ounces of water, the image came up slowly, giving a good colour, the lights being clear and bright. The rapidity with which the image appears is dependent upon the proportion of powder to the water.

In his original memoir, M. Mercier, alluding to the generally received opinion that borax or bi-borate of soda is considered as retarding development, says that being in itself alkaline it ought to prove an accelerator; but by investigation he explains the anomaly. Mixed with pyrogallol or certain other analogous bodies it turns them acid, as proved by the reddening of litmus paper; but with hydroquinone or eikonogen no such effect is produced, and therefore it acts as an alkali when mixed with a developer formed of these bodies. As an instance of this, he says that two parts of borax in a hundred parts of water in which two parts of pyrogallic acid are then dissolved possesses no developing power; but if to this a similar quantity of hydroquinone or eikonogen be added, it becomes a developer of an active character.

Concerning the properties of the carbonate of lithium, its equivalent is less than a third of the carbonate of sodium, and it contains no water of crystallisation; and as thirty-seven parts of the former correspond to 143 of the latter, a proportion of 1, approximately, one fifth only of the other is necessary. And as the lithium carbonate contains no free alkali, the developing solution does not fog the image.

The powder (eikonogen graphol) which we have been trying has preserved its whiteness up to the present time; we have been told that it may change to a grey colour, when it will yield a solution of a green colour, but which is, fortunately, as energetic as a developer as that obtained by the powder when in its pristine state of purity.

MANAGEMENT OF LANTERN MEETINGS.

If we may repeat a remark which occurs in the opening part of our article in the Almanac just published, there are few of the photographic societies that are without a lantern night; and as it is the season of the year when such entertainments mostly take place, we have thought that a short reference to some of the small details of non-technical management which go so far to make these gatherings successful will have some appropriateness at the present moment.

However admirably worked the lantern may be from an expert point of view, a matter upon which, perhaps, the great majority of those present at the meeting are not competent judges, the exhibition is almost certain to be a failure in several respects unless the "stage-management," so to speak, has been placed in trustworthy hands. If the non-photographic public, which forms so large a percentage of the audience at these agreeable gatherings, is not educated up to an appreciation of an exhibition of photographs, we rarely witness an inability to enjoy, and on most counts to understand, the merits of a good slide when it is projected on the screen. This is proved by the spontaneous generality of the applause that always greets a specially fine picture, and is to some extent explicable by the circumstance that for many years the optical lantern has been employed for the amusement and instruction of young people at schools and the like, and that some affection for this form of mental recreation has survived the advance of time. Hence we see that a lantern display appeals to the understanding of most people.

The elements of success are to be sought as much outside the manipulation of the instrument as in it. A lantern exhibition calls for a systematic pre-arrangement of details, which if not properly taken in hand will mean all the difference between triumph and failure. This is more apposite in the instances of amateur societies than in those of professional lanternists and others frequently concerned in giving public lectures illustrated by the lantern. Here we shall find that everything is so ordered as to reduce the possibilities of hitches

to the minimum. The lantern operator is skilful and experienced, prepared for emergencies, and trained in the mastery of them; while the lecturer has arranged the matter and the manner of his part up to the last word. We do not always find a similar state of things in societies giving occasional lantern nights. The society may, and generally does, possess its own lantern, but it is not often professionally worked. Again, "an exhibition of members' slides" is usually of an extempore character, so that probably there are two drawbacks, at least, to that anticipation of smoothness which one feels in attending a professionally organized entertainment.

It is a useful practice for a society which holds slide competitions to show the certificated and other competing pictures on the screen, although if the same subjects are chosen by the competitors, as is sometimes the case, an impression of monotony is apt to supervene among a general audience. Repetitions should, if possible, be avoided. Slides with mechanical defects, such as opaque spots in the clear parts, transparent holes in the shadows, scratches, fog splashes, and so forth, should be excluded. Indeed, all productions of an obviously faulty kind ought to be weeded out, for to exhibit them is to depress the average of quality displayed, and thus to react unfairly on those slides that are meritorious. The admission of "lame ducks," which is often made in the "miscellaneous" section that is a common feature of lantern nights, might be prevented by the institution of an official committee of selection. It is true that youth joined to inexperience, as well as inexperience alone, requires encouragement for the promotion of perseverance in amateur photography, but it is scarcely fair that the outside public should be invited to suffer in the cause.

Lantern exhibitions, moreover, have a tendency to spin themselves out to such a length as to induce auditorial weariness. It is possible to have too much of a good thing, and especially of photography. When outsiders are present the display should only form a part of the evening's entertainment, unless a set lecture is to be delivered. The latter is often broken up by music, songs, and recitations—a merciful custom. At a lantern meeting we attended last winter something like two hundred slides were passed through the lantern in about fifty minutes, at the end of which time a second operator came to the relief of his tired colleague and proceeded to carry on the charter with even greater rapidity. Fortunately it was discovered that the audience for the time being had had more than enough, and an interval was called. Including the competition pictures, the number of slides might easily have been reduced by one-half without robbing the audience of any pleasure. It is desirable, in our opinion, that before a public exhibition is ventured upon the technical and pictorial qualities of the slides should touch a reasonable standard of merit. The optical lantern exalts the innate beauties of a good slide, but fatally magnifies the defects of a bad one. The remarks we have heard of non-photographic visitors over the merits and demerits of screen pictures as they appeared to them convince us that society committees would do well not to proceed as if an average audience was incapable of discriminating between good and bad work.

Members are often remiss in marking their slides with the title of the subject, thus creating confusion at a time when confusion is particularly mischievous. It is absurd to expect an operator to guess both the name of the author and the subject; but this kind of improvisation has commonly to be resorted to. These and kindred omissions all help to provoke an audience to merriment in the wrong place, and nobody likes to be laughed at—even in the dark. Perhaps we may usefully direct attention to the suggestion of the Birmingham Society, made a year ago, as to the proper mode of labelling a lantern slide. It should be done on the front of the picture preferably at the top. This recommendation is not nearly so generally carried out as it should be. Let committees of societies holding lantern meetings insist upon the observance of a carefully framed code of rules regulating the identification, mode of handing in, and re-delivery of slides for exhibition, and a clear gain will result in the successful and harmonious conduct of these deservedly popular entertainments.

THE EFFECT OF TEMPERATURE ON DEVELOPMENT

The spell of intensely cold weather that has prevailed for the greater part of the last two or three weeks has produced, no doubt, the usual crop of trouble in many quarters, but perhaps in no respect is greater annoyance caused than by cases of supposed under-exposure. The light at the present season is under the most favourable circumstances, none of the best, but when still further reduced by fog and leaden skies, the necessity for increasing exposures is forced upon every operator. And yet, when every reasonable allowance has been made, even when some form of actinometer is employed, and the exposure increased accordingly, in too many cases feeble images and lack of detail recur with exasperating persistency.

It is not unseasonable therefore to repeat the warning frequently given in the past to look to the temperature not only of the developing room itself, but also of the stock solutions, and especially of the water used in mixing the developer. It is not too much to say that plate makers receive more undeserved abuse, and more failures are set down incorrectly to under-exposure at this time of year, or during the prevalence of such weather as we have had lately, than under any other circumstances, and solely in consequence of disregard of the altered conditions attending the lowered temperature.

How greatly the conditions of development are modified by a sudden change of temperature was brought forcibly under our notice a few days ago upon resuming the development of a number of plates exposed some six weeks ago, a portion only of which had been developed at the time, the remainder being left over. The exposures had all been short—a fraction of a second—but tolerably uniform, the subjects being all of a similar character, and so far as those previously developed were concerned, had proved sufficient when treated with a knowledge of the circumstances. On resuming development, however, pyro and ammonia failed entirely in giving anything but the merest ghost of an image; so we were fain to avail ourselves of the extra energy alleged to be one of the chief features of eikonogen, but even this in two or three trials fell short of producing the desired result.

It was then that the question of temperature forced itself on our attention, and here a peculiarity in connexion with pyro and eikonogen development respectively made itself apparent. Whereas when the developing solutions were made up with water direct from the tap, and necessarily very cold, the difference between the images produced by the two agents was very pronounced when water tempered to about 65° Fahr. was employed, the results were practically identical, and negatives in every way equal to those obtained when the

weather was warmer were obtained. This seemed to establish the fact that development with pyro is far more powerfully influenced by the temperature of the solution than is the case with eikonogen, and suggested the question as to how hydroquinone compares with its rivals.

Hydroquinone, as we all know, is, under like conditions, far slower in its action than pyro or eikonogen; but a way out of this difficulty was put forward by some of its earlier friends in the recommendation to slightly raise the temperature, thus showing that its susceptibility to this influence was fully recognised. Upon submitting plates similarly exposed to the action of the three developers, hydroquinone, as we were prepared to find, proved to be far more strongly influenced than either of the others, eikonogen, as already stated, being least so, and pyro occupying the midway position. Indeed, with an exposure that sufficed to give detail under treatment with eikonogen when mixed with water at a temperature but a few degrees above freezing point, hydroquinone, under similar conditions, appeared scarcely to possess any developing power at all. In view of the great and growing popularity of this developer in many quarters it is therefore of the very highest importance to bear this in view.

Another very curious point of difference between the behaviour of pyro and eikonogen under variations of temperature may also be noticed. Some three or four years ago, in an article on the effect of temperature on development pyro alone being then referred to—it was shown that given a sufficient exposure, a more vigorous result was produced by a cold developer than by one of higher temperature, and such also proved to be the case in our recent experiments. But with eikonogen a precisely reverse result was obtained. With a solution at the low temperature above alluded to it was found impossible with any exposure or with any strength up to ten grains of eikonogen to the ounce to get anything beyond a thin delicate image, while on raising the temperature to 60° or 62° full density was easily obtained with a solution of half the strength. Here, then, is another point it would be well to bear in mind.

With regard to the means to be adopted to remedy the evil of cold solutions, much will depend upon circumstances. The precautions that might satisfy an amateur or small worker would probably be insufficient or inconvenient in a large professional studio, while the elaborate arrangements suitable for work on a large scale would be altogether out of the question for the amateur. For the latter, perhaps, no greater refinement is needed than a jug of warm water with which to bring up the temperature of a second jug to the necessary point, and to use this for, at any rate, mixing the developer and the fixing bath. The temperature of the washing water is a matter of minor importance, except in so far as it affects the expansion of the film; for it must be borne in mind that the use of solutions of varying temperature has been alleged to be a prolific source of frilling. This, however, was in days gone by, when frilling was a greater bugbear than it is at present.

Any method of working on a large scale should at least possess the advantage of being automatic, that is to say, it should not require the constant attention of the operator to keep the temperature properly regulated. This in the majority of cases would fall in the domain of the hot-water engineer. But a very simple, and at the same time efficient, arrangement for a moderate-sized business is found in a small self-supplying cistern in the dark room, refilling itself, as need from, from the main or other source, and warmed by means of a properly protected gas-jet working in connexion with a suitable thermostat or regulator. The best regulator for this purpose that we are acquainted with is that of Reichert, with which we have maintained an even temperature, without the variation of half a degree, for a period of three weeks. It costs but a few shillings, and is wonderfully sensitive, and can be set to any desired temperature.

In dark rooms, as so frequently now illuminated, the method of labelling the various bottles in use is a matter of some importance, the method best combining ease in making and legibility being, perhaps, that in which black varnish is employed, the letters being either written with a camel-hair pencil, or scraped out of an opaque square of black previously painted on, and well dried by baking. Letters so painted, though not indestructible, are very permanent. If the ordinary white label be preferred, it should, for bottles requiring much handling, be varnished with copal varnish, the kind purchasable under the name of "oak varnish" being suitable for the purpose. But before applying a varnish the label should be first sized. The glue or paste employed for mounting prints will be all that is necessary; a thin coat should be laid on, the label dried, and then the varnish applied. Varnishing without sizing will produce a greasy-looking appearance.

Messrs. Merk & Kreitner, of Berlin, have patented in this country a method of etching which also should be suitable for such purposes as we allude to. Their solution is made of, first, ten grains of pure fluoride of ammonium, half a grain of common salt, and half a gramme of carbonate of soda, well pounded in a mortar, and mixed in a bottle with four grammes of concentrated, fuming hydrofluoric acid and two grammes of strong sulphuric acid, the whole being well shaken. Next, there is dissolved, in a separate vessel made of lead, half a gramme of fluoride of potassium in one gramme of ordinary muriatic acid, the heat of a water bath being necessary. To use the liquids, a gramme of the latter mixture is added to the first described the bottle well shaken, and two drops of silicate of soda solution and one of spirits of sal ammoniac added completes the mixture. It may be used with a quill, or laid on with an indiarubber stamp, just as the ordinary coal-tar colour inks are used; but in lieu of a woven fabric pad, one covered with indiarubber should be employed.

An excellent *resumé* of photographic work done in connexion with lunar observations was given a little while ago in the columns of *Nature*, and at the same time an excellent engraving from a photograph of the central region of the moon. This view is one of several taken in March last by the Brothers Henry at the Paris Observatory, and, it is stated, appears to eclipse all previous lunar photographs. The instrument used was the 13-inch equatorial. The superiority of the results is said to be due not only to the perfection of the object glass, but to the use of a secondary magnifier, by means of which the size of the image given by the objective alone was increased fifteen times. The article goes on to suggest that further development of this mode of photographing may be expected.

Many photographers employ systems of speaking tubes to various parts of their premises, or to outside printing rooms. For the future those who wish to employ telephones will be glad to learn that the Bell telephone patent is now expired, and the receiver is open to use by any one. When the Blake transmitter patent expires the two most useful instruments will be available for public use. It is also said that the Postmaster-General has in view a scheme for facilitating telephonic communication for the public.

Most photographers are compelled to be more or less meteorologists, and, whether for outdoor use or to control the operations of the stoker who attends to the furnace for the hot-water pipes, are possessed of a minimum thermometer. As this is the season when

low temperatures are looked for, it will be well to point out that such instruments, when the indicating column is of spirit, are very liable to read, temporarily, too low a temperature. The cause of the error is a portion of the liquid being held in the upper part of the tube by capillary attraction, having arrived there through evaporation or other causes. The upper part of the tube should periodically be examined; if there be a lodgment it may be moved by swinging the instrument sharply round, bulb end outwards.

ON THINGS IN GENERAL.

How often in a single year, at meetings of the various societies, does not the lens-*versus*-perspective question spring up? It would be saddening if it were not maddening to be compelled to listen to the evergreen assertions of the capability of one lens more than another to give good perspective representation of a given object or view (using the word in its ordinary mathematical signification, and disregarding aerial perspective upon which a little argument might be continued). How long will it be before the time arrives when it will not be necessary to point out that all lenses producing rectilinear images will give pictures which when brought to one scale will if superposed be found to be, in regard to outlines, identical in every respect? I found my weary comments on the report of the meeting of the London and Provincial Photographic Association, on page 732 of this JOURNAL, and there would appear little probability of its substantial accuracy being impugned in this instance. I mention the point because the paragraph at the foot of the same page gives a report of a statement that I think Mr. J. Traill Taylor did not make, at any rate in the manner reported. "Mr. Taylor said that any attempt to photograph some object in focus and other objects immediately surrounding it and at the same distance not in focus must fail." Now the front lens of a portrait combination used alone and with a large stop behind it will just do this impossible thing beautifully, and no one has explained the reason more cogently than Mr. J. Traill Taylor himself. With regard to the particular question under discussion, I must say that the objects with the nearest approach to what a photographer terms sharpness that I have noticed in Mr. Emerson's pictures were the nails in a man's boots in one picture, and a large hook (belonging to a draw-well, I think) situated close to the extreme edge of another, and actual mechanical sharpness where the outline of a man's hat and head are clearly cut against what is intended for the sky of a third, this effect being, I presume, obtained by blocking out the original sky. There is a fair amount of sharpness also in the vertical lines of another picture, in which those horizontally inclined are much blurred, through, apparently, a slight up or down motion of the camera.

Speaking still of lenses, I would draw attention to Professor Vogel's excellent suggestion (p. 763) that, in describing the covering power of a lens, its capability should be described by "giving the image in terms of the focal length. If I say the effective image is one and a quarter times the focus, the reader can at once form an opinion of what sized plate the objective can cover, without consulting trigonometrical tables, which are not usually to be found among the photographer's stock-in-trade." So writes the Professor, and is transparently clear; but what he means in the concluding paragraph of his communication when he says, "In general, I regard as good an objective when, with aperture *f*-6 and a stop of *f*-40, it will give good definition over the whole of the plate employed," I will leave to my readers to discover.

The question of stereoscopicity on the lantern screen has appealed to thousands of minds, and numberless have been the occasions when it has been explained to the would-be inventor that the two halves of a stereoscopic slide thrown at once on to a screen, and viewed without further aid, do not produce stereoscopic relief. Why Mr. Varley anticipates that such "relief" will be obtained by rapidly presenting first one and then the other image with scarcely a moment of intermission I fail to understand.

Harking back for a moment to Professor Vogel's paper on testing lenses, it may be worth while suggesting that if, as is believed, the authorities at Kew intend to establish a photographic lens-testing department, after the manner of thermometers, barometers, watches, &c., testing there carried out, it would be advantageous if a body like the Photographic Society of Great Britain were to make suggestions, and they were considered, as to what qualities a lens should be tested for. How or to what extent these qualities were to be tabulated would not fall in the province of an outsider to make remarks upon.

Since my last long letter two interesting questions upon the use of ground glass have cropped up. One is a letter from a writer regarding the use of cutting shapes with one side ground to avoid slipping. I would again point out that for nearly a score of years glasses of this kind have been made by Messrs. Forrest & Co., of Liverpool, and I may say that no one who has used them is likely to employ the plain glass cutters with polished sides.

The other question *re* ground glass was its use for printing rooms. It is just possible, under certain aspects and surroundings, for a window of ground glass to give more light than plain glass would, as stated by Mr. Archer Clark; but for all ordinary purposes ground glass robs the light considerably. Of course, frames directly exposed to the sun would be all the better for a screen of ground glass; and, again, such glass in a well-like room with a high roof partially screened might when receiving the sun's rays, conceivably diffuse in a given direction so much light as to more than counterbalance the loss by obstructing some of the weaker light.

I note that a discussion has been raised about priority of invention of printing frames with backs of uneven size. Very probably each maker has, independently, and ignorant of past work in the same direction, re-invented the obvious improvement. Mr. Tylar has just designed them, apparently; Messrs. Ross write to say they have made them for half a dozen years. But, then, Mr. Watmough Webster also invented them perhaps twice that length of time ago, and no sooner had he published his invention than Captain Abney proved that he had anticipated the latter gentleman's discovery a long time before. Clearly "great minds think alike!"

FREE LANCE.

WINTER WORK.

ENFORCED idleness is with many photographers occasionally unavoidable during the dark, foggy winter days, and they are at their wits' end how to fill up their time with any approach to profitableness, not but that there are many processes to be worked to the best advantage with artificial light even if an unlimited supply of the natural article is available. With many the result of such work is neither required or desired, simply because in their particular business there is little or no demand for the results. I now allude to lantern-slide making, bromide printing and enlarging, and other special work requiring artificial light, &c.

A special work for dark winter days to generally commend itself as a fill gap, must be of some substantial use and incur but little outlay, and also something that although it may be favourably considered is not sufficient to induce the busy photographer to devote the valuable time of brighter days to its accomplishment. The following is possibly something that will commend itself to those who do not feel inclined to forsake their usual beaten path of ordinary work for anything that seems to require a special trouble and with a problematical profit, or the production of results that may scarcely ever be in demand in the usual run of their businesses. I allude to a novelty in the finishing of prints, attractive and pretty, requiring nothing more than the expenditure of a little time and taste, which I fancy will amply repay for the spare hours so occupied. Photographers will call to mind the paper masks in the form of leaves that laid on a vignette prepared in the ordinary way will give the effect of a portrait on a white leaf with a dark margin; at the best there is a crudity about the results that does not altogether satisfy an artistic taste. A modification of this plan will, I think, be acceptable and introduce a pretty variety into the ordinary work. The necessary materials required are exceedingly simple and inexpensive, consisting as they do of a couple of stout, smooth boards and a few sheets of blotting paper, with a handful of delicate grasses, leaves, and ferns, procurable all the year round. Set to work to select a number of delicate sprays of grass, ferns, &c., and lay them carefully out on the blotting paper, cover them with more paper, placing them between the boards under pressure to dry after the manner of forming a *Hortus Siccus*. Here then with the addition of a little thick gum water and a few pieces of clear glass we are prepared to set to work. Lay on the table a piece of white paper of the size of the print required, say cabinet, and place on it

the glass: now with the aid of the gum water attach small pieces of dried fern and grass in a suitable grouping in the centre; place a larger leaf, say one of ivy, which in order to make it a better screen has had a coat of black varnish, and is of sufficient size to contain the vignetted head. Of course, the thinner these leaves, &c., are, the better it is: the stalk, joints, and midrib when thick may be shaved down with a sharp knife.

A vignette, being printed in the usual manner, is then covered with this floral or leafy mask, and printed until the margin is considered of a proper depth of colour. We shall now, in all probability, find the different thicknesses of the lighter sprays and leaves have a somewhat crude effect. To obviate this, cover up the portrait part with a tuft of cotton wool, kept in place with a small weight, and expose to the light until the necessary toning down has taken place, and a proper harmony with the grounding secured. The result will be an exceedingly pretty novelty, and one that will, in all probability, be attractive and saleable.

It is needless to remark there is absolutely no limit to the variety of designs to be obtained, it is indeed improbable that any two masks can be made alike, and they will last with care for an indefinite time. The materials are easily procured at any time of the year, which, combined with the ease with which one with any pretentions to artistic feeling can make them up, must commend it to those who wish to fill up their spare time with a pleasant, artistic, and useful occupation. It goes without saying, delicate seaweed can be utilised in the same manner, the central part being covered with a mask of black paper cut out in the form of a skull. Many other materials can be pressed into the service by those whose inclinations may tempt them to try their skill. The process specially commends itself to ladies who have a little time on their hands, and wish to fill it up profitably or vary the monotony of their usual work.

EDWARD DUNMORE.

STEREOSCOPIC WORK FOR AMATEURS.

VI.

In a previous article I referred to the development of stereoscopic transparencies on eastern emulsion plates, and offered a few suggestions whereby a beginner might be enabled to produce each picture in as nearly as possible equal densities.

To enable such transparencies to be viewed by means of the now popular hood-and-bar stereoscope, all that is necessary in the way of finishing the same is the mounting of the pictures with a suitable mask, binding them up with a sheet of glass just like a lantern slide.

When showing my stereoscopic pictures I am frequently met with the remark, "Oh, I notice you do not varnish your pictures!" "Quite true," I reply. When a lantern emulsion plate is properly treated, and has received requisite care in washing, and a clearing solution used and carefully dried at a proper temperature free from dust, the surface of the film ought to show up in a most delightfully brilliant and sparkling manner, a condition, in fact, which, in my opinion, is in no way improved by any system of varnishing. With collodion pictures, however, it is quite different. In this case the utmost care should be taken to avoid dust and other defects; but with lantern emulsion plates—the use of which I have so strongly advocated when undertaking this work—I firmly believe they are best left unvarnished, because experience has taught me that hardly one worker in twenty could be found who would in any way improve their transparencies on lantern emulsion plates by any varnish. I may just here remark that a very common mistake which young workers fall into when varnishing in any shape or form is that of overheating the plate. No plate should ever be made really hot, there is a distinct difference between a warm and a hot plate, and when a plate is kept in a merely warm state, and the varnish be in good condition and sparkingly bright, much will be done in the way of successfully varnishing their negatives in such a manner as it would require some little scrutiny to distinguish the glass from the film side of the plate.

With lantern emulsion plates, however, I never varnish. When a good stereoscopic or any other transparency has been produced, and thoroughly dried free from dust, the sooner it is masked and bound up with a protecting glass the better. It is not good form to get into a practice of fiddling about and showing them to one's friends through the stereoscope in an unbound, unfinished state. Fingering and dust soon make their presence felt, and detract in a marked degree from the beauty of the pictures. I always cut my own masks, not that I believe I can do so better than those supplied by the trade, but I have got into the practice of doing so, and with me now I derive much pleasure from the work. It only wants a little neat handiness and a finely pointed and sharp knife. When going to cut my masks I select the cutting shape which in my opinion is best suited for the picture under treatment. These little cutting shapes I make myself with the aid of my diamond and some old glass. Any worker who has not a diamond can get a glazier to cut these little glass shapes for a copper or so; but once a worker has his own diamond, he possesses one of the most useful tools to be found in a photographer's outfit. To enable me to cut my masks, I take one of my cutting shapes ($3\frac{1}{2} \times 2\frac{5}{8}$), and laying it on a piece of black needle paper, in size slightly larger every way than a half-plate, I cut carefully all round the edges of the glass. This will take out, if cleanly cut, a nice aperture. The shape is then moved so as to leave a centre bar about one-eighth to one-quarter inch wide, and the other aperture is then also cleanly cut out. The picture is then taken and so registered over the mask that each picture is in its desired position. The knife is then drawn round the outside edges of the picture, and the mask is complete and ready for binding up with the cover glass.

The needle paper can be bought in very large sheets in any wholesale stationer's for a mere trifle. The last quire I purchased cost me a shilling. It is also very useful when it is desired to cut lantern masks of any odd shape. In my practice I frequently have to cut special little glass shapes with my diamond. When using these shapes the main thing is to cut so as to get nice clean edges. When a plate of sheet zinc or plate glass is used to cut upon, the work will be found much more easily performed than is the case when cutting on wood. When the masks are fitted, the title of the picture can be written on them with white ink, which any respectable optician will supply in small bottles at a nominal cost. This titling is best done neatly when a very finely pointed lithographic pen is used.

All being complete, the transparency is then bound with its cover glass round the edges with gummed paper, and the job is done.

Some people have an idea that a stereoscopic picture should be bound up in contact with a sheet of ground glass. When the hood-and-bar stereoscope is used this is not necessary, the picture can be viewed by looking down at a white card if at night, or by day by looking upwards to the sky. Should the ground glass, however, be insisted upon, then it is quite an easy matter to provide a permanent screen of such, and mount the same in a metal slot on the cross bar of the stereoscope, just behind the viewing slot which carries the pictures. I hardly ever think of using ground glass when showing my pictures.

To those workers desirous of treading pastures new in photography, I say try stereoscopic work. There is a boundless pleasure laid up in a stock of stereoscopic pictures that any one who has never undertaken this work has no idea of, while if the beginner goes about the work much after the lines I have laid down in these articles, he need not rush into any great expense. Once begun, an enthusiastic worker in photography will never regret having commenced it, for not only will he have a supply of negatives for stereoscopic printing, but at the same time will have such negatives as will lend themselves at all time to contact printing for making lantern slides.

I often wonder if we are ever going to see a revival of stereoscopic work amongst amateurs, and would hail with delight any scheme, such as the recognition by our various photographic societies of the importance of cultivating in a greater degree this work among their members. Could encouragement not be given to such by the offering of medals and special prizes at the various exhibitions for beginners only in the work? Once let a few members of any society enter freely into the spirit of stereoscopic work, and much will be done by others to follow in their wake in this, to my mind, the most delightful of photographic work.

T. N. ARMSTRONG.

SOME OF THE TENDENCIES IN PHOTOGRAPHIC ART.

[A Communication to the West Kent Amateur Photographic Society.]

To observe and comment on some of the present tendencies in photographic art, one is of necessity bound to notice its exhibitions, and although opinions may be divided as to the merits or demerits of the Photographic Society of Great Britain, and however one may be disposed to quarrel now and then over the justice of its awards in particular instances, or to question the advisability of its making any awards at all, one must, I think, allow, if indeed it does not almost go without saying, the exhibition in Pall Mall is usually fairly representative. That of this year being no exception to the general rule, I shall make no apology for drawing your attention to it, as the basis of the critical remarks I have the honour to address to you this evening, premising, however, that criticism from my point of view is not necessarily fault finding, and where fault must be found it is in no carping spirit, but after full conviction, and for that which I conceive to be of the very highest importance, viz., the true interest of art.

Now, at first sight, it may appear a very easy thing to make remarks on a photographic or any other exhibition: you have simply

to go and look at the works, see which you like best, stamp them with your approval, slate all the others, and there you are. Of course, one has to give some reason for one's likes and dislikes, but if this is wrapped up enough in technical phrases, bristling with plenty of the art-jargon current, one may sufficiently mystify an audience, and one's voice be none the less divinely authoritative because it comes from a cloud. But as I do not like this sort of thing at any time, and have too much respect and sympathy with my audience, in the present case, to veil my own ignorance by relying upon theirs, I grapple with the fact that it is not such a very easy thing after all to give a clear and useful opinion on the great variety of works comprised in the recent show in Pall Mall.

In the first place the photographic journals have already had much to say on the subject, often dealing with the works exhibited *seriatim*, and pretty exhaustively; how, then, am I to drag you over this ground again and tell you that Mr. So-and-So "surpasses himself in the true æsthetic way"—whatever that may mean—or that Mr. Somebody-else is "very much befogged" and ought not to have been hung at all? Now, however necessary this sort of criticism may be thought to be in the management of a photographic journal, it cannot be said to be of much service to the amateur, so that if we are to talk profitably for an hour on the exhibition it must be on other lines than these.

Now I am not a photographer, scarcely an amateur, but very much an outsider, and I think it not unlikely that your sagacious President, when he favoured me with your invitation to read a paper, thought there might be some hope in this; at any rate, it gives me hope that in looking at things quite in an outside sort of way, I may be able to point out more in the landscape of general interest than if I groped for it in the dark room or through the camera. By the way, what an awful thing it seems to have to put one's head in a bag to look for the right combination of art and nature to make a successful picture! Woe unto those who have continually to do so, and cannot see a picture in the camera of their eye before they focus it in that of wood and brass. I fancy sometimes, when I talk to some photographers, or look upon their works, that they have never got their heads out of the bag from the first moment of their focussing career, art and nature both being to them thenceforth but darksome ways illuminated only by weird and flickering lights, leading them to the valley of the shadow of artistic death. If not so, how is it that the walls of our exhibitions are often smothered by lines of frames enclosing befogged inanities representing nothing in nature or art truly—perpetrations of people who are not, and never can be, either photographers or artists; or if they should happen to excel in one direction, are so blinded that they persist in thinking they must necessarily excel in another; obstinately exhibiting caricatures of portraits, when their *forte* is landscape; or whom, though their portraits may be tolerable, maintain the idea—as shown in their works—that ærial perspective in general landscape justifies indistinctness in every plane? Let us get our heads out of the bag, at any rate, and look at this recent exhibition in Pall Mall in the light of clear and wholesome day, if possible, and without a sniff of the dark room about us; and let us see what are our impressions, or depressions, as to questions of art. Firstly, it seems to me that this exhibition was an epoch-making one, because it emphasised new departures in several directions which the next exhibition must advance, or stultify itself as to its present leading. These new departures are principally in reference to printing processes. The old albumen silver print is becoming rapidly a thing of the past; it lingers here and there, unmedalled, on the walls; and it may not be prophesying too much to say that in the next exhibition it will be extinct, and that, for better or for worse, platinum and bromide will hold its place. Another new departure that undoubtedly will be more greatly in evidence in the next exhibition than even in this is rough-surfaced paper, as used in most of the new processes. Again, the carbon process seems not only to hold its own, but is gaining in interest as affording opportunity for a genuinely artistic alliance with hand work, as evidenced in some prints showing dry point finishing. There are on the walls many excellent examples of photo-etching and photogravure, but I only allude to them in passing; it would take far too long to enter into their merits and progress particularly, or to more than mention the highly interesting diazotype printing, based on the application to the art of the new coal-tar colour, primuline. While speaking of photogravure, it must be remarked, as subject of regret, that the processes whereby it is endeavoured to produce engraved blocks for stereotyping, or to be used with ordinary letterpress type, are in a most unsatisfactory state, at least for all commercial purposes where an artistic result is desired; the monotony of tone, or mere smudginess being, in most cases, very dissappinting. A great field is open here for photographers to invent a really artistic process to serve the purposes of the ordinary wood blocks. I may be forgiven for dwelling upon this if it does not arise naturally from the exhibition so much as from my own personal feelings and experience in regard to a series of illustrations "processed" from very tolerable negatives of my own, the prints being far, however, from all one could desire. The exhibits of photo-micrography show, if anything, an advance; in their direction the painstaking labour of those who devote themselves to this less picturesque portion of the art is evidently bearing most desirable fruit in the general application of their results to purposes of study. If your worthy President does not make what is generally known as an artistic exhibit with his bacilli and dry bones, it must be allowed that he has succeeded in getting such a range of tones in the printing of these anatomical illustrations that in an artistic point of view some of the landscapists may envy him. And now, having lightly touched on a variety of classes of exhibits in this Pall Mall show, it is time for me to direct your attention to that which I conceive to be one of the most important, if not quite the most important, subject for our consideration, and wherein, I think, a decidedly epoch-making departure for good or bad must be admitted—I, of course, allude, as you will have guessed, to the medalled exhibits of Messrs. Davison and Clark. The work of these gentlemen is always brave and conscientious, and worthy of the greatest respect, and in this particular instance their exhibits are highly deserving the awards the Society have given them. But while admitting that the works are in one direction a very great success indeed, I must demur to the success being in the direction that is generally supposed. Messrs. Davison and Clark are artists, artists of the camera if you will, but that is an accident; did their practice lead them to use any other medium as a means of expression they could not help being artists, even if their technical results were not so successful as in the art of photography. Now the general belief is that the works, *Dedham Lock*, *Dedham Bridge*, and the *Old Farmstead*, &c., owe their charms as much to the merits of the printing processes employed and the accentuation of an out-of-focus motive as to other characteristics; but it is precisely here that we must distinguish between success and failure. The choice of subjects, composition, and all that technical excellence can give, with one exception, are eminently pleasing and satisfactory, promising artistic and interesting pictures; but this exception in their negatives, emphasised especially in the case of Mr. Davison in his printings, indicated that these gentlemen have thrown away the substance, so to speak, for the shadow, and are satisfied by a result, which, because it gives a more or less close resemblance to a second-rate sepia drawing, is deemed artistic.

But I think I hear you say: "Oh! don't you like rough paper, then, and fuzzy prints, and sepia tones!" Personally, I do like the rough and fuzzy effect. I will allow that my idiosyncrasy is better satisfied when my eye has some artistic work to do, and has to complete for itself a more or less well-defined image. Moderately near-sighted people are favoured in this respect, and perhaps that is one of the reasons the projected enlargement on the screen of a photographic picture gives me far greater enjoyment than any printing process has ever done, mainly, I say, because of this work the eye often has to do in such a case. I shall have occasion to speak further on more particularly of screen enlargements, and will return for the moment to fuzziness in prints and rough paper, which, though I have said that I liked, I now desire to make myself clearly understood by adding that, as with every other artistic attribute, I like it in its proper place, without which I emphatically deny its *raison d'être*. The roughness or smoothness of surface of a work of painting, printing, or photography is simply a question of scale; argue the matter out as you may, it always comes to that.

Let no one persuade you to the contrary; the use of a rougher paper than the area of your print justifies is an affectation, and a sin against good taste. That you may be the more readily convinced that this dictum is neither arbitrary nor empirical, let us look at the subject for a minute or two from a very common-sense standpoint, and I will ask any one with ordinary eyesight how far he places a photograph or other object from his eyes when he is looking at it for ordinary purposes, viz., to be pleased or refreshed by its artistic suggestion, or the memories it may recall—I say its ordinary purposes? I shall be answered, the distance referred to is generally rather less than twice the length of the greatest diameter of the work under inspection. This being so, I will further ask the person inspecting the work at that ordinary distance if he, or she, desires to see the undulations in the texture of the paper, or surface, before or simultaneously with the subject under view? whether the ribs and marking in the structure of that paper, or surface, contribute in any degree to the enjoyment of the picture? No, I shall be generally answered,

not at all, but rather that the lines and markings militate against that enjoyment, distract the eye, and withdraw in some measure the attention from the picture, or subject, whatever it may be. I may be asked to be more precise as to the proper distance to view a work of art with fairness to the artist and enjoyment to one's self. I can only say—always subject to variable idiosyncrasy, of course—that that distance will be approximately given by double the altitude of an equilateral triangle constructed on the greatest height or width, as the case may be, of the work to be looked at; and I repeat, that any paper, or canvas, whose texture asserts itself, and can be distinguished equally with the work printed, or painted, upon it at the distance I have mentioned, is in bad taste, and, indeed, a barbarism and an affront. Who, I ask, but the most ignorant person, would think of printing a *carte-de-visite* on very rough paper? Who, but a most affected or ignorant person, would pretend to be satisfied with it? When done, should we derive any satisfaction from the works of Teniers, or Gerard Dow, had they been painted on brick bats or sand paper? Would the pictures of Peter de Hooghe, Van der Weyde, or other painters of detail, charm us, did we see the lines in the canvas, falsifying by their light and shade the drawing in their work? Of course the reverse of the proposition holds good, and we are none the less displeased with a smooth, hard surface in a large wall painting or fresco. Roughness or granulation here gives life and brilliancy, and at the same time a sense of vagueness, which the eye is doubly charmed to correct for itself, and complete our artistic satisfaction. Roughness of surface then is, as I have said, a matter of scale in all cases, and a scale which we must naturally apply to the works in the recent photographic exhibition, and I fear very much in their disfavour; for, on the application of the test I have mentioned, we shall see the structure of the paper in many instances asserting itself before we have time to enjoy the pictures. I am compelled to dwell particularly on this in a paper addressed to a society of amateurs, and treating on some of the recent tendencies in photographic art, because where professors have been in error, amateurs are most likely to stumble. Now it is, of course, very interesting to see such a very successful work as Mr. Davison's pinhole picture, but it must be remembered that if the rule of scale applies to roughness of paper proportionately with the size of the work, to be consistent, it must equally apply to vagueness of outline from any other cause, indeed, such as the pinhole gives. The question then arises, Does Mr. Davison's pinhole picture justify this vagueness in point of size? I am afraid we are driven to the conclusion that it does not, and quite apart from the considerations of whether under any circumstances, excepting the necessity of the case where a lens is not obtainable, or for an experimental *tour de force*, a pinhole is desirable at all, or whether in the nature of things it is desirable to have photographic excepting of limited dimensions. It is more than questionable whether fuzziness is not entirely out of place, excepting in very large scenic work in landscape, and only tolerable in photography at all in life-sized portraiture. But because of this very desirability of fuzziness in the life-sized head it must be, the less desirable in the much smaller scale of the landscapes we are speaking of. All praise to Messrs. Davison and Clark for their choice of subject, composition, lighting alone, and so forth; but we cannot thank them for works on a limited scale affording no point of sharp focus for the eye to rest upon. Assuredly the works of these gentlemen, however successful they may be in one respect, distinctly fail in another, and which I point out as being based on an artistic misconception, and against which every amateur should be warned. PHILIP H. NEWMAN.

(*To be continued.*)

ON THE NATURE OF THE INVISIBLE IMAGE.*

Several of these statements require very emphatic qualification. Here, however, is one to which no exception can be taken, unless indeed the word "violet" be read too literally.

"If we take a dilute solution of nitrate of silver in free nitric acid, and precipitate a quantity of chloride of silver from it, and expose it to the action of light, in the course of a few hours the surface will be covered with a violet compound, which I do not profess to name, plainly resulting from the action of light."—(Miller, *Photographic Journal*, 1856, p. 50.)

But even here, while we have the truth and nothing but the truth, we have not the whole truth; and the partial information is liable to a false interpretation. As a matter of fact, dilute nitric acid almost totally dissolves the great bulk of unfixed and untoned "darkened products" or images; and, but that a faint feeble ghost frequently remains, the statement would require no reservation. The darkened product on a basis of chloride of silver is dissolved, seemingly entirely, but the solution in its turn is reduced by light, and the precise extent of the action is thereby more or less concealed; and it is noticeable that it is where the nitrate of silver has been formed in the greatest excess that the darkening is most visible, just as in the ordinary circumstances. We have already said that certain solutions of silver salts throw off a solid darkened product when exposed, in a condition of impurity to light. An aqueous solution of silver nitrate is a familiar example, and those who affirm the existence of a sub-chloride have shown that in certain cases where the halogen is not liberated the same cannot be said of nitric acid. These draw a distinction which we think very far-fetched—considering that in photography we have so much to do with nascent elements—between the degree of solubility of the darkened product and that of normal metallic silver. The following experiment will perhaps furnish as good an example of the chief phenomena observed as any that could be offered:—Take a piece of albumenised and sensitised paper and expose it under a negative of very violent contrasts till the deeper shades are strongly bronzed, and wash it well on taking it from the printing frame. Have ready a porcelain bath, a very dilute solution of nitric acid, and a bottle of fuming nitric acid; lay the print face upwards in the bath; cover it with the weak solution, and if it does not almost at once show signs of dissolving, pour off, strengthen, and re-apply, continuing to do this until the acid begins to work, when a rather curious effect will be observed, more particularly if the print consist of a flowing dark pattern on a couple of lighter shades. The bronzed parts will suddenly begin to vanish—most probably at the margin first—and before the acid commences to attack the deeper half tone it will have almost entirely eaten away the bronzed portions, when the print will present a peculiar piebald appearance, what were before the deepest shadows now being the highest lights. If the operation be conducted in a powerful light, it will be seen that these bleached portions will commence to darken simultaneously with the half tone starting to fade. The palest shades will be the last to disappear, if indeed they ever do so at all, for in common with the corresponding tones of a carbon print on opal glass they seem almost indestructible. If, however, these operations be performed in the dark room, the darkened product will quietly dissolve in two or three well-marked "fyttes." The colour of the parts which have darkened for the second time is strikingly different from the original rich purple, and is either a pale bluish violet or a slate grey. In the dark the final colour of the film is a pale yellow, with a phantasmal green reminiscence of the parts which were printed to a brilliant metallic bronze or silver.

If instead of taking a silver print to operate upon we take a precipitate of silver chloride (bromide or iodide) in a watch glass and narrowly observe what takes place, we will find, as already suggested, that whereas at first the acid, *faute de mieux*, seems to act as if it were essential to the change—possibly by forming with the reduced metal that darkening-promoting substance silver nitrate, or a salt analagous to the iodo-nitrate—it, after a little, seems to cease to allow a further discolouration, even when the mixture is subjected to a blazing sun, for while minutes alone were sufficient to produce the pale bluish-violet tint, days will not sensibly darken it farther, and in the dark it is slowly dissolved. If we look up Davanne and Girard's tables of the "Acids capable of replacing Acetic Acid as an addition to Pyrogallic Acid in Reducing Solutions" (*Journal of Photographic Society*, 1855, p. 217), we will see that "all those which give an insoluble precipitate when added to nitrate of silver," such as HCl, HBr, HI, must be classed among those which annul the developing action, so that the impression does not appear, though among the mineral acids "which, when mixed with pyrogallic acid, moderate its action, at the same time allowing the image to appear more or less rapidly, and more or less clearly," we have HNO_3, $HClO_4$, and H_2SO_4. The full significance of this, however, will be seen as we draw nearer the end of our paper; be it observed in the meanwhile that hydric iodide, bromide, and chloride, and other acids which "took possession of all the free nitrate of silver remaining on the surface of the glass, always sufficed to destroy all trace of the image. This fact, corroborated by many others already known, would seem to indicate that developing agents only have power in the presence of free nitrate of silver, however minute the quantity." (*Ibid.*) In the case of the development of dry plates it might be well, possibly, to substitute for "in the presence of free nitrate of silver" the words, "in the presence of a solution of a silver salt," or otherwise to convey the idea that besides having an attractor and a depositor, we have something from which a deposit, liable to be attracted, can be thrown down. We must have a supply equal to the demand if the negative or positive is to be properly developed, for it is precisely when the one or the other is disproportionate that we

* Continued from page 802.

have harsh "under-exposure" or flat "over-exposure." Whether in every form of developer employed in multiplying the reduced molecules in a modern dry plate we have a solution of a salt of silver, or whether some ingredient in the developer facilitates the decomposition of the unreduced silver salt, which is certainly the only source from which the building material can possibly be obtained, the influence of the solvent is of supreme importance, and, we think, accounts for much that has not hitherto been satisfactorily explained.

If in a glass tumbler we suspend a quantity of silver chloride with silver nitrate in excess in a thin viscous or glutinous medium, and expose the whole to strong sunlight for a few days, we will find on pouring off the bulk of the mixture that the side of the vessel nearest the light is covered with a fine grey precipitate, which is completely and very easily soluble in dilute nitric acid, the solution exhibiting the usual proofs of the presence of silver. But when the violet-coloured body, from which all excess of free silver nitrate has been removed by heating, dilution, and repeated washing, is subjected to the action of nitric acid of various strengths, not only is the hue of the substance not perceptibly strengthened by very prolonged exposure, but in proportion as the light is intense and the acid weak, or the light feeble and the acid strong, the darkness of the superficial coating seems to vary, apparently exhibiting a condition of equipotential, which excess in either direction is just sufficient to disturb, if not destroy; for the action of the hydric nitrate is strongest in the dark, and in the most intense sunshine with which this climate furnishes us, appears not merely to be a minimum, but to favour discolouration. The amount of variation is, however, sufficiently slight to justify the assumption that there is an early stage at which nitric acid promotes reduction, a late stage at which it undoes the reducing action of light, and an intermediate stage at which it has no apparent effect whatever. Recent experiments also tend to show that the purest and least chemically sensitive precipitates of silver iodide (and bromide) are marvellously sensitive to physical modification of structure, for a couple of precipitates prepared so as to exhibit scarcely a trace of discolouration, when shaken down at night into a flat, smooth, pale deposit, exhibit in the morning, after an hour or two's sunshine has played upon them, a most picturesque alpine-like series of peaks of various size, covering the entire field, the peaks of which alone seem to darken from a pale primrose or lemon to a dirty straw or drab. Hence we conclude that, first, the purer the salt the less the visible discolouration by light; second, the presence of a solution of a silver salt favours discolouration; third, there is a stage at which the chlorous action of the solvent counterbalances the reducing or basylous power of light. As already noted, a basylous solvent greatly favours the discolouration acknowledged on all hands to be the concomitant of reduction.

HUGH BREBNER.

(To be continued.)

NEWSPAPER PICTURES.

How They are Turned Out at Short Notice for Lightning Presses.

The illustration of newspapers is a new branch of art. Ever since its beginning its apprentices have been trying to find out the simplest and most effective methods for the reproduction of drawings, in order that they might be made with the greatest possible quickness, engraved on metal with the utmost attainable celerity, and printed clearly and well at the rate of twenty thousand copies per hour. To such perfection have the processes for this purpose been brought that the turning out of pictures all ready for the lightning presses is nowadays hardly more than a matter of a few minutes' time.

Most interesting of the processes employed in newspaper illustration, from the point of view of simplicity, is what may be termed the "chalk method." Take a thin bed of smooth chalk laid upon a metal surface, and draw upon it with a fine steel point any picture you may desire. The steel point will cut the lines of the picture out of the chalk to the metal, and thus you will have it in the shape of an intaglio. Make a stereotype from this intaglio, and you have your metal plate to print the picture from. Could anything be more simple?

Drawing on a Bed of Chalk.

Such is the idea of the chalk process. In applying it, instead of pure chalk various mixtures are used, such as plaster of Paris, which is merely chalk in another shape, with a certain proportion of a white Carolina clay. The stuff, pulverised and stirred up with water, is spread over a rectangular sheet of polished steel, as you would spread a slice of bread with butter, to an even thickness of about one thirty-second of an inch. Now you are ready to begin operations as soon as you have baked the steel plate in an oven for a while, until the chalk layer has been rendered perfectly hard.

It will hardly do for you to attempt to draw your picture directly upon the chalk, lest you make mistakes. The best way is to make your sketch on a piece of paper, and then laying it down upon the chalk surface, go over the lines with a pencil point, which will indent the paper and leave marks beneath upon the chalk. Lift the drawing, and you find under it, in the chalk, its reproduction. Now you apply your steel point directly to the chalk, cutting all the lines of the drawing down through the chalk to the surface of the steel plate. When you finish this operation the dark steel of the plate shows through the chalk in all the lines of the sketch. And these lines are perfectly clean and sharp, thanks to the keenness of the knife-like steel point employed. All you have to do for the rest is to pour molten lead over the chalk surface in a mould and let it get cold. The lines that are cut out of chalk will be reproduced in relief upon the lead, and thus you will have your metal engraving to print the newspaper picture from, mounting it for the purpose on an iron block, thick enough to make it level with the type.

Zinc Etching.

Though so advantageous for its simplicity, the chalk method is not so good for fine work in the way of sketches and portraits as the "zinc process," so called, which the *Star* employs for its pictures. The former, however, by reason of its cheapness, is most useful to provincial newspapers, which cannot afford the comparatively expensive photographic plant required by the latter. In the zinc process, to begin with, an ordinary photograph reduced to the required size is taken with a camera of the pen-and-ink sketch drawn on cardboard by the artist. Next a smooth plate of zinc is "flowed over" with an albumen solution that forms a sensitised skin on the surface; the glass negative of the picture is laid upon this zinc plate, and the two are put together in the sunlight. What are to be the black lines of the printed drawing are, of course, white and transparent in the negative. The sunlight goes through wherever the negative is transparent, and has the effect of hardening the sensitised skin beneath, so that it clings tightly to the zinc. It requires only one minute to perform this operation. Now the zinc plate is taken and given a coating over the sensitised skin of lithographers' ink, rubbed on with a roller, after which the plate is washed. In all places where the sunlight has not struck the zinc, owing to the opacity of the glass negative, the sensitised skin readily washes off, together with the ink that covers it; elsewhere it clings. Thus, after the washing, the perfect drawing in ink remains upon the zinc plate. To make the ink lines harder the plate is brushed with powdered dragon's blood. Then it is plunged into a bath of acid, which eats away the zinc wherever it is not protected by the ink, so that when it is taken out the lines of the drawing are found all raised above the rest of the surface of the plate, like a map for the blind, and when mounted "type high" on a metal base, you have your "cut" ready to print from.

Such is the zinc process by which the pictures in to-day's *Star* were made. "Processes" have infinitely multiplied within the last few years —so much so, in fact, that the student of engraving is aghast at contemplating their variety. At present, however, the zinc method seems to be the most available for journals of the period. At all events, it is employed by a majority of the big newspapers of the country.

A Third Process,

considerably used for newspaper illustration, is that of photo-engraving, which somewhat resembles the zinc method. A glass plate, however, is used instead of a metal one. This glass plate is covered with a thin layer of sensitised gelatine, which is permitted to dry. Then the photographic glass negative of the drawing, made with the camera, just as in the other case, is laid over the gelatine, and the glass plate and negative, with the gelatine layer between them, are put in the sun for half an hour. The light hardens the gelatine, and makes it cling to the glass plate wherever it strikes through the negative, so that when the glass plate is subsequently put into water all the rest of the gelatine comes off, leaving the drawing on the glass in gelatine lines. Moist plaster of Paris is spread over the plate next and permitted to harden; when it is taken off it is a mould of the drawing. From this mould a plaster "relief" is made, and a reproduction of metal in this relief by stereotyping is the plate to print with.

These are the three methods by which newspapers produce the pictures which go so far to brighten up and help out the interest of the columns of the daily press.

—*Washington Star.*

FURTHER NOTES ON SILVER PRINTING.

[A Communication to the Camera Club.]

My contribution of this evening to the proceedings of our Club will partake rather of the character of desultory notes than that of a fixed paper, as I propose to give you the benefit of what further experience I have gained in a year's working of the process I described before you on December 19 last, and also to more fully develop the process of intensifying my silver prints, which I merely foreshadowed on that evening.

Beginning with the support or paper that is to receive the print, I mentioned that I had just received a batch of paper from Messrs. Reeves & Sons, known as "Arnold's pure unbleached," but had not had time to experiment with it. Since that date I have, however,

been able to give the paper a thorough trial, with the result that I certainly find it superior in quality, or, perhaps, I should say purity, to any of the Whatman papers. The *rough* quality shows a rather decided diagonal surface grain, to which personally I do not object, although others may; but the smoother qualities, of course, are quite free therefrom. It is, however, on account of its great purity that I chiefly prefer it, for I have hardly met with a single instance of metallic impurities, or, indeed, any imperfections in the paper. I am unaware whether there is any difference in the sizing of this and the Whatman paper, but I am inclined, from its behaviour, to believe that there is.

With the Whatman I have frequently, indeed almost universally, found patches of the paper that refused to soak up moisture, and remained comparatively hard and dry, even through the toning, fixing, and washing baths. I cannot say that there was anything dangerous about the appearance, nor, indeed, was it at all visible on the face; but I always had a sort of feeling that these patches might be portions of congulated sizing and silver, to which the hypo could not get proper access, and which, therefore, would remain as patches of hyposulphite of silver, or silver chloride, only waiting the proper temptation to burst out into nuclei of discolouration or areas of fading.

I must confess that up to the present they have not been led into temptation, or the temptation has not been strong enough, for I have failed to trace any harm to their presence. But, nevertheless, the freedom that the Arnold paper appears to possess from them is, in my estimation, another plea for its adoption.

Coming now to the sizing and salting baths, I find but little to change in my formulæ. The quantity of gelatine I have recommended is doubtless high, as indeed is also that of the salt, but the amounts are intentional, as it is essential to get as vigorous an image as possible, if we wish to have a good black-and-white picture left after toning.

I have personally almost discarded the use of arrowroot or any other sizing agent than gelatine; or, if I do use it, I make it up fresh each time. I find that if the arrowroot mixture be allowed to stand, all the colloid principle appears to settle down to the bottom, and the clear liquid that is decanted off is little better than salt water. Used fresh, arrowroot is, however, very useful, but it is difficult to get it to the right degree of viscosity: if too thick, it dries in streaks on the paper, especially when the solution is cooling, and unless one does use it as thick as possible, it will not remain sufficiently on the surface of the paper. Therefore, for the rough papers, or those requiring a maximum of sizing, I have discarded arrowroot in favour of gelatine. But for the smoother quality of paper it can be advantageously used of a strength of about 18 grains to the ounce, or 1 in 25. This strength is practically about as thick as you can get it to lie on the paper evenly, and may, of course, vary with different samples. The solution should be used fresh each time, and the paper floated on it whilst it is still quite hot—in fact, it should be kept hot by the addition of hot water to an exterior dish, making, in fact, and impromptu sort of *bain-marie*. I find no filtering to be necessary. If the dish be covered to a depth of an half inch, any impurities will sink to the bottom, or, if left floating, will come off if a trial piece of paper be used to skim the surface.

Gelatine should also be used as hot as possible, at least when coating rough paper, and the strength of 24 grains to the ounce, or 14 grammes to the litre, has given me the most satisfactory results. I am afraid I did not make it sufficiently clear, either in my pamphlet on "Platinum Toning," or in my paper before this Club, that it was necessary to apply the gelatine, when used in such strong solutions as I recommended, in as hot a state as possible. If the smoother variety of paper be used, such a proceeding is not so necessary, but with the rough papers it is essential that the gelatine should be very thin and liquid, so that the excess can freely run off the surface of the paper and not lie in and clog up the interstices between the granulations. With the above strength of gelatine, it must be used quite warm to do this, and therefore I now make a practice, if I have many sheets to salt, of keeping the bath warm by immersing it in another larger dish that I supply from time to time with hot water.

Unlike the arrowroot bath, the gelatine one can be used over and over again, the jelly that forms when the solution cools being each time re-dissolved by the application of heat. In fact, the bath remains good as long as the jelly remains a jelly when cold; when the mixture shows signs of becoming watery and losing its viscosity, the gelatine is beginning to perish and rot, and should be thrown away.

I have quite discarded filtration also with gelatine, and use instead a pretty deep layer of the liquid, when the heavy impurities will sink to the bottom, and the lighter ones will be taken up by the first piece of paper floated, which should therefore be a waster.

If anything, I am inclined to think that for summer work, or for hard negatives, the strength of the chloride given is too strong, and I now usually reduce it to six grains per ounce, or one in seventy-three, but for feeble negatives the eight-grain bath can still be used.

As a general rule, too, I use the simple chloride bath, and keep the mixed citrate and chloride one when very vigorous prints to give very black images are required. For the benefit of those who were not present at my last lecture, I will here repeat these formulæ of salting baths.

For average negatives from spring to autumn:—

A.

Chloride of ammonium.....	120 grains,	14 grammes.
Water.....	1 pint,	1 litre.

For feeble negatives, or for winter light:—

B.

Chloride of ammonium.....	160 grains,	19 grammes.
Water.....	1 pint,	1 litre.

To these baths a crystal of sod. carb. about the size of a pea should be added to ensure their alkalinity.

To obtain very vigorous prints, or for weak negative or very feeble light:—

C.

Chloride of ammonium.....	120 grains,	14 grammes.
Carb. sod. crystals.....	240 „	28 „
Citric acid crystals.....	60 „	7 „
Water, up to	1 pint,	1 litre.

With all these baths the amount of gelatine to be used is:—

For	Grs.	Grms.		Grs.	Grms.
Rough paper.....	240	28			
Not hot-pressed	120	14,	or arrowroot,	180	21
Hot-pressed	60	7	„ „	180	21

These quantities are per pint or litre of liquid.

Coming now to the application of the salting solution to the paper, I now invariably use the floating method as the most suitable and easy. It is true that most heavy, rough papers will be found to be very repellent of the liquid, and when floated will at first refuse to take up any of the solution. But I get over this difficulty by brushing some of the hot salting solution over the surface of the paper before floating it. For this purpose I lay the paper face upwards on a board, and with an ordinary broad camel-hair brush apply a fair amount of the hot solution, as evenly as possible, to the surface of the paper, and then leave it lying on its back whilst the preceding sheet is floating on the bath. This procedure effects a double object: it not only makes the paper take kindly to the bath, but causes it also to imbibe a certain amount of moisture, and, therefore, to lie nice and flat on the bath. I usually float the sheets for three minutes, and whilst one is being floated, a second is being brushed over and left ready for its turn.

With regard to the drying of the paper, I have nothing to add, except to reiterate the statement that they should not be dried in a cold place. In fact, the hotter the drying room the better.

Failures in Salting.

With the system of preliminary brushing there is but little danger of leaving places or patches untouched by the salting solution, a somewhat common fault, and the only other danger to be avoided is that of allowing any solution to get on to the back of the print. For some time I was troubled with insensitive, or nearly insensitive, spots on the prints when they left the printing frame, of a faint lilac colour, surrounded by a halo of darker colour than the rest of the print. Sometimes these markings would take the form of a line right across the print. The cause of these markings I have now traced, they are entirely and solely caused by some of the salting solution getting on the back of the print and soaking through when it joins, so to speak, the salting solution on the face. This, therefore, creates a maximum quantity of chloride at this spot, and therefore the silver, when applied, is insufficient to convert all this chloride into silver chloride and still leave an excess of nitrate, and therefore insensitive spots are formed. The darker nucleus also is due to the excess of silver chloride at this spot, for since, generally speaking, the darkening is proportional to the amount of silver chloride (providing some nitrate be always in excess), darker patches are formed where this happens. These dark patches, as a rule, only show when, from insufficient floating or a weak salting bath, there is an insufficiency of haloid chloride on the print, as it is evident that if the maximum amount of chloride be applied in the first place, no further addition can make any portion of the print more sensitive or prone to darken. Such places will then either not show at all, if an extra amount of silver has been

applied, or, if this be deficient, they will show as white, insensitive, or nearly so, spots. In any case, however, the greatest care should be taken to avoid any of the salting solution falling on the back of the print.

In my last paper I made a few remarks on the two systems of floating or soaking the paper in the salting baths, and can strongly confirm my first view on the subject. With heavy drawing papers I find floating by far preferable, the method of soaking being a very wasteful and risky proceeding, nearly always requiring double sensitising.

Silvering or Exciting the Paper.

I have but little to add or extract from my previous remarks. I still find brushing on to be far the most economical and expedient manner of applying the silver, and I find the modified form of Buckle brush I described in my last lecture to be a most valuable aid, and I am greatly pleased with its performance.

I have not found it necessary to make any change in the silver baths I recommended, for they each have their use. For feeble negatives or dull light, or if I intend to tone with gold, I use the Hardwich ammonio-nitrate bath described in my paper on "Platinum Toning" (*Camera Club Journal*, November, 1889). But for the generality of my work, and especially for the intensification process I shall describe later on, I use the silver citrate bath; the plain nitrate bath I have practically discarded, as it possesses no special advantages. The citrate bath is made up as follows:—

Nitrate of silver (recrystallised), 60 grs.	14	grammes.
Citric acid (crystals), 25 grains	5½	grammes.
Water (distilled), up to 1 fluid ounce ..	100	c.c.

Paper brushed over with this bath keeps fairly well, and when printed can be kept almost indefinitely before toning. I came across the other day a piece of this paper that I printed for my lecture in December last, and it shows no signs of degradation.

With regard to the subsequent operations of toning with gold or platinum fixing, &c., I have nothing to add to the remarks and directions given, either in my former papers or in my pamphlet on this subject.

Failures in Sensitising.

The commonest failure that is likely to happen is to find that the paper, on exposure to light, refuses to darken in certain portions. This is caused by an insufficiency of silver. It is an absolute necessity, as I pointed out in my former papers, that there be some free silver in excess in order to get a vigorous image; if there be only sufficient to convert the chloride into silver chloride and leave no silver in excess, or if you wash the paper, so as to free it from all other substances, on exposure to light it will be found that this pure silver chloride will only darken very slowly, and assume at the best a faint lilac instead of a metallic brown shade. But if to this washed or pure silver chloride a little free silver nitrate be added, the darkening will be seen to take place at once, and the mixture will blacken to the deepest shade. It is therefore necessary, in exciting paper, to brush on not only enough silver to convert all the chloride into silver chloride, but enough to leave a certain amount still in excess.

This appears to be the commonest source of failure in silver printing, and is much more common, as, indeed, is to be expected, when the paper has been soaked in the salting bath, and I have had many examples sent me. As a general rule, the paper prints out in patches of dark colour, with insensitive places between, showing distinctly where the silver was in excess and where it was not. It is, therefore, important not to stint the silver, but brush plenty on; indeed, the surface should glisten all over with the solution, and when hung up to dry a few drops should run off at the bottom corner. As a rough guide, I find that about two drachms of the silver bath are sufficient for a 12-inch by 10-inch piece of paper.

But in avoiding the Scylla of insufficient silver solution, I made the acquaintance of a Charybdis of too much silver; and as it was some time before I thoroughly found out the cause of the phenomenon, I will give it here for the benefit of any future Ulysses.

During the past summer I made one batch of paper that, when printed, showed patches, or in some cases the whole surface, covered with a curious frothy cobweb of white insoluble matter, something like the mould on damp leather. The image, too, was weak and sunk in, wanting in contrast.

My first thought was, of course, insufficiency of silver, and I added more and allowed the paper to lie flat and imbibe plenty of solution before hanging up to dry.

But this rather made matters worse, and I then ascribed it to the formation of carbonate of silver—an insensitive white salt—due to an excess of carbonate in the salting solution. But paper salted with the simple chloride also gave it, but in a less degree. I then came across an old piece of paper that had been soaked in the salting solution, and this printed out at once free from the defect.

This gave me the clue at once, for I saw that it was not want of silver, but rather excess of silver, that caused the appearance, and I tried coating a sheet unequally, leaving a pool to soak in the middle. As I surmised, the position of this pool was at once marked by the insensitive crape-like markings. I must confess that, chemically, I am still unable to account for the appearance; citrate of silver, which it naturally should be, is a soluble and sensitive salt, and I can only imagine it to be similar in composition to the white flaky scales that are generally gradually deposited when citric acid is added to silver. It may, of course, be due to impurities, and I should think a careful examination of it would interest some of our chemists.

Therefore, whilst using plenty of silver, do not use too much, and do not allow the paper to lie flat after coating; but directly the surface is seen to be equally covered with the solution, hang it up to dry by one corner, and allow the excess to drip off.

If the paper be properly and sufficiently salted, the above phenomenon is not, I think, likely to happen, for I clearly traced out in the above case that my paper had been, in the first case, salted on a weak bath, and in the second not floated sufficiently long.

I now come to the second half of my paper, that reserved for the intensification process, an outline of which I gave in my last lecture. I call it an intensification process advisedly, for it differs in its action considerably from several developing processes with which at first sight it may appear to have some similiarity.

In all the developing processes, an image that is invisible, or nearly so, is developed out, but in this process the image is printed out, to almost any point short of complete density, and is then intensified up to the required point, exactly as one would treat a gelatine negative. Like a negative, also, the clear shadows, or what corresponds to them, the high lights, remain unchanged, no invisible image being brought to light, whilst the heavy deposit is still further increased; and in both processes there is a tendency to harden the result, so that good results can be obtained from thinnish negatives. There is not the slightest need that any density be shown on the print, as the feeblest indications of light action can easily be intensified up to the most pitchy blackness, or it can be stopped short at any desired condition, and then toned and treated exactly as if it had been printed out in the frame in the ordinary way.

Lyonel Clark.

EDINBURGH PHOTOGRAPHIC EXHIBITION.—IV.

(*From a Correspondent.*)

The judges at the exhibition have found it much harder work to come to a decision about the pictures, the scattering of each class all over the place proving a much more laborious undertaking than was even anticipated—and it looked bad enough. It was only on Saturday that they completed this labour of love. I think it is much the best way to have the pictures at such exhibitions examined and judged before the exhibition is opened to the public, so that what is considered the best is seen and known by all; and it really gives an extra interest to the visitor, who, from his own point of view, may differ from the judges, and it gives him a chance of airing his views. Now this exhibition is more than half over before the awards are published. This is a defect.

In walking round and making jottings here and there we come upon J. G. Whaites' enlargements from hand-camera pictures. The past has been a season for hand-camera work, and there has been done by the so-called detective no end of work. The Chester Convention showed a great excess of these little hand instruments over all others put together, and if the work produced at that meeting compares in the least with these exhibits of Mr. Whaites, then it was highly successful, for the examples here shown by him are excellent.

The sharpness attained when enlarged from these small negatives up to about twenty inches is very marked. Nos. 493 and 496 are fine examples. The various groups scattered over these pictures are filled with life and motion, the figures being caught in very happy positions.

R. Slingsby's magnesium-light work forms a considerable feature here. There has been for some years a growing demand for a good artificial light for the taking of photographs, the electric light being found by many to be much too expensive and difficult to work, so that any other practical means of an easier and less expensive nature that solved the difficulty would be hailed with gladness. Mr. Slingsby has made the magnesium light a specialty of his, and from his show of pictures taken by this luminant it looks as if by his plan he was likely to make magnesium a rival of no small importance to electricity. One defect, however, we have found in working with magnesium, and that is the smoke and particles of dust floating through the room, which is a deterrent to successful photography. But in his process Mr. Slingsby may have got rid of this. To all interested in this subject his pictures in the exhibition are well worth

a careful study, one of the best examples being No. 373, a flash-light picture. It is remarkably free from light patches and that streaky flare so often found on the faces of subjects in many artificial-light pictures.

In his two frames (Nos. 598 and 618), C. Reid, Wishaw, shows a variety of new subjects in his animal studies. These little pictures always command great attention, and seem to give no end of pleasure to the sight-seers. Our dogs and puppies, our horses and ponies, and our fowls and birds, have a charm for all. In this difficult school of production the perspective of results has been obtained by Mr. Reid, and he stands second to none in this special walk of the art science. He also shows a frame of toning landscapes, No. 793.

Bits of Old Edinburgh, by A. Inglis (Nos. 120 and 132).—These two frames contain pictures of great interest for the subject matter alone, retaining as they do the faces of the old buildings and landmarks belonging to city historic in its every stone, so to speak, and now gradually passing from us.

These pictures are printed on a matt-silvered paper, which tends to give a rather too red tone to the prints; there is also a lack of uniformity of tone, which detracts from the general views. We anticipate that the quality of the old negatives will have much to do with this, as we have found that many of these will not throw a uniform tone, no matter how careful you are in trying to obtain it.

W. M. Warnerke shows a set of direct pictures, large—about twenty-four inches—printed in platinotype, and some platinum-toned. All of these are careful studies, finished in a warm brown tone. *Hermann Lea* (No. 505), platinotype, and *Miss Johnstone as Portia* (No. 193), are a fair sample of his work. But the whole of these pictures show the hand of an artist of no mean order, and the frame of cabinets of children—printed in aristotype (No. 279)—are charming pictures, both from a posing and lighting point of view.

L. Sawyer as usual makes a good show of fine work. We have had this artist's pictures under notice so often before that we can but repeat what we have previously said, that he gives fitly uses his materials to the best advantage for producing an artistic composition. In one or two cases we feel that the figures pose too much; there is forced expression rather than any defect of position, notably the standing figure, or out in the cold lower, in *Lord's company*, the displeasure in this face being a little too pronounced and consequently 'put on.' To those who have not seen L. Sawyer's work we would recommend a careful study of it, as a class of pictures that cannot be excelled from an art point of view.

Nos. 507-511.—*The Feast of Lanterns* (S. N. Bhedwar).—Platinum-toned. This is a very attractive set of figure subjects, being a story without words. First, *Consultation among Brahmins*; second, *Decorating the Courtyard*; third, *Hanging up Garlands*; fourth, *The Flower Girl*; fifth, *The Musicians*. The best picture in the set, we think, is *Decorating the Courtyard*. These pictures, however, lack depth of tone, the leaves being so flat that it conveys a washed-out look to them, whilst one or two of them actually look faded.

Kilpatrick (Nos. 164 and 179) with some other direct pictures of a large size printed in silver. They are finished with enamel surface, and are hung too high for examination. The surface of the pictures refer to the light above, and hence mars the view; but, as far as can be seen, they seem too darkly printed, and the figure in the *coral necklet* picture looks dwarfed; but really at the distance one cannot get a just examination of them.

H. P. Robinson is represented by eight examples. His work is familiar to us all, and we always read its own wherever harmonious composition is studied and admired. Although his pictures have been deprecated by the new school of gummists that have arisen in these days, it is wonderful to see how many people still find pleasure in lingering about these pictures, and evidently deriving considerable pleasure from them—poor benighted beings!

A. Nisbet (No. 149).—This frame contains twelve half plates—landscapes; very perfect specimens as regards exposure, development, printing, and toning, being so uniform all through. The subjects are well chosen, and printed in a warm brown (platinotype); every subject is full of detail and exquisitely fine. Mr. Nisbet also shows (No. 95) some photographs as he received ready for the engraver, which look fine specimens of this class of work.

H. Symonds (No. 160), *Understanding Scenes*.—Printed in silver; good pictures in a well-worked field. These pictures will hold their own against many of the fashionable yacht portrait-producers. The *Sweetness* is the least successful subject in the frame. It looks under-exposed and hard beside the others, which for exposure are perfect.

In looking at a general survey of the silver printed work, from small sizes up to whole plate, we find a very general tendency to dark printing. This fashion renders many pictures from really good negatives very poor indeed. The studies coming out dead black without detail. If a little thought and common care were taken in printing many of these pictures, we feel sure that much better results would have been obtained from the negatives. The hard, pasty effects showing evident carelessness in printing.

Lantern Exhibition.

An addition has been made to the attractions of the Edinburgh Photographic Society's Soirées by the introduction of a series of optical lantern exhibitions, the first of which took place on Tuesday evening, December 9, when a considerable number of slides sent in for competition in Class XVI. were exhibited. The conditions in this class are that they are to be sent in sets of six, without restriction as to number.

The lantern arrangements were under the charge of Mr. A. H. Baird, a local manufacturer and exhibitor. The instrument used was his optical biunial dissolver, the oxygen being used from a cylinder, and the coal gas from a bag, in default of other convenience.

Mr. Bashford, Vice-President, in opening the proceedings before an audience which filled the south octagon exhibition room, stated that the President was unable to be present, but in his absence Mr. Roddick would officiate.

In passing the pictures over the screen those of each exhibitor were shown in succession, sufficient time being allowed for the examination of each picture.

The first shown was a series of twenty slides by the President, Mr. H. L. Blanc, being the first moiety of his exhibit, entitled *Architectural Fragments* (No. 1071). The Assistant Secretary simply gave the titles of the pictures as they were presented, without comment, this method being adopted presumably because the awards have not yet been determined upon by the jurors. After these, in succession, those of Messrs. J. Lamond Howie, Edgar G. Lee, James Dore, G. W. Wilson & Co., J. Dore (second series), Alex. Pitkethly, A. B. Webling, W. Lee, W. Ellison, and Mr. J. Briglemen were exhibited.

The audience, while generally reticent, could not refrain from giving vent to admiration and applause when any especially fine slide was shown, but the whole affair being still *sub judice*, it would be injudicious to particularise examples. The allotted hour having expired, the audience separated, and spent the remainder of the evening examining the other treasures in the galleries.

Lecture.

The fourth lecture of the syllabus was undertaken by Mr. Hensley Walter, managing partner of the recently formed Photoglyptic Company at Broadstone Works, Causewayside, Edinburgh, which has been established for the purpose of introducing the Woodbury process among the printing industries of the city.

The President (Mr. Blanc), in introducing the lecturer, stated that his subject would be, as mentioned in the catalogue, an exposition of the Woodbury system of photographic printing, and from Mr. Walter's practical knowledge of it, they might expect an exhaustive and educational discourse.

Mr. Walter introduced the subject by stating that the Woodburytype process was one of those which was a direct outcome of the carbon process, and he proceeded to sketch the progression of the idea from the time when Mungo Ponton, of Edinburgh, discovered the action of the bichromates in hardening albumen, gelatine, and similar colloid bodies when exposed to light, which was a photographic action. Attempts had been made, by the admixture of pigments with the bichromated gelatine, to obtain half tone, but for a considerable period nothing but line work could be got, until it was found that by printing on one side of the pigmented paper, and dissolving or developing it on the other, that this could be got; but from the grain of the paper showing through this was unsatisfactory. Mr Blair he mentioned as the first to succeed in this method of getting half tone; and afterwards Burnet, about 1868, described this mode of getting half tone. He afterwards mentioned Fargier and others, till he came to Swan, of Newcastle, to whom he gave the credit of first reversing the image with collodion, stating that he patented the process, but that before the six months necessary for sealing and completing the patent, so altered the specification that he patented a different idea from that he started with, having, he thought, improved upon his first idea, or got it improved. He also gave Sawyer and Johnston credit for the improvements they had introduced into the carbon process.

Proceeding to the more immediate parts of the subject, the lecturer said the process took its name from the inventor, the late Mr. W. Woodbury, who conceived the idea of using the film of indurated gelatine as a matrix for a mould, an idea which he characterised as bold in conception and ingenious in practical working, and which was not, he said, practised in this country, except in London and Edinburgh. He then described generally the process itself in the first place. The sensitive film of bichromated gelatine is made on a plate glass, and when dry exposed under a negative and timed with an actinometer, after which developed by being placed in warm water from 120° to 150° Fahr. When this was quite dry, which took a considerable time, according to the weather and other conditions, it was examined, and after any necessary alterations, such as were necessary from pinholes in the negative or other causes, it was placed, picture face upwards, on a steel plate, and a sheet of soft metal placed over it, the edges being protected, if necessary, to prevent the squeezing out of the metal under the pressure. This was effected in the hydraulic press, and a pressure of from four to five tons to the square inch was about the usual amount. This, however, depended largely upon the size of the plate, and also the kind of metal of which it was composed, some examples being harder than others. In this way a reverse of the gelatine relief was obtained, from which the printing took place.

Mr. Walter then took up examples of each stage of the process, and

explained them in their turn, dealing successively with the relief, the mould, and the printing, handing each round for examination.

With his assistants he then proceeded to print from a press on the lecture table, explaining the necessity there was for the utmost exactitude in bedding of the plate in order that it might stand the enormous pressure and be dead flat at the same time.

The mould having been oiled by passing a soft oiled cloth over it, in the centre of the plate is poured a superabundance of a warm gelatinous ink, and the peculiarity in the printing is that the pressure is made so great that the ink is squeezed off the high portions of the relief, and it is only the varied depths of the hollows which remain and make the impression on the paper. The lecturer stated that the process of production was very rapid, and therefore very cheap, and that most of the pictures which are distributed by the automatic machines were Woodburytypes.

The paper from which they have hitherto been printed has been the fine photographic paper of Saxe or Rives, obtained from France and Germany, which had to be rolled, smoothed, waterproofed, &c., in order to stand the pressure and the damp of the gelatinous ink; but he had now obtained a Scotch paper which, while it might not do for ordinary photographic purposes, yet he found it answered very well. A print was made upon the paper and handed round along with the prepared unprinted paper.

The President, in giving the thanks of the Society to Mr. Walter for his interesting lecture and demonstrations, expressed his high opinion of such practical lectures, as by such he and others were thereby much benefited.

Many of those present lingered examining more closely the various exhibits and apparatus which had been operated with and asking questions, which were all most courteously and clearly answered. The remainder adjourned to the other galleries, examining the exhibits for the remaining hour.

BIRMINGHAM PHOTOGRAPHIC EXHIBITION.

From thirty to thirty-five years ago Birmingham had a "Photographic Society," in which Rejlander, Robinson, Breese, and other giants of those days were "shining lights." This old Society (like many more in those days) was founded on the enthusiasm aroused throughout the land by Scott-Archer's discovery of the collodion process. But this first Society ceased to exist about 1862; and it was not until 1885 that a new company of zealous workers in the "hardware village" resolved to band themselves together for the purposes of good-fellowship and "for the advancement of photography." This new Society was "founded on gelatine," and we hope that they will stick to it.

To any photographic society with high aspirations the holding of an annual exhibition is an indispensable event; and we were glad to receive an invitation to view the fine collection of pictures which had been got together in the Temperance Hall, Temple-street. The rooms were open to the public on four days, December 16, 17, 18, and 19; and there has been a capital lantern show every evening, the first-class biunial recently acquired by the Society being manipulated by one of the Vice-Presidents, Mr. Howard Jaques.

Medals, prizes, &c., were offered for competition in twenty-five classes. As last year, the pictures were sent (unframed) to the judges, and by this means the Society was able to obtain the services of many experts at a slight expense. Among those who kindly gave their services in this direction were Messrs. Geo. Bankart, W. Adcock, T. C. Hepworth, R. Keene, Paul Lange, H. P. Robinson, F. Sutcliffe, J. B. B. Wellington, &c. Each judge was responsible alone for the class or classes which he consented to judge.

The principal prize-winners were Messrs. Jerome Harrison (silver medals for landscape, interiors, and scientific); B. Karleese (silver medals for lantern slides and genre, and President's prize); A. J. Leeson (silver medals for hand-camera work and landscapes); E. H. Jaques (silver medal for *Peasantry*, bronze medal for lantern slides); W. Booke (silver medal for small landscapes and prize for best platinotype print); J. H. Pickard (silver medal for enlargements); T. J. Davies (silver medal for "artistic quarter-plate picture"); G. J. Sershall (silver medal for portrait); H. W. Southall (silver medal for transparencies); Whitworth Wallis (silver medal for architecture); J. W. Morse (prize for Hoar-frost or Snow picture). In addition the judges awarded "honourable mention" to thirty-six pictures. There were thirty-four competitors and 349 frames (containing over 400 pictures) were hung round the walls of the Temperance Hall.

Among the pictures which attracted most attention we may name the Hon. Secretary's fine enlargement, *Bunch of Grapes*, and Mr. Harrison's Dartmoor landscape and his interior of the Beauchamp Chapel. Mr. Leeson's were mostly printed on rough drawing paper, sensitised with ammonio-nitrate of silver. Mr. Karleese showed fine work, and plenty of it, his seascapes and river scenery being remarkably fine. Mr. Moore is a young worker whose art training will bring him speedily to the front; while Mr. Sershall's name is already familiar in several branches of art. His portrait study, a young lady seated at a piano, shows great mastery of light and shade.

In the galleries surrounding the Hall the "Warwickshire Photo Section" of the Society exhibited a collection of local pictures, which are of the highest value and interest. Mr. J. B. Stone's large prints (18 × 15), in platinotype from negatives which he had taken more than twenty years ago, prove how rapidly things change, for half of the places therein depicted have already been swept away or radically changed. Mr. Jerome Harrison (the originator of the project of county photo-surveys) shows about 200 whole-plate prints, in which the towns of Birmingham and Warwick are largely represented; and Dr. Leach, with Messrs. Pickard, Karleese, T. Taylor, Leeson, Kimberley (of Kenilworth), R. Keene (of Derby), and others, help on the good work by splendid efforts.

In another gallery, two members (Messrs. Fowler and Middleton) show a number of prints representing the scenery along the River Severn, from its source to the sea.

Our Editorial Table.

Amateur Photographic Requisites.

London: The Stereoscopic and Photographic Company.

One of the neatest compendiums of amateur requisites we have seen is that just received from the London Stereoscopic and Photographic Company, Limited. It is beautifully printed in two colours of ink, and contains 193 pages, with an immense number of woodcuts by way of illustration.

Several pages are devoted to complete "sets" and outfits, in the compilation of which everything necessary or useful seems to have a place. Detective or hand cameras are represented in great variety, including the useful "artist" series, the Kodak, and others. We find here, too, an outfit specially adapted for "evening photography." In the lens department of the booklet prominence is naturally given to the Company's well-known series of black-band lenses. A speciality is also made of Carbutt's flexible films, for which the Company are the sole wholesale agents; plates of all the favourite makes also find a place in their list. The general apparatus department is very complete, and is admirably arranged for easy reference. Taken as a whole the book is a model one.

RECENT PATENTS.

APPLICATIONS FOR PATENTS.

No. 20,199.—"Improvements in Photographic Negative and Print Washers, and for such like Purposes." A. Palmer.—*Dated December* 10, 1890.

No. 20,239.—"Improvements relating to Photographic Cameras." A. Staehle.—*Dated December* 10, 1890.

No. 20,287.—"A New Process of and Means for Colouring Photographs." S. H. Crocker.—*Dated December* 12, 1890.

No. 20,299.—"Improvements in Photographic 'Sheaths' or 'Carriers.'" A. S. Newman.—*Dated December* 12, 1890.

PATENTS COMPLETED.

Improved Photograph-burnishing Machine.

No. 8160. John Pitt Bayly, 18, Fulham-place, Paddington, London.—*November* 22, 1890.

This invention has for its object to provide a photograph-burnishing machine, having a burnishing tool which is capable of being shifted in a direction transversely to the action of the roll, and thus bring a new burnishing surface into action when required.

The machine comprises a fixed frame, in the upper part of which the burnishing tool is secured, preferably in a groove. In the ends of the frame are pivoted, midway their length, two side frames, in the upper ends of which is suitably journalled a roller, and the opposite ends of which are provided with locking bolts. These locking bolts engage suitable apertures in the ends of the fixed frame, when the pivoted roll-carrying frames are swung over in such manner as to bring the roll over the burnishing tool.

The bearings in which the roll is mounted are supported upon suitable springs, which tend to keep the roll elevated above the burnishing tool. These bearings have inclined upper faces, corresponding to inclined wedges joined by a rod, and running in slots in the ends of the fixed frame. One wedge is provided at its end with a threaded aperture in which it engages the screwed portion of a stem free to turn, but not free to move, longitudinally in its fixed bearings. Two of these adjusting screws provided with hand-wheels may be provided if desired, and serve to adjust the pressure upon the photograph between the roll and the burnishing tool. By means of suitable set-screws carried by the fixed frame and acting on the burnishing tool, it may be shifted in a transverse direction for the purpose hereinbefore set forth.

Photographic Club.—December 24 (Christmas Eve), no meeting. December 31, Lantern meeting. January 7, *Photo-micrography.*

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting.	Name of Society.	Place of Meeting.
December 22	North Middlesex Club	Jubilee Hall, Hornsey Rise, N.
,, 24	Great Britain (Technical)	5a, Pall Mall East.

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 11.—Mr. A. Collin in the chair.

A member inquired what was the proper angle at which to grind cutting tools for working vulcanite in the lathe. He had used tools fit for wood turning, and found the vulcanite fly and chip.

It was reported that the tools should be of the same angle as for brass work.

Mr. T. K. FRESHWATER asked whether any member could give an explanation of the cause of the explosion in the case recently tried for damages in consequence of the bursting of a pressure gauge used in connection with Brin's oxygen. The oil, he said, must have had a very low flashing point.

Mr. L. MEDLAND showed a printing frame for producing lantern transparencies from any part of a negative. The frame contained a sheet of plate glass on which was laid a sheet of thick cardboard, having an opening to fit the negative which it might be desired to use. Along the two sides of the frame were parallel bars standing about an inch and half behind the glass. The frame containing the plate to be printed on was furnished with extending arms that ran under the parallel bars, and there was thus a means of adjustment, not only for selecting any portion of the negative, but for placing the plate upon it at an angle if required to correct any deviation from the perpendicularity of lines in the negative.

The usual monthly lantern display then took place, and included slides by Messrs. Pemberton, Teape, Parfett, Aldham, Kellow, Medland, and Freshwater.

Mr. J. S. TEAPE said that with regard to reducing any excessive density from a negative that had been intensified with uranium and ferrocyanide, it was not necessary to depend upon a very long soaking in plain water. An alkaline solution acted at once, and he had found that with a ten per cent. solution of washing soda four minutes did the work nicely.

CAMERA CLUB.

DECEMBER 11.—The Rev. F. C. Lambert occupied the chair, and in the opening proceedings alluded to this as the last Thursday evening meeting in the present premises.

Lieut. C. E. GRANSTONE, R.N., read a paper on *Interior Photography*. The lecturer dwelt upon the deep interest attaching to the study of architecture and the new field opened up to the photographer. In England we were particularly favoured in respect of our cathedrals. He then described his apparatus, and treated of the whole of the special technicalities in interior work, giving many excellent hints from his wide experience, and illustrating his remarks by handing round the negatives and prints.

A good discussion followed, in which Major NAIR, and Messrs. Maskell, Davison, Freshwater, Clark, Corbould, and the Chairman took part.

THE LANTERN SOCIETY.

AT a special general meeting held at 20, Hanover-square, on December 8, it was resolved that the entrance fee should be abolished, and members joining now are therefore only liable for the subscription.

At the ordinary meeting held on the same night, a paper was read by Mr. J. G. Ormiston, F.R.M.S., on *Means of Protection amongst Animals*. The paper, which was illustrated by some 80 lantern slides, was of very considerable interest, the lecturer discussing the various means adopted by animals for their protection in the great struggle for the survival of the fittest, some of the methods employed being of a most remarkable description, more especially in the cases of insects, where the animals reproduce the appearance of natural objects with such marvellous exactitude as to defy detection.

The following are the Arrangements for the meetings of the Society up to the end of February:—December 22, Mr. C. E. Gladstone, on *Some Architectural Features of Normandy and Brittany*. January 12, Mr. E. M. Nelson, F.R.M.S., on *The Lantern and its relations to Photography and the Microscope*. January 26, Mr. C. Harrison, on *The Confederation of Egypt and Assyria, as illustrated by its Pictorial Remains and Records*. February 9, Mr. J. Traill Taylor, on *Lenses and Condensers for Lantern work*. February 23, Exhibition of lantern slides for members and their friends.

HOLBORN CAMERA CLUB.

DECEMBER 12.—Mr. R. LAYTON in the chair.

Mr. HERBERT THOMPSON demonstrated on the method of making lantern slides on Fry's plates. Three or four plates were exposed at different distances from the gas, and gave very good results.

Members who had sample packets of Fry's manufactures brought up their results for comparison.

The annual exhibition of the Club is to be held at the latter end of February.

HACKNEY PHOTOGRAPHIC SOCIETY.

DECEMBER 11.—The proceedings on this occasion partook of the nature of a conversazione and exhibition of competition pictures and lantern slides—the work of the members. St. Andrew's Hall, Well street, was crowded, and the walls were decorated with pictorial works. The musical entertainment consisted of pieces by the orchestra, with songs and instrumental solos. During the interval between parts first and second of the concert, Mr. J. Traill Taylor was called upon to distribute the prizes which had been awarded by the judges to the works possessing the highest degree of merit.

Mr. TAYLOR said that he could not commence his pleasant duties until he had congratulated the Society upon the great excellence of the pictures that evening exhibited. The Hackney Society was not yet two years old, and yet there were pictures upon the walls that evening which would hold their own with many lately shown at the more pretentious Pall Mall Exhibition. The medal question had always been, and probably would ever continue to be, a vexed one, and it was only natural that, by some, dissatisfaction might be felt at some of the awards. In this case he could say that the judges had acted to the best of their ability, and without knowing who was the producer of a single picture. He was the more particular to mention this because from the list now presented he found that the name of President and some of the officers of the Society stood high among the fortunate recipients of the honours. This only showed that they had had the good sense to elect as their officers gentlemen who could teach them by example as well as by precept. Whatever drawbacks attended the medal system there seemed no doubt that it acted as a stimulus for members to produce the highest possible class of work. It might prove a satisfaction to those who had not received any award to know that some of those who had been more fortunate had only won by half a neck. He then distributed the prizes as follows:—"For Pictures on Society Excursions:" silver, Dr. Gerard Smith; bronze, Mr. W. G. Linsdell. "Seascape or Landscape" (Mr. Crouch's donation of lens): Mr. Walter Wesson. "Architecture:" silver, Dr. Roland Smith; bronze, Mr. Fred. H. Evans. "Beginner's Prize:" bronze, F. W. Cocks. "Lantern Section—Microscopical:" silver, Dr. Ambrose Kibbler. Lantern Section—Artistic:" silver, Mr. J. Carpenter. "Isochromatic" (Messrs. B. J. Edwards & Co.'s prize): Drs. Gerard Smith and Roland Smith. "Championship:" gold medal, Mr. Walter Wesson.

WEST KENT AMATEUR PHOTOGRAPHIC SOCIETY.

DECEMBER 10.—The President (Mr. Andrew Pringle) in the chair.

The business of the evening consisted of the reading of a paper by Mr. P. H. NEWMAN on *Present Tendencies of Photographic Art* [p. 805]. Mr. Newman has strong views upon the work to be done by photographers, and impressed upon his hearers that those who were striving to represent photography as the work of a painter were throwing away the substance for the shadow, and that it was much to be regretted that some prominent workers appeared to be content if their photographs resembled badly executed sepia drawings. Mr. Newman drew attention to the work of Messrs. Davison & Clark at the recent Pall Mall Exhibition, and condemned the use of rough paper, drawing comparisons between it and frescoes or scenic painting. He said that the texture of the paper was a matter of scale, and that it would be absurd to print a *carte-de-visite* portrait upon rough paper, such as had been used by several exhibitors at Pall Mall. The paper was most exhaustive upon photography of the present day, and the writer deprecated the idea that the photographer should be ashamed of his work being called "a mere photograph," and made the statement that, strive as he may, it was impossible, by throwing the lens out of focus, or using no lens, as in pinhole photography, to secure the feeling and expression given to a picture by the genius of a man's mind or the cunning of his hand when using brush or pencil. The paper will doubtless be published in the photographic press, and forms a most interesting and instructive essay.

Messrs. PRINGLE, SHADBOLT, and HASTINGS spoke in support of Mr. Newman's opinions.

The remainder of the evening was spent in the exhibition by the optical lantern.

BRIGHTON PHOTOGRAPHIC SOCIETY.

DECEMBER 9.—Lantern evening. Mr. J. P. Slingsby Roberts presided, and presented the medals won in the 1889 and 1890 lantern-slide competition, viz., 1889, bronze, Mr. A. H. Webling; 1890, silver, Mr. A. H. C. Corder; bronze, Mr. E. J. Bedford.

A varied assortment of slides, the work of Messrs. Mitchell, Bedford, Corder, Patching, Webling, Williamson, Emery, and a selection kindly lent by Messrs. R. W. Thomas & Co., were passed through, the majority being of the very highest quality. The lantern was lent and worked by Mr. W. A. Ford

TORQUAY PHOTOGRAPHIC ASSOCIATION.

DECEMBER 9.—A discussion on *Silver Printing and Toning* was started by Mr. A. R. HUNT, M.A. (Vice-President). A series of prints toned by different formulæ were exhibited, also three prints, taken by means of an electric arc in the ten-thousandth part of a second, of a jet of water.

Several ladies have joined the Association, which now numbers over fifty members.

DEVON AND CORNWALL CAMERA CLUB.

THE opening meeting of the Club's winter session was held at the Club Rooms, the Athenæum, Plymouth, on the 8th inst. Mr. R. Murray (Vice-President) occupied the chair.

A letter was read from Mrs. Mildmay, thanking the Club for the presentation album of views of Flete.

A large number of lantern slides by various members were exhibited, the contributors being Messrs. Aldridge, Carnell, Micklewood, Murray, Tweedy, Weekes, and Worth.

When the supply of slides was nearly exhausted the limelight failed, and the oxygen bottle was found to have been emptied. It was fortunate this incident did not occur earlier in the evening.

The next meeting will be at the Club Rooms on Monday, the 22nd inst., at half-past seven p.m.

NEWCASTLE-ON-TYNE AND NORTHERN COUNTIES' PHOTOGRAPHIC ASSOCIATION.

DECEMBER 9,—Mr. J. P. Gibson in the chair.

Five new members were elected.

The new optical lantern which has been subscribed for by the members was in operation for the first time, and over two hundred and fifty slides by various gentlemen put through. The lantern, which was ably operated by Messrs. Ridgway and Pratt, gave great satisfaction to the large number of members present.

Nominations for officers for the current year were received, and the election will take place at the annual meeting in January next.

BRECHIN PHOTOGRAPHIC ASSOCIATION.

THE new rooms of the above Association at 14, St. Mary-street, were opened by the President on Tuesday evening, December 9, in the presence of a large number of the members. The rooms consist of a fair-sized reading room, which is also to be used for meetings; a dark room, in which benches have been fitted up and water laid on; a cloak room, &c.

Mr. W. S. ADAMSON (the President) opened with a lecture descriptive of *A Tour from Liverpool to the Yosemite Valley by the Straits of Magellan*, illustrated with lantern slides; and Mr. A. R. McLean Murray exhibited over fifty slides of the ruins of Pompeii, with which he intends to illustrate a lecture on that ill-fated city.

Five honorary and two ordinary members were admitted, namely, honorary: Messrs. J. S. Baxter, D. Hunee, Rev. H. Campbell, J. Simpson, and Watson; and ordinary: Messrs. W. Ferguson and Colin Hutcheon.

Now that this Association has got a local habitation they intend to further their objects by arranging to give hints to beginners in the art. Some of the older members are to meet with the younger ones and help them by developing plates, prints, &c., and by giving instruction regarding exposure and the hundred-and-one little things that have to be attended to to make a successful photographer. It is hoped that their enterprise may be rewarded by such an accession of new members as will justify them in the steps they have taken to push forward the claims of photography in "the ancient city."

LOUTH AND DISTRICT PHOTOGRAPHIC SOCIETY.

IN order to give a stimulus to the art of photography amongst the amateurs of the town, an exhibition was held on Thursday afternoon and evening. The Mayor (Alderman James Fowler) opened the exhibition. The exhibits of the Louth members were supplemented by some from Mr. Gale, of London, and Mr. Armitage, of Nottingham. The several exhibits reflected great credit on the exhibitors, who, by their work, clearly prove that they have taken interest in the art, and their efforts to produce good pictures have been successful.

The MAYOR said it gave him great pleasure to come and open this exhibition of amateur photography. He thought he was right in saying this Society in Louth was the only one in existence in the whole county of Lincoln, and this was the first exhibition of the Louth Society. There were over 200 pictures exhibited by the members of the Society, some of which had been shown for competition and won nineteen awards. If this might be taken as an augury of the Society's success, great might be the result of their efforts. After looking round at the exhibits, he might say that there was one word which might have been left out of the circular, and that was the word "amateur," for on carefully looking at their views, which were of such a character and good quality, they might conclude they had before them the work of professionals rather than amateurs. He thought it was a credit to the Society having members who could produce such pictures as were on the easels.

THE LONDON CHAMBER OF COMMERCE (INCORPORATED).

AMERICAN COPYRIGHT.—A largely attended meeting of representatives of the various trades interested was held at the offices of the London Chamber of Commerce on Thursday, last week, Mr. R. K. Causton, M.P., presiding, to consider what action should be taken in connexion with the American Copyright Bill. After discussion, in which Messrs. Edwin Ashdown, James Bowden (Ward, Lock, & Co.), W. C. Knight Clowes (William Clowes & Sons, Limited), C. J. Drummond (Secretary of the London Society of Compositors), R. W. Routledge (George Routledge & Sons, Limited), A. C. Trench (Kegan Paul, Trench, & Co.), and others took part, it was unanimously agreed that a Committee, representative of all interests concerned, be appointed to consider the whole question and report to a future meeting as to what steps they would propose should be taken. It was also suggested that the London Chamber of Commerce should communicate again with the Board of Trade on the subject.

DECIMAL ASSOCIATION.—A petition in favour of the appointment of a Royal Commission to inquire into the desirability of introducing the decimal system of currency and weights and measures into this country is being circulated by the Decimal Association. Copies of the petition lie for signature at the London Chamber of Commerce, Botolph House, Eastcheap; at the offices of Mr. J. Emerson Dowson, C.E., 3, Great Queen-street, Westminster, S.W.; and at the offices of Messrs. Cridland & Neil, 17, Bedford-row, W.C.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

EMULSIFIED SILVER HALOIDS.

To the EDITOR.

SIR,—With reference to the article on the *Nature and Proportions of Emulsified Silver Haloids* which appeared in the issue of THE BRITISH JOURNAL OF PHOTOGRAPHY for October 31, I may explain that in suggesting that dry plate makers might indicate on their dry plate packages the nature and proportions of the haloid silver salts used in the emulsion, I, of course, had no expectation or desire that makers should give more than the broadest indications of the silver salts contained in their emulsions, with possibly a little more as to the proportion of iodide to bromide, whether large or small—just sufficient, in fact, to let people know roughly what kind of plate they were using. It might be sufficient if plates could be described as bromide, iodo-bromide, chloro-iodo-bromide, chloride, as the case might be, in exactly the same way as collodion makers describe their collodions as iodised, bromised, bromo-iodised, &c. The proportions of iodide to bromide could be roughly shown as B for pure bromide, BI for bromo-iodide, with a fraction to show the proportion of iodide, as $BI_{\frac{1}{10}}$, or more roughly still, by BI, BII, BIII, to show different degrees of iodising.

Passing my life here in India, I know nothing of the home dry plate trade, but it seems to me that an indication to the above extent of the nature of the manufactured dry plates would do the makers of dry plates no more harm than in the case of the collodion makers, and, as you agree, the information would certainly be valuable in the case of experimenters and investigators, though these naturally form only a very small proportion of the persons using the plates.

I have myself experienced the want of such information in spectrum photography; and when recently working on the thio-carbamide reversals, the fact was so new and so puzzling that a simple clue to the cause of the variations of results with different plates would have been of great value. According to Captain Abney, a plate containing pure silver bromide should reverse more readily than one containing iodide, and, judging from the behaviour of the thio-carbamides I tried with pure silver bromide and iodide, the same rule would probably hold good, and one might be saved a good deal of trouble and disappointment by being able to select at once for experiment plates containing pure bromide only, if it could be known which they were. No doubt makers would not be unwilling to give the information in special cases, as you suggest; and in Europe it would be quite easy to apply for it and obtain an immediate reply, or have special plates prepared, but distance makes this practically impossible in India and far-away colonies. Moreover, the information obtained for one make of plates would be of no use for another, whereas the general indication I have suggested would be of universal use.

In Europe or cool climates, too, it would be comparatively easy to prepare dry plates of known composition for oneself, but here in Calcutta, at any rate in the hot weather, it is almost impossible to do so. It may, I believe, be said that practically the manufacture of dry plates is now entirely in the hands of the professional makers, and it is well that it is so, because each maker has his own formulæ and methods of manufacture which enable him to supply a standard plate of fairly unvarying quality. The successful manufacture no doubt depends probably more upon the quality of the gelatine employed and details of manipulation in the preparation of the emulsion than it does upon the mere choice and proportions of the haloid silver salts. Any concession, therefore, which the manufacturers could make in the direction I have indicated, without of course divulging trade secrets or information which would put them at a disadvantage with rival makers, would, I believe, be greatly appreciated by many users of the plates, and would enormously increase their value for all scientific purposes.—I am, yours, &c., COL. J. WATERHOUSE.

Survey of India Office, Calcutta, November 26, 1890.

"JUDGMENT."

To the EDITOR.

SIR,—In THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC just published (may its shadow never grow less!) there is, under the above heading, an amusing little skit upon my exposure meter. The writer discovers that one of the factors, that of the subject, requires a certain amount of "judgment" on the part of the photographer, and asks a pertinent question: "If judgment is a factor, why not apply it *alone* when making an exposure, *instead* of using it in conjunction with those perplexing things—actinometers, exposure tables, and the like?"

My answer is this, that the amount of "judgment" (it is Mr. Hubert's term—I should call it observation) required to estimate the photographic value of the subject is mere child's play in comparison with the skilled and long-trained judgment required to estimate an exposure under the constantly varying conditions met with.

In the first case, the photographer, looking at his subject, has to ask himself the question, "Is the average *colour* of my subject lighter or darker than the general run of subjects?" If it is not different to the average, it is valued at 100; if lighter, at a less value, down to 25 for a white subject; if darker, a greater value up to 300 for old black oak. Here a definite standard is given, and no variations of light, plate, or stop need perplex the worker in his estimate.

But turn to the amount of judgment required to estimate, unaided, an exposure. What photographer can give another a standard to work by? How many failures have to be made before a worker can form a standard of his own, and even then, when he attempts an unfamiliar subject, such as an interior, how little help he gets from his own past standards in other branches of work?

Experienced photographers naturally prefer the method—or want of method—of estimating exposures in which they have gained comparative perfection by long usage. I wonder if they ever consider how slipshod and wasteful it is? I say wasteful, because the results of long experience can be communicated to no one else, but each beginner has to grope his way with very little help.

But the advance of scientific method must sooner or later embrace this question of exposure, which should be—but is not—the most exact branch of an exact science. No wonder the photographic press is flooded with particulars of modification after modification of developing formulæ, "plenty of latitude" being the most prized qualification. Alas! exactness in grains to the ounce in the developer will not make up for inexactness in light action on the plate.—I am, yours, &c., ALFRED WATKINS.

Hereford, December 10, 1890.

TEN PER CENT. SOLUTIONS, PRINTING FRAMES, AND DEVELOPERS.

To the EDITOR.

SIR,—In looking over the last number of the JOURNAL—that of December 12—I am struck by some remarks of Mr. Symonds on page 798. He says that "If your correspondents will try a ten (10) per cent. solution (one pound of hypo to the gallon of water)," &c. Now, may I ask if that is what you would consider a ten per cent. solution?

Several years ago I enjoyed myself hugely by propounding in an American journal, *What constitutes a ten per cent. solution?* The answers were something wonderful to contemplate. I believe there was some such difference as fifty grains to the ounce of solvent among those who answered.

Let Mr. Symonds take, for example, ten grains of any salt he may wish, dissolve the same in the smallest quantity of pure water possible, and after solution add water to make the solution up to 100 grains weight, and he will have a ten per cent. solution. How he can have it any other way puzzles me, but perhaps some one can enlighten us both, Mr. Editor.

In regard to printing frames with unequally divided backs, let me say that perhaps six or seven years ago I used exactly the same thing in America, made by the Scovills and, as far as I know, nobody ever thought it worth while to consider them patentable. Whether the idea is English or American I don't know and don't care; the fact remains that they are no novelty.

I have been experimenting with the combined eikonogen and hydroquinone developer recently. Dr. Eder first suggested the idea to me, but I find his developer has several faults.

I now get the most satisfactory results—the best, in fact, that I have ever had—from the following formulæ:—

For landscapes and instantaneous:

Eikonogen	10 grammes.
Hydroquinone	10 "
Sulphite of soda	100 "
Hot water	1 litre.

When cold add fifty grammes of carbonate of potash. In general use add a few drops of bromide of potash.

For portraits:

Eikonogen	6 grammes.
Hydroquinone	8 "

and the rest of the developer as above, having the bromide handy.—I am, yours, &c., "QUAND MÊME."

Paris, December 15, 1890.

CALCUTTA PHOTOGRAPHIC EXHIBITION.

To the EDITOR.

SIR,—We regret to say that the number of exhibits forwarded to us from abroad is so small that it has been decided to abandon the International Exhibition advertised to be held in December, 1890.

The Photographic Society of India beg to tender their best thanks to those who have despatched exhibits, and can only express the hope that on another occasion they will not be deterred from once again assisting us.

All exhibits will be returned carriage paid as soon as possible.—We are, yours, &c., JOHN S. GLADSTONE,
A. FLEMMING,
Hon. Secretaries Photographic Society of India.

Calcutta, November 26, 1890.

PRINTING FRAMES WITH UNEQUALLY DIVIDED BACKS.

To the EDITOR.

SIR,—My attention has been called to a letter appearing in your issue of December 12, 1890, from Messrs. Ross & Co., London. This letter has been penned before the real nature of my new printing frame was known to them. I am quite aware that printing frames with unequally divided backs have been made not only six years, as stated by Messrs. Ross & Co., but twenty years ago, and I am pleased that there are still some firms that stick to one of the good ideas of our forefathers in the photographic art. I do not claim the unequal division of the back at all. What my improvement consists of is this: the back of the frame is composed of *two pieces of different widths*. The *projecting ends* of the widest portion of the back fit *in corresponding recesses in the side of the printing frame*. The effect of this arrangement is that, no matter how carelessly the flap of frame is opened or shut, there is not the slightest chance of the print being moved out of position. Many of the oldest dealers have already seen it, and acknowledge it to be a real advance in the construction of printing frames.—I am, yours, &c., W. TYLER.

57, *High-street, Aston, Birmingham.*

Exchange Column.

**** No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

I will exchange fifty slides of the county of Fife, with *Handbook* of the county, for other good slides.—Address, TAYLOR & SONS, Photographers, Kirkcaldy.

Wanted, a cabinet portrait lens and landscape backgrounds in exchange for a forty-foot hydrogen gas cylinder, nearly full of gas, a good dissolving tap, and a half-plate camera with four double slides.—Address, L. DIXON, Hall-street, Colne.

Answers to Correspondents.

**** Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPHS REGISTERED:

J. W. Beaufort, Birmingham.—*Photograph of child in bath.*
Norton McNeil, Blackburn.—*Two photographs of J. N. Boothman, Mayor of Blackburn.*

C. H. G. (Chicago).—Effect will be given to your suggestion.

J. SMALE.—In registering an enlarged photograph it is not necessary that the enlargement be sent. An unmounted proof from the original small negative will serve the purpose equally well.

MCANDREW.—We shall have an article next week on the subject. The spots on your pictures are of the same character as those referred to. We should say that the paper had nothing whatever to do with the evil; certainly not in your case.

F. H. WORSLEY BENISON.—Any well-made dark slide will bear the test of two minutes' exposure to bright sunshine. Any of the best camera makers will supply reliable slides. The test is a rather severe one for common apparatus, but by no means so for that of the best makes.

REKKIE.—It does not at all follow that a photographic process does not give permanent prints from the fact that the paper becomes discoloured by exposure. Nearly all kinds of paper, although untouched by chemicals, assume more or less quickly a yellow tint upon exposure to light and atmosphere.

C. KNIGHT.—1. We cannot say. With the same plates and same developer we find no difficulty in obtaining density.—2. There should be no precipitate unless the solution were put into an unclean bottle. You ought to experience no difficulty in getting all requisite density with eikonogen. We suspect you have been over-exposing.

E. RAY.—To obtain warm tones on bromide paper a very long exposure should be given, say three or four times the normal; then the image should be brought out with a very weak developer, and with a minimum of bromide, or with the bromide entirely dispensed with. By a weak developer is meant the ordinary one diluted with three or four times its bulk of water.

T. SHORTER.—If the new Society can succeed in settling the number of poses that should be made for a given number of portraits it would be a great advantage to the profession generally; of that there is no question. But the fact will remain that although the Society may formulate rules for their own members they will not be binding on outsiders. Possibly there may be a way out of the difficulty.

W. BROWN.—When a certain brand of gelatine is mentioned, it must not be taken for granted that all samples bearing them are alike—even those of the most expensive kinds. It is rarely that two samples of the same make are identical. This fact may probably account for some of the discrepancies met with by different workers. English gelatines are much more uniform in character than are those of foreign manufacture.

R. C.—Obviously the spots exist in the paper before it is sensitised. On examining the unexposed piece we could see them plainly.

W. A. J. writes asking where thin sheets of transparent gelatine can be had that are quite free from air bubbles and other defects, as that supplied by fancy box makers is not good enough for his purpose.—The best gelatine films supplied commercially are those sold by the dealers in lithographic materials. We have obtained them of very good quality from Cornelissen's, Great Queen-street, W.C. They are much more costly than those vended by the box makers.

Nota Bene puts the following query: "Would there be any objection to the following plan of keeping bromide paper flat when making enlargements of 15 × 24, namely, place in dark slide a sheet of perfectly clear glass, then place paper thereon, and back up with another sheet of glass? The enlarged image would have to pass through the front glass before reaching the paper."—Provided the glass is clean and free from defects, there is no objection. As a matter of fact, all the old calotype and waxed paper used to be exposed in this manner.

Plano.—Our correspondent sends us his first attempt at enlarging on bromide paper. He has, in our estimation, done remarkably well, the negative not being well adapted for the purpose. This arises from its being rather too dense. With a little more experience he will do still better. The lantern seems all right. He may, however, try the effect of placing a diaphragm (extemporised out of cardboard) in front of, and close to, the front lens. The colour of the final mount is a matter of taste. It may be either a pure white or a pale brown.

A. Z. (Liverpool).—In the apprenticing of a lad in the photographic profession the premium is governed very much by the status of the establishment to which he is bound. As a matter of course, the experience to be acquired in a third or fourth-rate house is not to be compared with that obtainable in a first-class establishment. Again, a great deal will depend upon the salary the youth is to receive during the term. There is no set premium; it is all a matter of mutual arrangement. It will be advisable to have it definitely stated in the indentures what branches of the business are to be taught. This may avoid disputes in the future.

M. Hargreaves.—From your letter it is clear that your trouble is due to something in the manipulations. How can it be otherwise, seeing that you find, when prints are made from the same sheet of paper (and that of your own sensitising), from the same negatives, and are toned side by side in the same bath, that some are all that can be desired while others are yellow, or nearly? We note that you say that the first prints put into the toning bath tone to a good colour, while some of those immersed afterwards become yellow. This would indicate that during the toning the bath becomes contaminated with something, probably hyposulphite of soda. This would fully account for the trouble.

Mr. [Slingsby sends the following explanation in reply to Messrs. Tear & Sons: "I notice in your last issue that during the flash-light demonstration on the evening of December 2, at Messrs. Marion & Co.'s studio, Messrs. Tear & Sons complain that they did not see the sitter lighted up by the burning of a small piece of magnesium ribbon previous to the exposure being made. Mr. Frank Bishop, one of the firm of Marion & Co., undertook at the commencement the duty of lighting up a piece of magnesium ribbon, and as the evening wore on the pressure of visitors became so great that I suddenly missed him and the magnesium ribbon too. The magnesium ribbon was only an auxiliary, so I went on without it for a time until the supply was discovered. If Messrs. Tear & Sons will look into my work on *Flash-light Photography* at p. 13, on 'Portraits by Magnesium Flash Light,' they will read that I propose the room should be filled with a flood of pure white light lasting a few minutes, and the exposures taken with instantaneous shutters attached to one or more cameras. This matter was written early in the month of March of this year."

J. Cook writes: "Would you kindly give me your opinion of the following through the Journal of this week, if possible? A friend of mine was sending a dog to a show, and there was an objectionable white spot on the nose. He asked me if I would put a little silver nitrate on to darken it. I did so with an ordinary spotting brush—about four or five brushfuls. It was very dull at the time, and seeing it was not taking effect, I then put on a little pyro and ammonia ordinary developer. This had the desired effect. I may state that the silver was about sixty grains to the ounce—just the stock that I keep for keeping up the sensitising bath. During the operation the dog put out its tongue once or twice, and licked the spot. This was on Friday morning. The dog was taken to the show on Saturday morning, and was in splendid spirits two hours after being benched. During the evening my friend received a telegram that the dog was dead. Do you think the silver or pyro had anything to do with its death? Of course, the owner attaches no blame to me, but I would like to hear your opinion."—Our opinion is that the dog died through being poisoned. It may not be generally known that both nitrate of silver and pyrogallic acid are poisons *per se*. It seems a just retribution; the owner of the dog attempted to cheat the judges and suffered the penalty. Could our sympathies restore the poor animal to life, the dog would now be alive. If the chemicals could express their feelings, they would probably exclaim: "To what base uses may we not come?" Oh, photographers!

Photographic Society of Great Britain.—Technical meeting, Tuesday, December 23, at eight p.m., at 5A, Pall Mall East.

The Photography of Solar Prominences.—Mr. G. E. Hale, of Kenwood Physical Observatory, Chicago, describes in *Astronomische Nachrichten*, No. 3006, the results of some attempts made last winter to photograph solar prominences. One of the methods employed is to alter the rate of the driving clock of the equatorial, so that a prominence may move slowly across the slit of a spectroscope adjusted radially on the sun's image. A prominence line, say C, is brought into the centre of the field of the observing spectroscope, and at the same time falls upon a photographic plate having a motion such that the radius of curvature of the sun's limb upon it is the same as that of the focus of the equatorial. A second method proposed is to use a stationary solar image and photographic plate, with two slits in uniform motion—one the radial slit of a spectroscope, the other a slit moving directly in front of the plate. The plates have been stained with cyanine, alizarine, and erythrosine for the photography of the prominence lines C and D_3, utilised in the experiments. The work is to be resumed shortly with a rotating cylinder having upon its circumference a strip of dyed celluloid film moving across the focus of the observing telescope instead of the plates previously used. If this be done, and a uniform motion given by a good clock or clepsydra, some definite results may be expected.—*Nature.*

Infringement of Copyright.—At the Carlisle County Court, on Wednesday last week, before Judge Hastings Ingham, Mr. Abel Macdonald, photographer, Garden-terrace, Ulverston, sued Mr. Joseph Wood, carrying on business as J. Wood & Co., Silloth, for an infringement of the Copyright Act, claiming 50*l.* damages. Mr. Brown appeared for the plaintiff, and Mr. Paisley, Workington, defended. Mr. Brown stated that the plaintiff carried on business as a photographer at Silloth, and took some views of that marine resort and duly registered them under the Copyright Act. The defendant was a general dealer, and it was alleged that he had pirated three of these photographs, and had had them reduced in size in Paris and placed in the end of pencils. Defendant had not done this in ignorance, because before this act of piracy he called upon the plaintiff and asked what the terms would be for photographing views which he might sell. Terms were named, but were not agreed upon. Mr Brown handed in the views to the Judge. One of them, he said, was a view of the Queen's Hotel, with the inevitable German band in front. Another was a vessel leaving the port—he thought it would have looked better if the vessel had been entering. In the pencil there were six views, all by Mr. Macdonald, but only three had been copyrighted. The pencils had been on sale for some time when the matter was brought to Mr. Macdonald's knowledge, a lady showing him one. He and a friend went to the shop and bought some of the views. There was a label in the window stating that these views were to be had in pencils at a certain price. The Judge: This Act of Parliament leaves the amount of penalty to be fixed entirely to the Court, provided it does not exceed 10*l.* It puts the Court in the rather awkward position of saying whether the penalty should be 10*l.* or 10*s.* The verdict must depend upon the course taken by the defendant, and I wish to see how far Mr. Paisley is ready to make admissions as to the facts you have stated. Mr. Paisley said he agreed with the main facts. He agreed that the articles were made abroad. The Judge: But selling them in this country is sufficient. Mr. Paisley said he relied upon a case which had been decided in 1887, and by which it was decided that where an article had been made abroad and imported into England the penalties imposed by Section 6 of the Act could not be recovered. It was the case of Tuck & Son *versus* Priester, a German. The Master of the Rolls held that the penalty was upon the unlawful making. The Court held that the plaintiff was entitled to bring an action for damage sustained, and probably for forfeiture and an injunction to restrain, but not for penalties. The plaintiff in the present case asked for penalties, forfeiture, and an injunction. The proper reading of the Act, it had been held, was that no penalty should be imposed when the copy sold was made in a foreign country. The copyright was in England; the making was abroad. The Judge: He has sent them abroad to be reduced and put into these pencils. Was the case Mr. Paisley quoted, he inquired, one in which the photographs were made in England and sent abroad? Mr. Paisley said he could not say; but it was the unlawful making which was the infringement of the Act; the mere selling might have entitled the plaintiff to ask for damages, but not for penalties. The Judge (to Mr. Brown): Can you not bring an action for damages? Mr. Brown: That is certainly open. The Judge: If he brought an action for selling these things in England, the ground for damages would certainly be, "These are my copyrights, and you are selling them instead of me." Mr. Brown said although the course was perfectly open, the plaintiff was by no means precluded from resorting to the remedy that Acts of Parliament had conferred upon him. The Judge agreed, and added that the photographs appeared to have been made abroad. Mr. Brown held that they were not created abroad, but merely imitated and reduced, and remained the creations of the plaintiff's skill and art. The Judge suggested that a compromise should be arranged. Mr. Paisley said he had made the suggestion to Mr. Brown. The Judge agreed to give a decision on the subject at next Court.

*** As Christmas falls in next week we shall go to press two days earlier than usual. All matter intended for the body of the Journal should be received by us not later than Monday forenoon. Small advertisements may be received up till Tuesday morning.

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A POSSIBLE CAUSE OF INSENSITIVENESS IN COLLODION EMULSION.

Some three months back we published a series of articles entitled *Wet Collodion Plates for Lantern Slides*, in which a process was described based upon the employment of a collodion emulsion in place of the ordinary bromo-iodised collodion and sensitising bath. Since the appearance of those articles the interest evinced in collodion plates for transparency purposes has been sufficiently demonstrated by the number of communications we have received recording failures partial or total, and at page 705 we devoted an additional article to the subject, pointing out some of the principal defects met with and their causes. Still more recently we have received complaints chiefly in the direction of insensitiveness, in consequence of which we are induced to revert once more to the emulsion question.

That many of these later complaints are traceable solely to a thoroughly mistaken estimate of the relative sensitiveness of gelatine and collodion films respectively can scarcely be doubted. Amateurs whose experience has been gained entirely in connexion with the former kind of plates find it difficult to realise how great is the difference in rapidity when they venture into the older process, just as fifteen years ago the users of collodion plates refused to recognise the vastly enhanced sensitiveness of the new plates. As a matter of fact, many of our correspondents, while expecting a lower grade of sensitiveness in collodion plates than in gelatine, anticipate a difference little greater than actually exists between the extreme varieties of commercial gelatine films; whereas in reality, under some conditions, the difference in rapidity is not overstated if it is placed at 100 to 1.

But that the whole of the complaints of insensitiveness are not based on this misapprehension is proved by one correspondent's letter, from which we quote the following passage:—"I prepared some collodion emulsion according to the directions given in your Journal recently, but find it very slow, almost insensitive when exposed in contact with a thin negative, the light being gas from a No. 4 Bray's burner, and distance one foot, and time forty-five minutes! From this exposure only a very weak image was obtained with acid pyro developer." Then follow minute details of the method of procedure, both in the preparation of the emulsion and of the plates, everything being apparently correct throughout.

Now the exposure mentioned is so preposterously out of proportion to anything in reason required with such an emulsion that we are forced to look for some explanation altogether outside the data given by our correspondent. With alkaline development, from ten to fifteen seconds would be sufficient for such tones with a "thin" negative, and even with the acid pyro developer, probably at the outside three or four minutes would be ample. But three-quarters of an hour, and then only a "very weak image," points to something altogether abnormal.

In hazarding an explanation—for obviously we can under the circumstances only suggest—we would call attention to the warning given in the closing paragraph of the article on *Defects, &c.*, in our issue for November 7, page 707. We there call attention to the importance of keeping clear of methylated "finish," which is often sold as methylated "spirit," "finish" being, as is well known, spirit containing a certain quantity—about two ounces to the gallon, we believe—of gum-resin dissolved. The quantity is not large, but it suffices, as we have proved, to utterly ruin an otherwise good emulsion, producing just such an effect as that described by the correspondent we have quoted.

Some few months back an amateur friend consulted us with regard to a sample of washed collodion emulsion, which was stated to have almost entirely lost its sensitiveness after being kept for a few weeks only in the dry state. It had been properly prepared and thoroughly washed, and a portion of it redissolved soon after drying was in every way satisfactory; but upon dissolving a second quantity the result was, as stated, almost total insensitiveness. The peculiarity was that an exposure of less than a minute to gaslight would produce as good an image, such as it was, as one of several minutes to daylight; and even sunlight or magnesium failed to give anything like vigour. The case was so peculiar that we obtained a sample of the dried "pellicle" to experiment with, and on dissolving and trying it we found it to be in every way satisfactory, and utterly unlike the emulsion previously submitted.

On inquiry we found that our friend had employed a new sample of methylated spirit in compounding the second batch of emulsion, and we secured a small quantity. In his presence we poured a few drops into a tumbler of water, when, lo! the mystery was solved, for a dense milkiness proved that the "spirit" was really "finish."

For various reasons we were reluctant to believe that such a very decided effect could be produced by so apparently slight a cause, so to fairly test the matter, five and a half grains of gum-sandarac were dissolved in one ounce of methylated spirit that was known to be above suspicion, and this, mixed with an equal volume of ether, was employed to dissolve the required quantity of "pellicle" to form two ounces of emulsion. The quantity of sandarac used was practically equivalent to the proportions used in making "finish," and the result was exactly as already described.

The curious part of the matter to us, on first thoughts, was

this: Thirty years ago, as old dry plate workers are aware, a favourite process was the "resin" process, in which a small quantity of resin was dissolved in the collodion in lieu of applying a preservative, the plates being simply sensitised, washed, and dried. The quantity of resin, it is true, was much smaller than that given above, only half a grain to the ounce in fact; but, on the other hand, the emulsion described above gave but little better results when a single drachm of it was mixed with seven drachms of good emulsion, in which case the proportion of gum-resin present was less than a grain to the ounce.

On thinking the matter over, however, the explanation of the possibility of developing an image in the one case and not in the other is perhaps not difficult to find. In the older process silver development was invariably employed, the image being formed by deposition upon the surface of the film so that there was little necessity for the developer to penetrate far into the body of the collodion. With alkaline development the case is altogether different, since the image is formed *in* the film itself, which must therefore be as porous and permeable as possible, in order that the developer may be able to reach every individual particle of silver salt. The different action of a waterproofing material under the altered conditions may be therefore well imagined.

It may be urged, however, that our correspondent's complaint is made in conjunction with the "acid pyro" or pyro and silver developer, and that therefore this explanation fails to meet his case. Not necessarily, we claim, because the conditions in the resin process—a bath process—and a slow emulsion are altogether different. In the one, the sensitive material is formed in the presence of a large excess of soluble silver salt, at least on the surface of the film where reduction takes place under the developer, while in the emulsion to which the present remarks refer there is never any free silver present. The result of this difference is, that in the one case the film is particularly sensitive to silver development, in the other the very reverse.

If any doubt exist as to the effect thus produced by the action of free silver, let two collodion plates of approximately similar sensitiveness—one prepared with the bath, and the other from an emulsion—be exposed for the same period of time under a negative and let them be cut in halves. One half of each developed with pyro and alkali may prove, we will assume, to be about equally exposed; but if the remaining halves be developed with pyro and silver the bath plate, though under-exposed, will be found much in advance of the other, which under these circumstances will scarcely show an image. If the exposure be sufficiently increased to give a good image on the bath plate, the other will still be found far behind it. A similar result follows the comparison of two emulsion plates if free silver has been present in the one and not in the other case, though the difference will not be so marked.

We have gone thus deeply into an apparently small matter, for the simple reason that despite our previous warning the danger of the unconscious use of "finish" still appears to exist. In purchasing spirit, or at any rate before using it for emulsion purposes, we strongly recommend our readers to apply the simple test we have given. It is no use asking for "spirit" at an oil shop without "seeing that you get it," for in nine cases out of ten the shopman could not tell one from the other if he tried.

We may add one final remark with regard to great insensitiveness. Though we mentioned the use of acid pyro, this method of development is not to be recommended with a slow emulsion, such as the one described, except for contact printing with a very powerful light, for the reason we have just given. For camera work or with artificial light the exposure necessary for the best results will be far too protracted, and almost as good a colour can be gained by alkaline pyro followed by silver intensification.

SPOTS ON PRINTS.

During the past month or two we have received an unusual number of letters complaining of spots on paper pictures. Several of the letters have been from professional photographers of long and extended experience who are unable to account for the trouble. Of course there are spots and spots, but the particular spot in question, it may be explained, is a pale yellow one, sometimes almost white in the centre, and deepening in colour towards the edges—not unlike the spots caused by air-bells adhering to the paper while fixing. It has no apparent nucleus even when examined under a powerful magnifier. In size the spots vary from that of a small pin's head to that of a pea, or even larger. Usually they are round, though sometimes they are slightly oval. They cannot be detected on the paper, either before or after printing; neither are they seen during the toning or the fixing. As a rule, the spots are not apparent until after the prints are dried, and often not until they are mounted. A large number of prints out of a batch will be perfectly free from the evil, while others will be more or less affected, some having but a single spot and others several.

When the spots crop up, as they appear to do periodically, they seem to be almost epidemic. Various remedies have, from time to time, been suggested by some who have surmised that they have found the root of the disease. Reverting to correspondence in the past, we find one worker saying that the cause is in the paper, because by changing the sample the spots disappeared. A second says that by discarding ready-sensitised paper and going back to home-sensitising the evil was avoided. Some one else changes the formula for the toning bath, and this is said to have effected a cure, while another considers that the spots are due to the zinc-washing trough, for they did not occur when an earthenware one was substituted. Recently a correspondent attributed the annoyance to a particular make of hyposulphite of soda, and sent a sample; but we did not find that it caused spots in our hands. While the causes assigned and the remedies suggested are so wildly diverse, the actual origin appears to be still open to speculation.

If the spots were due to the paper, or its preparation, or were caused in the printing, one might fairly expect that they would be apparent before they left the fixing bath. If they proceeded from the toning or fixing solution, why does the evil take the form of decided spots? Why is the action so completely local? It is scarcely conceivable that any particles of undissolved matter of a highly deleterious character could exist in the solution and attach themselves to the surface of the prints while going through the different operations. Even supposing they could, the effect would in all probability be discerned almost immediately.

It is far more probable that the spots have their origin after they are removed from the fixing bath, and there are several circumstances under which they may be fully accounted for. As an example, there are many deleterious matters that may be dis-

seminated through the atmosphere of photographic workrooms which, if they came in contact with a print while in a moist state, or with the blotting paper between which it is dried, would certainly have a marked effect. Such things as ferrous sulphate, ferrous and ferric oxalate, pyrogallic acid, hyposulphite of soda, bichloride of mercury, &c., are in general use, and solutions of these often get accidentally spilt. As the solution dries, the salt crystallises, then, when the floor is swept, the fine particles become diffused through the atmosphere of the apartment.

It is very manifest that if some of the matters just alluded to were to settle on a print while it is in a moist condition it would act injuriously. Here is a case in point. We took a mounted print and moistened the surface with water, and then scraped from the neck of a bottle containing a solution of sulphate of iron a few minute particles of the oxidised crystals and placed them on the picture. On examining it a couple of hours afterwards, by which time it had become dry, we found yellow spots corresponding with each particle, and precisely similar to those of which so many complaints are now being made.

There are many other substances besides those enumerated that would have a pernicious action on a damp print. When investigating this subject last year we found that spots were produced in an hour or two by allowing particles from a coke stove to settle on damp prints. The sweeping and cleansing of workrooms is generally done in the morning, and this is usually the time that the prints of the previous day are being dried, hence they are exposed to the dust created, and this is more often than not the cause of the mischief.

Whenever these "mysterious spots" are met with, their origin should be sought for in influences to which the prints are subjected to after they are practically finished, rather than in the materials used in their production.

There is no reason now why there should not be a good assortment of photographs of winter scenery, as Christmas and New Year's cards, in the market next season. We have before called attention to the fact that nearly all the views produced by lithography depict winter scenes, whereas those by photography are almost universally summer pictures. These always give one the idea of being incongruous and unseasonable for the purposes indicated. That winter photographs are not forthcoming is easily, however, accounted for by the circumstance that there has been very little opportunity for some years past of securing a good stock of frost and snow pictures. But this has not been the case this winter. It may be well to mention for the information of those who may be availing themselves of their opportunities that no time should be lost in getting the work before the wholesale trade. Manufacturers have for some time past been busily engaged on next year's stock of Christmas and New Year's cards. They always work about a year or fifteen months in advance.

Portrait photographers have not had a happy time of it of late. As usual at this season they have received a liberal number of commissions, all of which are required to be executed before Christmas or the New Year, and, as is generally the case, the light is bad for their being carried out. This month the light has been exceptionally bad for studio work in the London districts, and those houses who are wholly dependent upon daylight for enlarging and similar work have been for days together at a complete standstill. Those who have been able to utilise bromide paper have found themselves at a considerable advantage over those who have to be dependent upon direct printing.

With such light as we have had of late a great advantage would accrue from the use of orthochromatised plates for ordinary work in the studio. Plates sensitised for the yellow rays to a great extent ignore the yellow fog intervening between the lens and the sitter. Several excellent formulæ for the purpose are given in the Almanac. Their application is simple, and plates treated at night may be ready for use the next morning.

In the Edinburgh Photographic Exhibition there is, just now, a very interesting picture. It is a portrait of the late Sir John Herschel by Mrs. Cameron, a copy of which appears in the last number of *Sun Artists*. Visitors there have the opportunity of seeing what difference exists between the two pictures. The original is of large size, about 15 × 12 inches, and the negative from which it was printed is absolutely untouched. The shadow on the face is very strong, but it does not require the "imagination" to supply the gradations and detail. When comparing the stippled-up copy with the original, one is naturally led to inquire if the former should be attributed to the work of the late Mrs. Cameron. We venture to say, were she now alive, that it would receive her unqualified condemnation, and so would much other work shown in her name.

Mrs. Cameron took the majority of her pictures on large-size plates, and, so we are informed, a large number of them many years ago were irretrievably ruined. Reproductions were, however, made from the prints, some of which were considerably faded, and the negatives of them were considerably retouched, as well as had many of their photographic imperfections removed. Seeing this, is it right under the circumstances to credit the lady with these sophisticated reproductions? We strongly suspect that some of them who talk so glibly on Mrs. Cameron's work have really seen very little of it in its original condition.

A very interesting report has just been issued by the Meteorological Office of the work done during the year ending March 31. The affairs of the office—it may not be generally known—are under the guidance of a committee appointed by the Royal Society, and the work is not confined to Great Britain alone, but extends to nearly all parts of the globe. For the preparation of the weather forecasts that appear in the daily papers, the office receives reports from no less than fifty-eight stations, of which thirty-one are situated in the British Isles, and the remaining twenty-seven in different parts of Europe. From a large number of these stations reports are received two or three times a day. The forecasts are prepared three times daily, namely, at 11 a.m., 3.30 p.m., and 8.30 p.m. The forecasts that appear in the morning papers are those prepared at the last-mentioned time. The 8.30 p.m. forecasts are prepared only for storm warning, except during the hay harvest season, when they are issued to those interested. All of the forecasts are at any time available for the information of any one who chooses to apply for them at the office.

It appears from the report that a comparison of the 8.30 p.m. forecasts during the year with the weather actually experienced shows that the predictions were most successful for the South of England, being for that district eighty-seven per cent. While the least successful were those for the West of Scotland, where they were only seventy-six per cent. For the whole of the British Islands the percentage of total successes was eighty-one. This on the whole must be considered very satisfactory. The report shows also that the success in forecasting the weather remains very much the same as it has done for several years past.

The application of photography to advertising purposes is largely increasing and in many new directions. Messrs. Schweppe & Co., the well-known mineral water manufacturers, have just struck out in a rather novel way. They have issued to their customers a series of show cards and tablets of charming photographic views of the highest order. The former are framed collotype prints of excellent quality, and the latter are carbon prints on opal glass. The pictures are not, as is frequently the case, disfigured by conspicuous advertisements; they simply bear a small, unobtrusive imprint of the firm's mineral waters. Hence the pictures prove attractive wherever they are shown, and thus prove the better advertisement.

SOME OF THE TENDENCIES IN PHOTOGRAPHIC ART.*

I HAVE gone so far, it will be remembered, as to make use of the phrase "throwing away the substance for the shadow," and I think it must be allowed advisedly, when we consider that one of the greatest charms of photography, its greatest boast, and indeed that in which no other art ever has, or ever will approach it, is in the veracity of its delineation of detail; this charm is surely a substantial one, and it must be asked: Why photographers should seek by any means to divest their work of it in the shadowy hope of rivalling that of a painter's handling, that individual charm by which genius, making dexterous use of accidents of stroke, and flow of colour, fulfils its bent unfettered, and with the least material interposition between the artist's brain and brush.

That handling we love so much to linger over in the pictures of the old masters; touches that make the dead past live again, touches which wake our souls to sympathy with those whose works shall be immortal, because their touches show for ever their souls within their works—I say that to try to effect this by means of the camera, is to endeavour to lift it from its true position, to give it another *métier*; in short, unworthily to follow in the fatuous footsteps of the fabled frog, and burst in envious emulation. Results such as the camera, or any photographic process can ever give, can, in the nature of things, never affect us in the same way as those of the pencil, the graver, or the chisel. Photography has its own proper and special fields, and it is a needless prostitution of its legitimate aims to endeavour to make it subserve the imitation of another art.

Now it may be asked: Why is it then that rough papers are used? surely the photographers know something of this rule of scale, if amateurs do not! They, many of them, do know, but they are on the horns of a dilemma, and this is the real crux of the matter. Much as the old albumen silver print is despised, none of the new processes of printing quite supply its place in range of tones, the reason being that lack of transparency in platinum and bromide papers, and necessarily incident in all matt surfaces. Photographers feeling this have endeavoured to mitigate the evil by breaking up their printing surfaces and letting light into them by using rough papers, and that regardless of the scale which I have pointed out. We are all charmed by a chalk or charcoal drawing, because of this transparency in the shadows, given equally by diagonal lines, as by roughness of surface, and it is of course wished to realise this charm in photography if possible. Since the introduction of the carbon process especially, photographers have been further stimulated by the reproduction of drawings, etchings, and engravings, and they wish to obtain similar artistic results directly from nature. We must, however, be content to wait for this until a satisfactory process is invented, for it must be allowed, I think, we have not quite got it yet. Another reason for our anxiety shows a little human weakness. We are disgusted when we hear that paralysing phrase "a mere photograph." Let us admit at once that this is weakness; should we not rather be proud of our mere photographs? Is not the exhibition after all but an exhibition of mere photographs? At least, no exhibit can be the grander by affecting to imitate some other form of art; the art of making a photograph is none the higher for making it imitate a second-rate sepia drawing.

But there are other photographs at the exhibition which are calling loudly for our attention. Van der Weyde's capital Japanese costume group, Mr. Sawyer's artistic effects on the Tyne, and the excellent works of Mr. Gale and Mr. Edgar Lee. Mr. F. H. Evans gives some excellent and well-chosen pictures from Canterbury Cathedral. No one who has not photographed in a cathedral knows quite what it means. The temper and patience necessary in keeping the authorities—from dean to verger—in good humour during the long exposures in the dark interior is a diplomatic exercise of no mean order. Vergers particularly have a rabid, if pious, horror of a tripod stand. Visitors to the cathedral also get in front of the camera, and although they do not always spoil a long exposure, cause considerable nervous anxiety to the photographer. Mr. Evans told me how long he had to expose a rapid plate in the crypt of Gloucester. I will not hazard a recollection, however, in case I might exaggerate. It is pleasant to note that in photographing architectural objects, the custom of placing the camera directly in front, so as to get a symmetrical picture, is giving way to a more artistic insight, and consequently a more desirable result. In mentioning the very artistic results observable in landscape by Mr. Sawyer and others, it should be noticed that these are obtained apparently by perfectly legitimate means: a selection of time and subject, atmospheric effect occurs in its proper place and planes, the choice of the stops used has been judicious, and no sacrifice of sharpness, or rather clear definition, is made unnecessarily. That there should be perfectly successful work in landscape, with atmospheric effect and aerial perspective in the receding planes, at the same time that an agreeable and reasonable amount of definition is given in the foreground, is in itself an emphatic protest against a school of photographers who endeavour to persuade us that an inartistic subject may be rendered acceptable by fuzziness, and by the artists deliberately stultifying themselves in the use of the lens—I mean in putting the subject entirely out of focus. It is, of course, a pity that such a false view of art should obtain at all in the face of the customs and traditions of past centuries, but that men whose tastes and abilities have been shown to be superior to many of their composers should be induced to stoop to such trifling devices is almost incredible, and greatly to be deplored, in the interest of that art they might do so much to advance. I revert now to the subject of lantern exhibits on the screen, a custom on Monday evenings at Pall Mall, and which will be more honoured in the breach than in the observance, if some judicious, not to say ruthless, weeding-out does not take place, both in the interest of art and the patience of the visitors. Moreover, to say nothing of artistic proclivities, I look upon it as a downright absurdity to continually exhibit such monstrous pictures. It is bad enough in Pall Mall, but it is worse in some places, where one is made to look upon, say a man and woman, a pair of lovers perhaps, ten feet high on a donkey fourteen feet long. I cannot admit I enjoy this sort of thing, or find the sentiment of the subject magnified proportionately. I have never seen an artistic lantern slide yet that would bear enlarging beyond eight feet diameter, and would not have been better much less. Perhaps I feel this the more that I have a weakness for lantern slides. Some people think that it is inartistic; on the contrary, it is because there is a chance of their being artistic that I like them. At the exhibition in Pall Mall they show some very good ones (especially on the Field Club nights), but I have also seen some execrably bad ones, and it is for that reason I suggest judicious weeding. It no doubt interests some amateurs to photograph an ugly building from every conceivable point of view, and perhaps he may take a diabolical pleasure in presenting them successively on the screen, but no purpose is served by it in the interests of art or of the spectators. Mr. Pecksniff had many diverse views in his office of Salisbury Cathedral, but then it was Salisbury Cathedral.

There are many figure compositions in the exhibition that call for notice. Some of these are medalled, I presume, for some technical excellence that is beyond my ken, as, in an artistic sense, I fail to see their merits. They certainly often show a striving and effort to obtain an artistic result, but this very want of spontaneity is fatal to the success of this ambitious class of work. It would take too long to examine all these individually, and a mere catalogue would serve no useful purpose; doubtless, however, many of these photographs live in your recollection, especially those that obtained an award. Some works in the exhibition that are not medalled are very excellent indeed. Some of these—notably one silver print—can only have been passed over, I should say, because it was a silver print. If I remember rightly, it was a group of children on a cliff, treated with great delicacy and force, and called *Idle Hours*, by Mr. Robert Slingsby. When I look back to the old collodion days, and remember under what difficulties excellent work was done in all parts of the world, it is matter of surprise and great dissatisfaction to me that the present facilities of operation have not allowed a much greater advance artistically than I find. Now, you know when a man has to paint a picture, or design a cartoon, or take a photograph by the collodion process, his spontaneity is necessarily handicapped by the continuity and difficulties of the absolute physical work to be done; and the long breath, *le longue haleine*, as the French say, may be exhausted before he comes to the close of his performance, and we may naturally pardon him something if the attempt surpassed the execution. But in photography, *i.e.*, modern photography, surely this is unpardonable, and one has seriously to reflect whether, after all, this is not our most important lesson, viz., the small advance in genuine art in modern times. Perhaps the fact that photographs being more numerous emphasises the case of pictures being so few.

I shall now bring my paper to a close by briefly summarising my observations—the more desirable because of their necessarily discussive character. Firstly, we have seen, I think, that the best negative may be done ill justice to by injudicious printing. Secondly, that obscurity and negation of sharp focus or reasonable definition does not seriously imply fine art. Thirdly, that the grain of the paper used in printing should not be a matter of fad, but is seriously and actually a matter of absolute scale. Fourthly, that exaggeration and affectation is an affront to æstheticism and pure taste. Also let me add that however a society may deem it expedient and even honest to medal works tendered to them for exhibition on the sole principle of encouraging

* Continued from page 807.

worthy effort by such means, the amateur must use his own discretion, not being scared into blind worship of such work, but sift the matter for himself, and learn to discriminate between laudable effort and entire success. If the amateur does not do this he will be, unquestionably, of those who, following blind guides, fall by the way.

Now, one word to this Society in particular, who have honoured me by their kind and patient attention so far. I take it that most of you, by your very presence here to-night, if I may be allowed to say so, listening to my dry, but really earnest talk, have an equally earnest desire to do some really good work, and will take not a little pains for the mere love of art to do something more than pour ounces of developer over glass plates and mess your fingers, *pour passer le temps*, in the interest of the dry plate maker, or for the production of fog, as each of you has a desire to do something really worth looking at. Of course, in a Society like this there are many who have done so already, but I am not speaking to them, but to those, if there be any who have not been so fortunate, who are the real amateurs—I say to these: Don't fritter yourself away in formulæ—the snare of all beginners; master one process, and being assured that under most circumstances you can obtain a technically good negative, don't bother yourself about the chemicals any more, but devote yourself to your art, your greatest art, the art of photographing nothing, unless you see some reasonable chance of getting a pleasant composition, an interesting subject with agreeable and harmonious lines in it; something that shall not hereafter pall upon you; something that you can endure to live with, and that your friends shall say very nice to, and really mean it when they say it; then when you have done this, you may conscientiously lay the flattering unction to your soul that you have been working on the right road, and are far nearer ultimate success than some of the exhibitors in Pall Mall, who, "troubled about many things," are, it seems to me, giving far more attention just now to processes and chemicals—to say nothing of blurred focusses—than they are to art. Art is art. Your art, amateur photographers of West Kent, is the art of photography, which, again, is the art of expressing your feelings and sympathies, something of your own *ego*, something of your own souls, if you will, by photography, "more photography," never be ashamed of it. Let every tub stand on its own bottom, the photographic tub, if only true to itself, shall hold a dignified position; it can never be a reproach to a photograph that it is a mere photograph if an artist has selected the subject and photographed it correctly, and with this axiom ever in his mind, viz., that though "art forbids itself in many ways," the highest purposes of any art are not fulfilled in imitating, however well, the technical qualities of another.

PHILIP H. NEWMAN.

ANALYSIS OF COMMERCIAL GELATINE PLATES.

BEFORE the Editor "closes the book" for the year I should like to have an opportunity of adding a few notes to the article under this heading which was printed a fortnight ago. Peace and goodwill to all men being the order of the day at this moment, I refrain from scolding the printer for the several typographical errors of which he is guilty in the composition of the article. They are, I hope, of a sufficiently transparent nature to absolve me from any charge of ambiguity of meaning.

I notice that I suggest the stripping of the films by "soaking them in water and raising the edges." A great deal—nay, most—depends upon the temperature of the water. I find that by raising it to about 80° for a few minutes the films are readily detached from the glass; at 60° the operation is not always a certainty, no matter how long the period of soaking has been.

The statement that the average quantity of emulsion covering the area of a whole-plate is about a fluid drachm is a mistake. The quantity is undoubtedly more, much more; it is probably nearer half an ounce, as I have ascertained by actual trial with several makes of plates. A couple of whole-plates or two-thirds of a dozen of quarter-plates should yield, therefore, about an ounce of emulsion. This would apply to plates liberally coated—not to the "starved" varieties. About eight years ago Mr. W. K. Burton detailed some experiments he made relative to the quantity of emulsion required for plates of different sizes. Taking an emulsion in which four hundred grains of silver nitrate went to about twenty-eight ounces of emulsion, he found it desirable to spread a sixth of an ounce on a quarter-plate, a quarter of an ounce on a 5 × 4, fully one-third on a half-plate, and two-thirds of an ounce on a whole-plate; the approximate quantity of silver nitrate required for each plate being, respectively, 2½, 3½, 5, and 10 grains. By latter-day standards these quantities are, I fear, extremely generous; but, then, Mr. Burton was not a commercial plate maker, and so he could afford to be munificent—to himself. The author of *Photography with Emulsions* indicates three drachms as sufficient to coat a whole-plate. Three to four drachms of an emulsion fairly rich in silver should, as a rule, suffice for that area.

Finally, as to the digestion of the haloids by nitric acid overheat. I mention "hours." I find that if the vessel containing the mixture be placed in a saucepan of boiling water for *half*-an-hour the silver salts will be precipitated. Silver bromide thrown out of its solution in ammonia by KBr could, doubtless, be perfectly reprecipitated in the same way, and thus the entire operation of roughly analysing a batch of plates might be conducted within the hour.

THOMAS BEDDING.

IMPRESSIONISM IN PHOTOGRAPHY.

[A Communication to the Society of Arts.]

THIS is an age of scientific inquiry in every branch of knowledge. Empiricism, irrational authority, and conventions have been largely cast aside, and freedom of thought and scientific investigation have taken their place. Phenomena are closely observed, and a basis of material fact and proof is demanded for every principle that is sought to be established, whether in biology, mental and moral science, or philology. Matter is held to be the storehouse of every possibility, and the observation of its infinite functions the only source of true and useful knowledge and progress.

The supernatural is losing its power to command worship, and a nobler wonder, roused by the laying bare of the natural causes of the phenomena of the universe, reigns in its stead. Poets and philosophers have, equally with scientific men, been affected by the freer spirit. Literature has more of the true character of life and nature in it, and the newer light has even written its effect in our later students' text-books. Finally, in art the same influence is discovered in the revolt against conventionalism, and in the scholarly practice of those painters who have been variously called impressionist, naturalistic, and the like.

It would have been indeed strange if, amongst all these changes of principle and action, which we are pleased to call progress, the domain of art had remained untouched and unaffected. For the painter's art has been trammelled by conventions and chained by dogma equally with ethics and science. There have been unnatural conventions in regard to colour, conventions about form and proportions, conventions concerning light and shade, arrangement of lines, and decorative qualities, as well as many other marks and mannerisms imitated in a manner tending to obscure and lead away from the greatest beauty in pictures—namely, their truth to nature.

It has been well said, "It is so much easier to do what one has done before than to do a new thing, that there is a perpetual tendency to a set mode, but nature abhors mannerism, and has set her heart on breaking up all styles and tricks." Now these "set modes" and conventional treatments in art have been such that the more they have been compared with natural facts, facts of atmosphere, facts of light, facts of colour, the more have their formality and falsity become apparent to unprejudiced observers influenced by the spirit of free and scholarly inquiry. Nothing but a return to nature can break up such "styles and tricks" and free an artist from the tyranny of previous great names and works. It was such a return to nature, such a close observation of natural appearances under the influence of the materialistic tendency of the age, that led to the growth and practice of the body of painters known as impressionists. Abandoning all consideration of the arrangements and mechanism of previous workers, they have consulted only their impressions of natural scenes, and, to those impressions, painted. With one point of sight and one subject of supreme interest they have aimed to seize, above all else, the action and first impression of that subject. The effect of such work upon the painters of the older conventions, and upon their following amongst the public, was to rouse hot opposition, but the best of the new influences have had very considerable effect upon the more liberal of established painters. De Cheseneau, writing of the pictures of M. Monet, says:—"In spite of such works as these the eye of the public—trained to exclusiveness by long intercourse with other and no less legitimate readings of nature, and prevented in a great measure by the abuse of facile tricks of painting—refuses as yet to recognise the purpose and merit of this school. But it will come to it."

A more judicious section, those who seek a natural and scientific basis for their practice, has preferred, as far as such tenets permit any crystallisations, to style itself "The Naturalistic School." The painters of this school, seeing the conventional untruths generally practised in pictorial representations in regard to light, colour, and atmosphere, have set themselves to the practice of close observation of nature to gain a better knowledge of the infinite mysteries of these phenomena. Truth to nature is the first article of their faith, and the truest that science teaches concerning light and colour, and the manner in which the eye sees is made a guiding principle. Every naturalistic artist must be a scholar. Happily, a cultured sense arrives at the same preference as that to which in the main the scientific inquirer is led. Should any fresh investigation lead to a truer view of physical or mental fact, the naturalistic student, to deserve the name, must readily make a readjustment of his principles and modify his methods in accordance. It is not unnatural that the

eccentricities as well as the genuineness of a new development should come to be regarded as distinctive of a school, but it must be remembered that any tenet or practice, to be naturalistic, must stand the test of scientific investigation. Naturalism, then, instead of signifying indistinctness and eccentricity, as is not uncommonly supposed, purports to be the gospel of common-sense, scientific inquiry, and culture in art. It leaves its advocates free to express themselves about what is going on in the world by means of their graphic art, without other trammels than a severe regard to truth, naturalness, and perfect expression. The naturalistic painters find the possibilities of all poetry in nature; it is truthful representation, perfect expression, that constitute their art. They hold that what is seen should be painted, that symbolism and imaginative creations can have but a feeble interest, and that what we have actual contact with in life affords the opportunity for the most powerful expression by graphic art of any abstract quality. It is in the life of to-day, and not in the illustration of other people's ideas, whether past historical subjects or so-called works of imagination and allegory, that the proper province of the painter's art is to be found. To be true, and living, and moving to our sensibilities, the scenes and subjects depicted must be studied directly from nature by the artist.

Should any one desire to get a better idea of the tenets of the naturalistic school, I would refer him to Mr. Francis Bate's book, *The Naturalistic School of Painting*, a fresh, direct, convincing little work which every photographer should read, and in parts re-read, and to which I wish to express my own indebtedness.

Under such principles have been produced paintings which have the power of moving a sympathetic nature-loving observer to the keenest of æsthetic pleasure, an ecstasy of enjoyment far beyond any satisfaction derived from "the fitness of symbolism" or decorative arrangement. Some may never have discovered this feeling for subtle representations of natural scenes, but no one is capable of estimating the respective merits of the old and the new, the power of such poetry as is shown in symbolical or decorative work as compared with the poetry of naturalism, who has not felt enraptured by the perfection of naturalness of some of these genuine impressionists paintings. There is a liveliness, an exuberance of joy, a yearning for a sympathetic companion to share the feeling of exultation, when one has happened suddenly upon a subtle fact of natural light, colour, air, or form happily touched off, a curve of the beach, a boat seen from the shore level on a stormy day over the crests of the surf, a broken bit of ground in sunlight, and the like.

It is only in the light of such views, then, that I care to examine or put forward the claims of photography, as, indeed, of any other method, to be admitted as a capable means of artistic expression.

Photography compels to much that is naturalistic. It has proved the keenest critic of conventionalism, and has exerted great influence upon the painter's art; influence, sometimes good or bad, individually, according to the knowledge and power, or the ignorance, of the painter influenced by it, but in the main tending towards greater truth and insight. In regard, however, to its own direct claim to be admitted as a means of artistic expression, it has only happened with the introduction and application to photography of these principles that any serious demand to be recognised in the domain of art has been made. Photographers have previously been rather inclined to accept the slur commonly cast upon their means and results as mechanical, and have exaggerated the limitations which their tools and technique impose upon them. They seem to have been unduly influenced by the patronage of some classes of painters who have despised and contemned photography, partly with justice, seeing the average published results, and partly through ignorance of its possibilities. Photographers have accepted this degradation of their art, and have even joined voice in deprecating any reform or movement which promised better artistic expression as "apeing the conventionalities of painting." For example, some of the photographers of the older conventions have latterly objected to any but the most limited use of focussing for expressing the relative interests of a picture, and have even insisted that definition is the distinctive characteristic of photography. They have inveighed against rough-surfaced prints as being in imitation of sepia drawing, appearances presumably held to be the sole privilege of the brush workers; and whilst claiming for decorative, historical, imaginative, and symbolical painting the highest credit in art, they have disclaimed for their own medium any power or province in such work. Mr. Stillman holds that photography can have no place in art because design is impossible to it, and design he seems to define as "deliberate arrangements" carried out by hand. Mr. Pringle denies the possibility of what he terms "fine art" to photography, or at least to any but combination photography by the peculiar distinction that he lays down when he says, "Art obtains where a painter simply paints what he has before him. This is not fine art." Mr. Gale finds the greatest happiness in what he alludes to as a transformation of nature and "those ideal representations which are the perfection of art," and, in this reference, he instances Turner's *Storm*. Mr. H. P. Robinson approves and seeks to justify a wilful opposition between art and nature, and he goes with Mr. John Brett in demanding an improvement of nature, an exaltation of natural appearances, and an accentuation of beauties in pictorial representations, a position, perhaps, intended to justify combination printing.

There are other alleged limitations and defects, such as that photography cannot treat the sublime, that the nude is outside its scope, and a variety of cries all more or less included in the general exclamation that photography is merely mechanical.

In a very able and judicious report of the late Photographic Exhibition, the *Times* reviewer referred to the aim of the newer school of photographers to represent "the impression made on the artist's mind," and he said, "Here there are difficulties. The camera cannot select and discriminate. It cannot omit an ugly object or introduce a beautiful or suitable one. It cannot make those slight adjustments of the landscape which all painters do." Now this seems to suggest that the selection and discrimination is from something not in the particular scene in front of the artist. But the slight adjustments, the introduction of other objects, can be no part of the impression produced on the artist's mind by that particular scene. There is a supposition in this view of an insufficiency in nature, and a necessity for what I have referred to as Mr. Brett's "improvement and exaltation of natural images." Those who adopt this view must look for their beauty and interest in some conventional cleverness of brush work or in the fitness of the parts for telling a story, and not to the subtle truth of the picture. One may readily admit a beauty, an intellectual triumph in a composition perfect in the fitness of its parts, to tell a story or relate some historical incident, but this is a literary quality, or it furnishes an antiquarian and didactic interest, and does not constitute the best, if at all the province, of pictorial art. The interest in such work and in symbolism is, as a rule, feeble and superficial for the nature student compared with the absorbing and exquisite pleasure derived from a bit of simple, natural beauty, faithfully and spiritedly painted. For example, what is the interest and pleasure derivable from a mythological or historical subject? According to a man's familiarity with the literature of mythology, according to the extent that his mind has been absorbed by that particular lore, so he appreciates such pictures. Their seeming accuracy may please him. That is classical scholarship being taught and fed by painting; it is not æsthetic pleasure. The same holds with regard to historical painting. The artist may imagine vividly what a suit of armour he has studied would have looked like upon a soldier of the fourteenth century upon a certain battlefield. He may hunt up all the incidents, and study all the customs and costumes of the time and the occasion, and his research may be very creditable, but, after all, what value or subtlety can there be in such work? It is not the province of art to teach or illustrate history, nor is it at its best with any didactic or moral aim. But even in historical pictures, mythological subjects, and the like, there may be something of the natural character, and this may captivate the æsthetic sense. There may be that in such work which, drawn from a study of nature, any and every observer can compare with his own experience. Whether it be figures or inanimate objects, all have gained some sense of their form, proportions, modelling, texture, and general appearance under many circumstances of light and atmosphere, and the chief charm lies in the life-like representation of these known appearances. The common criticism of the public in a gallery—"Oh, that's not natural; nothing like that was ever seen"—when quite unconventional, and not the product of hearsay, is generally the ultimate verdict upon such an imaginative picture, and coincides with the more completely cultivated and scholarly discrimination which discerns where and why the thing is not true. The naturalistic position, then, is that so far as a scene appeals to our experience of nature—harmonious and truthful in its light, atmosphere, relations, incident, and action—so far will it affect most powerfully our æsthetic sensibility, and such harmony and truth are only to be secured by a direct reference to nature.

Mr. Hamerton, in *The Graphic Arts*, would make a distinction between truth and delight; but the naturalist, whether painter or observer, finds no opposition between the two, but derives the keenest of æsthetic pleasure from the faithfulness with which his own impressions of nature are expressed for him.

After all, nature is the best possible painter. Art has performed its highest function when it has enabled us to see "the eternal picture which nature paints in the streets," and has opened our "eyes to the masteries of eternal art." It teaches us to see the meaning, expression, and beauty—the poetry which lies in all natural phenomena, atmosphere and light, forms and actions. Emerson in his essay on art says, "The best pictures can easily tell us their last secret. . . . . There is no statue like this living man, with his infinite advantage over all ideal sculpture, of perpetual variety. . . . . Men do not see nature to be beautiful, and they go to make a statue which shall be. . . . . They reject life as prosaic, and create a death which they call poetic. . . . . They eat and drink that they may afterwards execute the ideal. Thus is art vilified; the name conveys to the mind its secondary and bad senses; it stands in the imagination as somewhat contrary to nature, and struck with death from the first."

Turning to the general contention that photography is merely mechanical, this cry may be answered by a reminder that so may brush-work be mechanical; and it is sufficiently answered, I think, by the fact that the work of various photographers is as distinctively individual as obtains in regard to painters. Even leaving figures out of the question, two photographers separately treating the same subject will produce two impressions almost, if not quite, as different in qualities as would two impressionist painters in monochrome. It may be said that the painter is freer to generalise, emphasise, and analyse, as he may please; but if this is said of an actual scene in front of the artist, it must be remembered

that the lens, as used by a trained observer, sees very much as the eye sees; and that most of the suppression and selection possible to a painter genuinely consulting his impressions is also at the command of the photographer. Unnatural emphasis may please a certain school, but it will not bear comparison with nature, and it will in time have its proper value assigned to it. It is also said that one photographer can easily proceed to take exactly the same picture that another has achieved. Well, I do not think it has ever been done yet in respect of any photograph worthy of the name of picture. And supposing it is so, cannot a painter copy the work of a fellow-artist? The mere fact of the means including more mechanism is not a disadvantage if the result be more truthful and life-like.

The *Times* reviewer finds difficulties—I am glad to notice that he does not say impossibilities—in the way of photography giving the impression produced upon the artist's mind. It may be advisable to look more closely into this. What is this selection and discrimination which is impossible to camera craft? What is it which is possible to the painter in monochrome which is really an essential of good art that is out of the power of the photographer? Leaving such vague references as "exaltation of natural images," can anything be definitely stated in respect of this rendering of impression? can the finger be placed distinctly upon any quality in hand work from nature—any power of the painter, excluding colour, which is absolutely out of the range of photographic possibility? Our impressions are made up of light and light values in relation to one another—colour, form, binocular vision effect, focus, perspective. The painter may not play with the tone or relative values of his subject and picture. He may not falsify what the eye sees in respect of focus and atmosphere, nor indulge in several points of sight. He cannot do much more than the photographer to express the relative interests of his subject, which must generally depend upon the point of focus of the eye. It will be said, "there is the power of emphasis." But how can the hand worker, a genuine impressionist, emphasise what the photographer cannot? Does he gain anything by putting a little more gaudiness here, a little extra detail there, in the extreme distance beyond what the scene gives an impression of, as, for instance, in Mr. Brett's own pictures? Does he make his figures stand out more plainly from their background than in nature, emphasising dark against light, or light against dark, to make the ignorant stare, as in some of the wood engravings in our illustrated journals? This is nothing more nor less than falsity of tone. In criticising Mr. Seymour Haden's famous *Lymemouth* etching, Mr. Hamerton asserts that "art is not the slave of nature," and on the ground of some greater purpose he defends what he calls the false tonal values of the plate. What this greater purpose was he does not state, but it is interesting to notice signs of some uncertainty in his opinion, for he almost immediately proceeds to show that, looked at from a certain distance, everything in the etching falls together into fairly truthful relation. If, then, it is admitted that emphasis by falsification of contrast or colour is not permissible, what is this discrimination which is so much insisted on? It would appear to be nothing more nor less than a seizing on those facts which most simply and directly give the spirit and character of a subject. The best of what is felt and thought to be "ideal beauty" is "abridgement and selection." This abridgement and selection is the broad treatment in painting the effect that the eye sees, and the photographer has the means of seizing or subordinating the same facts by the power of focussing that he possesses over the lens. The *Times* reviewer says the camera "cannot omit an ugly object, or introduce a beautiful one, or make slight adjustments in the landscape." Well, as it is the question of impressions we are discussing, neither can the eye omit, or introduce, or adjust details; but it can go a few yards and find an infinity of delight where there are no ugly objects. And if the camera cannot cut out an ugly object the photographer can. Mr. H. P. Robinson does so, and makes *very considerable* adjustments of his landscapes, and Mr. Lake Price has contrived historical subjects not greatly inferior to much that passes in conventional art. Is it a figure that is to be introduced? Surely the photographer may select the best type. Is it a tree he wishes to change, a notice-board, or other incongruous object to remove? These are trifles when he has all nature before him with infinite scenes and beauties that require no trimming of details. The hand worker can, if he deems it right, omit and add freely, but the balance is redressed by the consideration that the one labours for a prolonged time at one subject, whilst the other may seek many fresh inspirations in the same time. Too much emphasis is put upon this small limitation, which is really an advantage in photography. It is *the light* that is the first and foremost fact of any scene or picture—the colour, the action, and sentiment of the figures. A severe naturalistic refuses to alter and omit, for although so doing might introduce only small errors, a principle is involved. He feels that there is no occasion or excuse for it. He might make use of materials drawn from a variety of experiences—a cloud from this day, a figure from that field, a tree from yet another time and place, he might piece sketches together, sketches taken under altogether different circumstances of light and atmosphere, and each sketch might be delightful in itself; but, consisting as they must of impressions merely inharmonious, he would have done far better to have studied and expressed the beauty of each subject as it appealed to him complete in nature.

Mr. Brett proposes to exalt all natural appearances by drawing on memory and trusting a recollection of one scene and object upon quite a different one. Surely he must see that the "choice and exquisite appearances of nature"—his own expression—are too good to be falsified by what is termed idealising. Again, the perfection that Mr. Gale finds in Turner's *Storm* does not lie in any exaggeration of natural phenomena, nor in any impossible piecing together of the characteristics of one kind of storm with another. It has its effect because, and so far as, the impression made upon us by natural appearances is spiritedly reproduced. There is so much of this rare quality in much of Turner's work that keen pleasure is derived from it, in spite of some exaggerations and inaccuracies. Something less vague than claims for emphasis and the exaltation of natural images must be advanced before justification for painting from anything but nature can be admitted. The artist's work always falls short of his impressions received from nature. He has never given as fully as they impress him the pathos of human life, the radiance of the morning, the glory of the sunset. When he has achieved this, when he has succeeded in seizing for us one tithe of the splendour, the sweetness of nature, one single aspect and expression of the human face perfectly, as we ourselves know nature and life commonly, it will then be time to talk of improvement and exaltation of natural images, and to proceed to invent new combinations, which are to "surpass in delightfulness the real images."

I see no reason, then, why photography should not be used to express our impressions of natural scenes as well as any other black and white method. (I have, of course, all along intended that colour should be kept out of any comparison. The want of colour places a method altogether upon an inferior level.) Worked under the same condition as the eye, or under conditions as nearly approximate as possible, nothing gives so truthful a record in drawing as photography; and nothing, in my opinion, when the proper means are used and the requisite knowledge is possessed by the photographer, gives so delicately correct a relation of tones. It is to the proper use of the proper means at their disposal that photographers still need stimulating. The most important of these means are such as are directed to securing the proper light effect and relations of light values, and those which give the focussing and relative interests of the subject. In photography the subject of focus has altogether overshadowed the more important matter of tone, for no one, except Captain Abney, has given this latter any scientific attention. It is impossible now to go into the subject of means and methods, but it is worth while noting that some of the simplest facts of light are overlooked by photographers who have been governed by untrue and misleading conventions and dogmas concerning gradation and brilliancy. For instance, the necessity for points of the deepest black is insisted on, in order to give scope for as long as possible a series of steps up to points of white, regardless of the fact that this black is generally much too black for the purpose in hand. A little experiment would show how light outdoor shadows should be as a rule. For instance, the darkest shadow out of doors seen at a little distance is *lighter* than the shadow side of a *white* curtain in a room. Consequently it is of first-rate importance in landscape pictures to keep the shadows light. To repeat the impression of outdoor light the whole picture must be luminous, and not heavy and dark, as is the effect of the ordinary style of developing and the use of albumenised silver paper. Further, the shadows when the sun shines are lighter than when he is obscured. Or, again, there is the elementary observation that many objects seen against the blue sky come light on dark. The photographer has been so accustomed to obtaining a blank white sky on a blue day in his prints that he arrives at a conviction that this is correct. So much so, indeed, that it is related in the journals that the early photographers prided themselves upon their beautiful white skies, and would have no others.

In regard to focussing, again, there are similarly misleading conventions which prevent the free and general use of the full powers of photography. We still hear repeated the doctrine that minute definition is the distinctive quality of photography, and that, therefore, this should be made the most of in artistic work. Even if it were, it would be sufficient answer to this that such definition is not the distinctive characteristic of *seeing*. But definition is no more the distinguishing feature of photography than is exaggerated perspective, or, indeed, want of definition that is diffusion or softness. This depends upon the instrument used. We are told that in any broad treatment by focus we are imitating the natural characteristics of a certain school of painting. It might with equal force, or no force, be alleged that those in favour of minute definition are, in their sharpist tendencies, apeing the characteristics of the old miniature workers. Whether in painting or photography, it is purely a matter of the instrument used and the use made of it. In the one, either a fine point or a broad brush may be used; in the other, the optician's idea (a scientific aspect) of perfection in a lens is surely not expected to sway those bent on giving æsthetic pleasure. Every one has seen that so-called mathematical accuracy is not necessarily artistic truth. Nothing but what observation or science can establish can be adopted as a principle by a naturalistic photographer. That the eye with one point of sight sees in different focus near and distant objects every one admits; within what limits and with what differentiation is not so clear. If more observation and feeling are of any weight, I should say that in some subjects the relative interests are given best with considerable differentiation, and in others the effect on the mind is best gained by general diffusion. I am aware that this is somewhat opposed to the very forcible argument in favour of one point of sight for focus as for perspective in

any picture, but in many instances the difference of effect in the two treatments does not appear important, and is by no means easy to distinguish, even by expert observers.

A not unimportant consideration, bearing in some measure both upon the matter of values and definition, is the printing medium employed. I find, in the newest extra rough-surfaced papers, very excellent and distinctive qualities, in respect particularly of breadth and luminousness. Some extraordinary objections have been taken to the results on these papers as not being photography because they bear resemblance to wash drawings; and one gentleman finds in this, and the character of diffraction photographs, an opening of the door to any and every kind of brush work upon the print. But the answer is, first, that there is no aim to get wash-drawing appearance; and, secondly, all the process is pure photography. Both the photographer and the painter have the same aim, and it is not surprising if printing upon the same papers produce similar results, for photographic deposit more resembles painted surfaces than any other method. Both work in tones, or shades of monochrome, and both may be worked upon any medium which promises to give more truly and more effectively our impressions of nature. It is certainly very refreshing in its audacity to be told that because photographers have consented to smirch the fair name of their art by the general use of albumenised paper and small stops therefore this is to be its character for ever. In some respects the use of these rough papers, which are only now likely to become general for artistic work, constitute one of the greatest advances yet made. It need hardly be said that rough paper will not make a bad picture good or great, but it will do this: It will make all the difference to the majority of educated spectators between interested observation and contempt. It is difficult to over-estimate the importance of the printing medium, as far as the credit of artistic photography with the critical public is concerned. There is almost as great a superiority for most subjects in the new platinotype paper over the ordinary platinum surfaces as there is between these latter and silver printing. This quality of the printing has more effect upon the casual tasteful observer than any other quality of the production. The defective printing medium has obscured the qualities of photography. The effect of prints upon such papers as I allude to at once shakes the superstition of honest critics, who have hated photography for its hardness, vulgarity, and untruth. These extra rough surfaces I consider the best printing medium that has been introduced, not excepting reproduction of the negative upon a copper-plate or photo-etching. Unfortunately, the difficulties in the way of quick production must probably leave the field of commercial publication to the photo-etching process. This leads me to say a word in comparison of photography with other black and white processes. It is admitted to have very justly been the death of line engraving. We have heard much about the interpretation of a painting by the engraver in black and white; but both painter and public who wish to see retained the original quality of the work must prefer a photogravure to the hard, formal, and unnatural character of the line engraving. Photography has pre-eminently more of painting qualities than any other monochrome process. Take etching, for example. Which is the better adapted for reproducing natural effect—photography or etching by line? Mr. P. G. Hamerton, in his standard work, *Etching and Etchers*, compares etching with other arts, and finds the superiority of etching in its power to express form, and in its freedom, precision, and power. He admits that "perfect tonality is very difficult in etching," and that other arts are better in the representation of clouds. He recognises that the brush is better than the point, because lines do not exist in nature, but he contends that painting is not quite so well adapted to the expression of transient thoughts. How does etching compare with photography in these respects? I venture to think even less favourably than with monochrome painting. Photography is not specially limited to, nor compelled to emphasise, facts of form. It gives form by means of tone against tone, and that is the best means of rendering it, and its truth of form is unequalled. In regard to tone, it is equal to any other black and white process, not excepting mezzotint, to which, indeed, it is often superior in respect of delicacy of gradation. This, of course, only refers to photography used at its best. We are considering its powers, not the average of its productions. The crude, ignorant workmanship that is so common is no fair test of its capabilities. For instance, let it be admitted that there are great difficulties in a large range of subjects in respect of rendering their relative light values, and the ordinary practitioner very rarely takes any trouble to overcome them.

Further, then, every observer knows the perfection of photography under suitable conditions of light as regards transient action and effects, and in nothing more than cloud forms is the delicacy of its tonal discrimination shown. But Mr. Hamerton would say that all this technical perfection—even if he admitted it—is useless, inasmuch as the camera is incapable of what he calls "idealisation of natural form, emphasis in lines, and concentration of natural light and shade." These very vague qualities are, to him, the artist's especial and peculiar work. As I have already treated this matter to some extent, I will here only refer to the etchings in Mr. Hamerton's book for an example in illustration of my argument.

Some of the finest etchings in the work are photographic in character—using photographic in the best sense of giving true tone, drawing, and simple naturalness, without any playing with facts—such, for instance, as that by Rembrandt (*Rembrandt Drawing*), those by Lalanne, and, in part, that by Whistler. Referring to the Whistler etching of *Billingsgate*, Mr. Hamerton notices, with just appreciation, the observant work in the buildings on the quay, and he refers to the harmony in the festoons of the converging cables of the boats as approaching poetical synthesis. I should prefer to call the rendering of these festooned cables a bit of most natural analysis. It is the result of close observation, with a marvellous power of expressing the leading facts exactly as we know them and as Whistler saw them. The exquisite pleasure that this bit of the drawing gives is due to the natural way in which the impression of ropes forming long curves away from the eye and dipping in the stream is reproduced with a simple touch. In short, it is artistic truth—the truth that the artist wanted, unencumbered with local facts of which he would not be conscious save by scientific examination. This is true imitation, an exact hitting off of the leading fact, a power thought to be easy and mechanical, but one as rare in graphic as in literary art. Photography may never have yielded such subtle and exquisite analysis as this, and as the suggestion of heaving water, but photography has yet to get its Whistlers, and it works in a manner very different from etching. In the same etching it is strange that there should be such evidence of slovenliness and want of observation in the character and the form of the boats, which are egregiously unlike any vessel ever found at Billingsgate or elsewhere. Perhaps this would pass for exaltation of the natural images with Mr. Hamerton, but it would be painful to those educated by observation of the character of the objects.

Mr. Hamerton would have conferred lasting credit upon his insight had he, against the rigid prejudices of the time, been able to recognise the just claims of photography, and had he included for comparison in his book, *The Graphic Arts*, an example of photography at its best. Others, at any rate, are now able to see its power for expression of artistic feeling, a power budding under naturalistic influences and a more severe scholarship in the *technique* of the art. If the power of expressing artistic impressions by photography is impossible, then must all the work of the naturalistic school of painters be excluded from the pale of graphic art, for theirs is confessedly "an honest attempt to paint what they see," and photography, artistically employed, has the same aim.

Concerning photographs bearing somewhat the naturalistic character, that is, with truth of tone and suppression of unnatural detail, it is no uncommon thing to hear it said, "Oh yes, they are artistic enough, but they are not photographs." Such is the domination of conventional views. I believe, indeed, that some of our friends are prepared to accept this view, and we have an ingenious suggestion that as there are painter-etchers so there should be painter-photographers, a name to be accepted, I presume, either on the *lucus a non lucendo* principle that all painting is rigidly excluded from their plates and prints, or to proclaim that they gladly admit the soft impeachment that their photographs are guilty of looking like sepia drawings.

Be that as it may, I will now only say in conclusion that it is such work that has been most instrumental in breaking down the widespread prejudice against photography as an essentially mechanical, harsh, and vulgar medium for anything like artistic expression, and that it is in that direction we shall have to look for its elevation to its proper place amongst foremost black and white processes. It is from no mere formula of fuzziness or definition that the best work derives, or can derive, its quality; but from the acquisition of artistic facts by observation and experience, facts of light, the limitations in black and white work, the relation of light surfaces, orthochromatics, relation of objects in respect of focus or mental interest, study of form, action, and typical character, the use and application of lenses, knowledge of the subtleties of development with the relation of exposure thereto, and the study of the qualities of printing processes. This is no question of months, but a matter of years, before a man can hope to see clearly what it is he wishes to express, and move freely in expressing his impression. We need not be discouraged that unnatural "exaltations" and combinations are impossible to us. The quality of naturalness will tell in the long run. Men will weary of emphasis, and graphic artists will leave past history, archæology, and fiction to literature or scientific drawing. The keenest æsthetic pleasure is to be derived from the spirited truthful rendering of character, whether in face, figure, or landscape. The things of to-day will be of deeper interest to-morrow. As Emerson says, "It is in vain that we look for genius to reiterate its miracles in the old arts; it is its instinct to find beauty and holiness in new and necessary facts, in the field and roadside, in the shop and mill." The scope of photography is extended. Nature will never go out of fashion. Prejudice will fade, and even one generation ahead will find the value of photographic portraiture, if it be natural and permanent, as it may be. The prospect is worthy of work, devotion, and sacrifice, and, in our enthusiasm, we may be forgiven for indulging visions of a time when, with truth and nature as its watchword still, photography shall have taken to itself such glorious attributes, that with fewer limiting conditions, our every impression of the visible world, light, colour, action, and form will come within its scope to express.

GEORGE DAVISON.

DISCUSSION.

Mr. DALLMEYER said this paper would be welcomed by every one interested in the progress of photography. Mr. Davison had gone beyond most in suggesting that it might surpass all other forms of art in black and white, but he (Mr. Dallmeyer) regretted that he had not spoken at greater length on the

optical aspect of the question. He was glad to find that Mr. Davison based all his theories on submission to science, and admitted that naturalistic ideas must be subject to scientific investigation. They had heard similar views before from Dr. Emerson, who contended that what he called naturalistic focussing was a parallel to the impression produced on the eye in ordinary vision. It was said that many photographers claimed sharp definition as the main character of photography, and that was quite true, because no other process would give that when desired. The optician's effort was to obtain the highest degree of accuracy possible, and the object of the naturalistic school seemed to be to so misuse the lens as to throw the picture a little out of focus, and thus imitate what was seen by the eye. A great deal had been said about the introduction of spherical aberration into lenses to effect this end; but even if that were done, it would be a question whether the quality and definition so given would be true in tone, and it would be for authorities on the subject to decide whether the effect would be as good in that respect as that obtained with an aplanatic lens somewhat out of focus. In any case, if spherical aberration were introduced, it must be consistent with other requirements, covering power, flatness of field, and so on. He would suggest to those who wished to produce artistic effects the use of double backs, giving to one plate the finest definition they could, and then, after shifting the focus, using the other double back and comparing the results. Observation showed that in the naturalistic method of focussing, it was the larger aperture which gave the differential emphasis of varying planes, somewhat parallel to the phenomena of binocular vision. If the foreground object were of interest, the emphasis laid on that would be very much greater in comparison than if it were at a considerable distance; the farther off an object was the less was it affected by the parallax of binocular vision.

Mr. MACKELL said Mr. Davison's paper was a plea for the application of impressionist feelings or naturalistic principles to artistic photography. He had spoken temperately, and without exaggeration, of the conventionalism and symbolism found in earlier schools of art; but, admitting the beauties of the modern methods, we must beware of treating the wisdom of ages with contempt. In the graphic arts as in literature, in painting as in poetry, it would be long before the conventional, the symbolical, and the imaginative were thrust into the background and replaced by absolute truth and realism. Was there to be no pleasure in reading such works as, for example, those of that highly imaginative writer Théophile Gautier? Ought they to give a higher consideration to Mark Twain's impressionist descriptions, accurate though they were? In painting also, was the worth of G. F. Watts or of Burne-Jones to be dismissed as wanting in the highest expression of art? He had much sympathy with the newer schools of art, and especially in their relation to photography he considered their influence as hopeful; but to admire the new it was not necessary to decry and depreciate the old. The influence of the impressionist school was gaining ground every day, even amongst the Philistine public, as might be seen even in periodical illustrated literature. Look at *Scribner*, and *Harper*, the *Graphic*, and the *Illustrated* Christmas numbers, and the drawings in these periodicals, by Townshend and Bernard-Partridge, for instance. They were like wash drawings in sepia vague, suggestive, out of focus. Would the public delight in them if their taste had not been gradually trained to appreciate them? In photography, also, the impressionist school had taken hold of the public to a far greater extent than admirers of the old style would care to admit. It was not altogether a question of focus, though that had a great deal to with it. With regard to conventionalism, photography is an art which, more than any other, has a right to demand to be less trammelled. It was by its own nature already so bound by mechanical restrictions that in every direction in which it could possibly escape or evade the more likely was it to show its power. That the revival in photography had as yet produced any great work it would be hardy to assert, but the promise for the future was very great, and he felt certain that time only was wanting to produce from the students of to-day the artists of the future.

Mr. W. E. DEBENHAM said it seemed to him that the arguments in favour of blurring in a photograph were founded on one or two radical misconceptions. The first arose from the two meanings of the word "sharp," which, in the case of photography, meant well-defined, and was quite compatible with softness; but a painter, when he used the word, referred to contrasted masses of light and shade with accentuated outlines. He had heard a photograph condemned by a painter as too sharp, when photographically it was not sharp at all. This point was illustrated in one of Dr. Emerson's pictures, called *Barley Harvest*. Photographically, the sharpest part of it was the corduroy trousers of the man sitting on the ground; these were very well defined, though soft; but there was another part of it which a painter would call sharp, where the scythe and the men's head and figures cut against the sky. Being dark and heavy in tone, there was a sharp contrast. This part of the picture was, however, not photographically sharp—not in focus that is. It was assumed by Dr. Emerson, and he understood it to be endorsed by Mr. Davison, that photographic sharpness, fine detail that is, emphasised the part of the picture where it existed, and caused it to be regarded as the leading theme of the picture. If this was so, the corduroy trousers must be looked upon as the theme of the picture, but if this detail did not have this effect, but the sharpness (using the word in a painter's sense) of the scythe and figures against the sky did produce a contrast of light and shade, he would like a reply to this argument against fine definition. The next misconception arose from a confusion as to the extent to which we saw various objects out of focus at the same time; and on this point it would have been better if Mr. Davison had been a little more definite. If you looked at an object a few inches off, and at another many yards away, you could not see the two simultaneously with any distinctness; but if the nearest object were some thirty feet away, another object at any greater distance, but in the same part of the field, would not require any perceptible alteration of the eye to get it in focus. To what extent the eye differentiated objects at a distance, and how far the lens in a camera could do the same, depended on the size of the diaphragm. It was the absolute size of the diaphragm, not its proportion to the length of focus, which gave objects at different distances the same amount of distinctness; and it followed that to imitate the effect on the eye, the top should be the size of the opening in the iris, say one-eighth or sometimes one-fourth of an inch. Again, to produce effect without fine detail in a photograph, and in a picture, you stood on totally different ground. In a photograph it only required care in focussing, a very small stop, and a long exposure. The painter did not introduce detail which at viewing distance would not be observed, but neither was such detail observed in the photograph at viewing distance. The painter, by a few touches, could give the characteristic form to angles or leaves which the out-of-focus lens could not. If it were a little out of focus all angles became rounded, and thus the whole effect of a branch of a tree or foliage was gone. The most impressionist painter would not represent angular forms by circles, but would put in a few characteristic touches which would give the form. He could not see, moreover, that the appropriation of the term "artistic" to photographs out of focus was justified. It might be that artists did not give such fine definitions generally as a photograph would give on its best plane, but they generally gave better definition throughout than a photograph would at any part except that specially focussed, unless very small tops were used. Alma Tadema's pictures had been mentioned, and he remembered that it had been said that that artist's paintings were almost as sharp as a photograph. As a matter of fact, they were much sharper than a photograph of the same subject the same size could be obtained, except on one plane, and that was characteristic of painters generally. He fully recognised the artistic character of Mr. Davison's work, but thought it would be still better if he would use smaller diaphragms and give better definition generally—in most cases certainly. He did not look upon him as at all an extreme advocate of blurring. To insist on blurring generally seemed as reasonable as to say that every artist should finish his painting by going over it with a badger brush to give it artistic softness.

Mr. J. FLETCHER MOULTON, Q.C., F.R.S., said he took great interest in this subject, though he was quite ignorant of the technique of the art. He cared nothing for the means people used, but a great deal for the effects they produced, and looked at the matter from the point of view of the British public, who knew something of the pleasure of art, and wanted to see which of the two rival schools could give them most of that pleasure. He sympathised with the reader of the paper, who claimed for photography a place amongst the means of artistic production, and if photography did not come forward boldly and make the claim, it would never receive its proper recognition. He agreed largely with those who said that the best art teacher was nature, but he could not see that there was any necessary exclusiveness in regard to the production of art in faithful imitation of nature. He valued more highly the production of a great mind filled with poetry and imagination than the most perfect copy of even a beautiful bit of nature. It was only bigotry to suggest that you could get no beauty except by imitating those things which by chance or design came together in nature. Photography was absolutely debarred from imaginative art, but there was no reason why it should not do as valuable work in that department which went straight to nature. It could not claim a high place merely for its accuracy; if it only gave an accurate catalogue without calling up the associations belonging to the subject it was not artistic. That was what photography had been content with too long, and from that reproach persons like Mr. Davison were trying to rescue it. The question was, were they going the right way about it? He felt sure that a man did not get nearer to nature by blurring a good picture. He did not believe people did see things blurred, unless they were short-sighted, and then they sought the aid of the optician. Many people seemed to think that a picture which was blurred, either by rough paper or bad focussing, was a step in the way of art, but he could not agree with them. It was not more beautiful, and certainly was not more like nature. At the same time, the old photographs were not quite the right sort of thing. There was a painful, obtrusive accuracy about them which did not look like nature; but it was not to be got rid of by blurring, which was only a trick. They underrated the sensitiveness of the eye to light, and the peculiar paralysis of the optic nerve which came from bright light. We did not see those startling contrasts of light and dark except momentarily, then the excessively bright light was dimmed, and thus, though the former were not blurred, the contrasts of light and shade became blurred very rapidly, because the eye could not tolerate them. This could be seen very well in looking at a fine sunset. Taking the picture which had been referred to, he did not think the corduroy trousers would have a brightness which would fatigue the eye, but some of the brighter points of the picture would fade; and he rather thought the real defect in the old photographs was that they were too faithful in recording the contrasts of light and shade rather than that they gave the outlines too sharply. He did not think there

was any short cut to artistic truth by taking up any trick which was in the nature of a defect. The tradition of too harsh an effect might be broken by passing through this stage; but he did not think Mr. Davison, and those who sympathised with him, would rest there. No one with real artistic taste would allow himself to be deceived by mere imperfect work.

Mr. JOHN LEIGHTON said he read a paper thirty-seven and a half years ago in that room upon photography, Sir Charles Eastlake, President of the Royal Academy, presiding. Photography was then getting a strong child; it was the day of waxed paper and box cameras. Collodion had not been invented, and photographers were all trying to get away from haze and effect, and to produce maps and detail, by stops and over-focussing. Photography was then pure in one sense; touching was unknown, and the effect obtained was that of nature, and as such of value; now, all blemishes and wrinkles were stopped out, until a sort of typical wax-like image was obtained, flattering to all. He recollected a most laudable attempt of Mr. Smee, F.R.S., to produce, by binocular perspective on one plane, a picture by taking buildings by a moving camera, and he (Mr. Leighton) applied the same system to portraiture. During the taking of the picture the camera was shifted backward and forward, this produced more or less haze upon those parts in front and behind the plane of vision. In nature no two planes of vision can be seen at once, though the eye can flash about and make one think so. Impression is the one vision that should be the happiest, the broadest, and the most characteristic. Photography ran art much closer now than in 1853 he thought possible, whilst as to action, it had settled many problems of infinite use, perfectly unknown to art, which worked by instinct alone.

Mr. PHILIP H. NEWMAN said he had always endeavoured to maintain that in the hands of an artist the camera might be made a means of expression, the artist seizing upon some phase in nature to photograph which lent itself most directly to pictorial treatment. He saw no necessity for tampering with such a picture optically by putting any parts of it out of focus, or straining the perspective in any way. The camera, after all, was the most mechanical of all artistic appliances, and should not be used to effect results more easily obtainable by pencil, chisel, or graver. It had its own special *métier* and advantages, its greatest boast being its faithful delineation of detail. It seemed to him that those who desired to obtain an intellectual impression, or sketch, by the roundabout method of photography were practically throwing away a tangible and literal substance for an intangible if intellectual shadow, in trying to imitate the function and object of another art. Impressionist results in photography were exaggerated as much as possible by printing on very coarse paper, which was in itself a mistake; as grain or rough surface in works of art was a matter of scale. The *reductio ad absurdum* of printing a *carte-de-visite* on very rough paper would prove this at once, without dwelling on the fact that Gerard Dow, Teniers, and Van der Heyde did not paint on coarse canvases. Impressionism in photography, by its abnegation of detail, involves an amusing paradox, and might be looked upon by some as a craze of the moment, but the position of photography, and its growing value to the masses as an art teacher, required it to be treated seriously. Much as he admired Mr. Davison's work in general, he thought his new departure was on wrong lines, for he could not see that the highest attribute of one art, photographic or otherwise, lay in its more or less imperfect imitation of another. All artists will admit that the greatest use of photography was as a handmaid to art, and all would recognise her services. But the art of photography lay in the choice of subject, which must be made or arranged irrespective of lens or focus.

ON THE NATURE OF THE INVISIBLE IMAGE.*

WHEN we speak of "the darkened product" we are talking of the substance of which the visible image is formed, therefore we are practically thinking of the action of light upon pure or impure salts of silver, isolated, dry, and in greater or less bulk, or in suspension, or in solution. If we have never prepared pure silver salts, then we certainly never darkened these nor obtained "images" from them, therefore we will make an exception in favour of the pure salts in all that we are now about to mention, as that concerns only the colour and chemical behaviour of "darkened products," otherwise images.

Ag I.—Daguerre noticed that his film of iodide of silver (on silver, or silver oxide) darkened. Precipitates of Ag I also darken. So do papers impregnated with Ag I. So do wet plates. So do "washed emulsion" plates, so far. Solutions of Ag I throw down dark precipitates.

Ag Br.—Dry plates darken. So do paper-supported films. So do precipitates of Ag Br. Ammoniacal solutions of Ag Br throw down a dark precipitate.

Ag Cl.—Albumenised and sensitised paper darkens. It darkens, wet or dry, washed or unwashed. Obernetter paper darkens, wet or dry. Precipitates darken. Solutions throw down dark precipitates.

Ag NO_3.—Fingers dipped in solutions of this salt darken. So do paper, albumen, collodion, gelatine, wood, &c., when moistened with it. Solutions throw down a dark precipitate.

* Concluded from page 808.

Many organic salts of silver also darken under similar circumstances.

Sutton (*Photo. Notes*, 1858, p. 75) says:—"A mixture of chloride and nitrate of silver in a test-tube, *without* organic matter, is never bronzed by light. Bronzing always indicates the presence of organic matter." Now, it is generally conceded—and whether generally conceded or not, it is a fact—that the longer a powerful light acts upon a given haloid salt of silver under conditions favouring or allowing of reduction, the more will the product of this action be soluble in nitric acid. As we shall see, when the question of persistent images is presented to our consideration, the problem whether a sub-"organate" insoluble in sodium thio-sulphate, or metallic silver, forms the nucleus essential to development, or whether development simply depends upon the "allotropic" condition under which the substance is submitted to the "multiplier," is capable of very considerable simplification, if we can say definitely that the motive principle depends less upon the product formed than upon its normal or allotropic nascent condition. Nevertheless, simplicity—the essence of true knowledge—insists that certain standpoints, won by able experiment, disputed, besieged by skilful argument, shall either be shown to be impregnable or untenable. Now, the "Committee" decided (contrary to all the evidence, we think) that the developable image was due to the incomplete reduction of the silver salt, while Davanne and Girard maintained that the complete reduction of a portion of the film was necessary to all development. Monckhoven, the unbiased, endeavoured to show (*Photographic News*, 1860, p. 229) that both might be right, but his mediation was rejected at once by Hardwich (the dominator of the Committee) and by the Frenchmen. Monckhoven acknowledged that at a certain stage Ag_2Cl was formed; he also agreed that metallic silver was the final product of insolation. Hardwich denied that his experiments were conclusive, chiefly on the ground that the employment of lenses to effect the final decomposition was unfair in so far as heat was known to split up the sub-salt into metal and normal salt, whilst Davanne and Girard refused to accept his position on physical and chemical grounds, asserting (*Photographic News*, 1860, p. 230):—"Evidently there is every reason to believe from these experiments that these two bodies are identical; but does it follow on that account that they are sub-chlorides? . . . . This proof, drawn from the physical condition, appears to us to be in no way conclusive; for if we admit a mere molecular change in the violet substance obtained, that does not prove that this violet substance is a sub-chloride of silver. If it be pretended that it is not a mere molecular change, but really a chemical decomposition, it must be admitted:—1st, that the rays of the spectrum have more influence than white light, since they conclude a decomposition which three hours' exposure to white light had not been able to bring about; 2nd, that the decomposition is more or less profound, and that sub-chlorides exist of every degree of basicity." Not content with advancing this unanswerable argument, they go on to show that printed-out proofs on salted paper, proofs on albumenised paper, and a developed negative on glass, "developed with sulphate of iron, and, consequently, formed of pure silver," all disappeared under the action both of concentrated and dilute nitric acid: "the negative proof first, the positive on salted paper next, and that on albumenised paper a little later."

Hardwich (*Photographic News*, 1860, p. 253) had, as we have said, objected to the employment of heat (through lenses), but Monckhoven's exact words were (*Ibid.*, p. 230):—"We see, then, that all these experiments agree, and the light, in acting on the chloride, causes it to undergo a conversion into sub-chloride. But if, instead of leaving the glass for three hours in the sunshine, we submit it to a light concentrated by lenses or mirrors, *or otherwise leave it exposed to the sun for several days, it will assume a grey tint, and the film will be completely soluble in cold, diluted, nitric acid.*" Since then the bronzed portions of an ordinary silver print, and the "grey tint" produced by the prolonged insolation of a pure film of chloride of silver—for Monckhouse claims to have worked with a pure salt—are both found to be more soluble in nitric acid than the less-reduced mixture; it becomes an important point to decide whether the two first-named products behave similarly towards nitric acid on account of the presence in each of a quantity of reduced metal, or whether, as Sutton's statement would lead us to infer, the bronzed "organate" is yet another distinct sub-salt, possessed of a well-marked individuality. Doubting the truth of Sutton's dictum, and believing that under conditions favouring reduction the presence of an excess of a soluble silver salt from which the metal might be readily thrown down is the real essential to a bronzing action, the writer, in the months of July, August, and September, performed a very simple experiment with the view of testing the truth or falsity of the finding that "bronzing always indicates the presence of organic matter." A

quantity of carefully prepared chloride of silver was distributed in thin layers on a number of microscope-slide glasses and exposed, protected from dust, for days and weeks at a window giving on the south. From time to time a dilute solution of nitrate of silver was gently poured over each precipitate, and when the film had acquired sufficient coherence it was turned over and the fresh surface treated in the same way. Day by day a portion of one or the other was detached, washed, treated with nitric acid, and finally with a pinch of cooking salt. It was not, however, till after several weeks' treatment that any sign of bronzing was manifested, and, simultaneously, a palpable amount of silver dissolved from the well-washed, darkened product by nitric acid: and not till a fortnight afterwards did the bronzing become sufficiently strong to be unmistakable. When this stage was reached a proportionately large bulk of the altered substance was evidently removed by the nitric acid. We consider ourselves therefore entitled to conclude that bronzing can occur in the absence of organic matter—although the manifestation is greatly facilitated by its presence—and to hold that the iridescence or dichroism, to which the term "bronzing" has been given, indicates not an "organate" of silver, but more or less isolated metallic silver.

While we thus aver that nothing has been more conclusively proved than that light under certain circumstances—that is to say, when assisted by the presence of hydrogen or anything else—completely reduces the more superficial particles of a film composed of an insoluble and a soluble silver salt, and think it highly probable that the discolouration of the purer forms of the silver haloids is essentially due to the production of metal, and can see no reason why metal should not be formed long before we see it, we neither insist that we are entitled to take it for granted, as yet, that an image is developable solely because molecules of metal are liberated from the very outset, nor to deny, even for a moment, that there are stages in the darkening during which the silver must be considered to exist in an allotropic form. Nevertheless, it must be confessed that the behaviour of nascent elements is frequently abnormal, and is not to be calculated by that of the more familiar type. Indeed, since the force required to decompose a (binary) compound is necessarily exactly equal to that which caused combination, it would be very absurd, knowing what we do of the conservation of energy, of the conversion of one form into another, if we were to expect that elementary matter was constantly endowed with the same properties. Moreover, as it is now known beyond all doubt that electrical separation attends the impact of light upon films of silver haloids, when, in accordance with both chemical theories, halogen is liberated, it seems idle to suppose that every photo-chemical reaction indicates the formation of a definite compound hitherto unknown.

The conception that the substance forming the visible image is an oxyhaloid is, in so far as it is more scientific, far more worthy of respect than the idea that the colouration is due to a sub-salt of silver, but since at best it treats only of an intermediate product, it affords a less satisfactory working hypothesis than the free metal theory, which is certainly the most consistent and comprehensive of any advanced up to the present time.

In any discussion of the nature of the invisible "image," we require, since we must argue analogically, not merely to suggest the probable constitution of the visible image, but to advance some reasons for considering that the matter in both is, or is not, the same. As yet we have not got beyond the thought that if we know of nothing more contradictory, the mere fact that the developable nucleus is invisible while the printed-out image is not, is anything but sufficient grounds upon which to object to believe in the identity of their constitution. If, however, we can show that they have certain characteristics in common, we advance from a negative to a positive standpoint.

Now there are three important similarities to be found between the image which we see and the effect which we cannot see. 1st. That which promotes sensitiveness in the one promotes sensitiveness in the other. 2nd. That which develops or multiplies the former is capable of developing the latter. 3rd. Electrical separation accompanies the action of light, and also that of a developer. HUGH BARDNER.

COPYING BOOK ILLUSTRATIONS AND SIMILAR OBJECTS BY MEANS OF ARTIFICIAL LIGHT.

I can't know why it should be so, but with me it always happens that I execute most of this class of work to do right in the dead of winter, when but little daylight exists, and as it frequently happens that such commissions are always required in a hurry, recourse has to be made to some means of accomplishing the work by artificial light.

Quite recently a very large amount of this work has passed through my hands in the way of making lantern slides from book illustrations, pen-and-ink sketches, and photographs for lecture sets—an amount, I may say, that it would have been quite impossible to have overcome with daylight in the short time allowed to accomplish the work.

Last winter, when making some experiments in another direction, I hit upon an excellent and most simple plan of doing this work both by day and night. The plan is so simple that any one having a supply of house gas at command, or in its absence a couple or so of good paraffin lamps will be found a most effectual substitute. To those gentlemen amateurs who are engaged with business care all day long, and who therefore take an exceptional amount of pleasure in lighting up a cigar and having a slip into their hobby on their retirement to their homes at night, the plan which I am about to describe offers considerable attractions, for perfect negatives can with the utmost certainty be made from cartoons, photographs, book illustrations, or other similar objects, and once possessed of those negatives, then follows the further attraction of printing lantern slides from them, so that, in fact, as a hobby, photography stands only in an eminently satisfactory manner all the year round.

I am quite aware that for some purposes the employment of collodion is almost a *sine qua non* in the work I am describing, and whenever possible I invariably use it in my working in preference to gelatino-bromide. But most excellent results can be obtained with gelatine, once a worker enters fully into the importance of the necessity of working on a certain line that yields him negatives which are strong in contrast, and which will permit of being printed so as to yield dense blacks before the high lights get veiled over or degraded. No doubt such negatives are more easily produced by means of collodion: but where nowadays among the vast army of those who practise photography as a hobby can we find those who know anything about collodion work? This being so, need not, however, deter such from undertaking the work by means of bromide dry plates.

There is no great difficulty about it if gone about properly. To enable a worker to set about copying such objects one of the first necessities is a good copying board. This is easily procured from any joiner, or a clever worker can, with a little trouble, make one for himself. Mine consists of a long board five feet by twelve inches by three inches deep, at one end of which is hinged two legs; this permits the board being elevated at one end when required, and is most useful when working in daylight, for it enables the copying box, or whatever else is being copied, if transparent, being so elevated as to work into the sky. For night work this is not needed, although when any one is setting about making one he had better add the hinged legs, for sooner or later he will find them useful. The great advantage of this copying board is that it enables the camera to be adjusted with much ease and certainty exactly square on to the object being copied, for by means of lines ruled at various true distances across its surface it permits of the camera being at once registered exactly parallel to the frame, or whatever device be adopted for carrying the picture that is about to be photographed. Along this board the camera slides quite nicely, and in my experience it is not necessary to bind the camera in any way to the board by means of screws; it is quite easily held firmly in position when drawing the slide by merely pressing one hand on the front of the camera. I know of no better support to carry a copying board for night work than a good kitchen table.

The next point which a beginner might feel some little difficulty in is the employment of a suitable means for holding the cartoon, photograph, or whatever else is being copied, in position. When the object to be copied is simply a photograph, or some other picture mounted or unmounted, and not bound up in book form, there is no means so simple or easy as the placing of same in an ordinary printing frame which carries a sheet of clean glass free from scratches or flaws. With such the unmounted picture, whatever it may be, is held firmly in position against the glass by means of the ordinary back of the frame and springs.

Some may imagine that the intervening of a sheet of glass between the picture and the lens might have a detrimental effect in the way of causing a want of sharpness. Such objections, however, are purely fanciful in actual practice—they don't exist; and not only will it be found that the negatives are absolutely sharp when proper attention has been paid to the focussing, but that an actual benefit accrues from the use of the glass in the way of overcoming the presence of the grain of the paper. Neither does the glass in any way tend to cause the presence of reflections so troublesome at times when copying objects which have a glazed surface. On the contrary, the glass is just about the very best means an operator can employ to detect the presence of these troublesome ghosts when they are present, for by a cursory glance at the face of the picture it is at once seen if such be

apparent, and when noticed they are easily removed. Of this I will have occasion to speak later on, when I come to describe the manner in which I place the lights that I copy with. No one undertaking this work ought to discard the use of a sheet of glass between the object being copied and the lens, even should it be only placed over the pages of a book and not used in a printing frame as described. When it is required to copy illustrations bound up in books, then of course an ordinary printing frame is not deep enough in its rebate, and some other means must be employed to hold the picture up; but an ingenious worker will not go on long before some simple contrivance applies itself to his mind, and which will answer his purpose. In my practice I employ a box frame; by this I mean a frame like a printing frame, but one having a very deep rebate, and which carries a good stout sheet of glass. The page to be copied is placed flush up against the glass, and any unequal thickness of the book is made up with pads or cards, &c., till the back of the frame presses equally on both sides of the book when the back is sprung up with the springs.

When using printing frames or any other contrivance, it only requires but a very little practice to teach the worker how to contrive some simple means not only of holding the picture flat and square up against the sensitive plate, but also to so place the picture as to register at or about the proper height on the ground glass. One very good and useful hint to this end is to paste or gum on to the ground glass of the camera, exactly in the centre, an ordinary lantern mask, for when such is truly adjusted so as to register exactly correct on, say, a $3\frac{1}{4} \times 3\frac{1}{4}$ plate when inserted in the carrier, not only will the worker be enabled to make even small-sized negatives with a certainty of their being properly registered, but when using larger-sized plates he will have as good a guide as any for the proper adjustment of his picture when focussing. A little careful thought to such minor matters as these will at the beginning go a long way towards enabling a worker to work with much ease and certainty, no matter what sized plates he is using. When, however, copying objects for the purpose of finally making lantern slides from his negatives by contact, there is no need to employ plates larger than $3\frac{1}{4} \times 3\frac{1}{4}$; and when, as I have said, the lantern mask is so placed on the ground glass of the camera as to exactly coincide by register with the plate in the carrier, there will be at least some little economy practised in the way of cost of working.

In my next I shall describe the method I adopt for lighting the objects to be copied, and state how any worker can with ease rig up a suitable arrangement in any house having a supply of gas.

T. N. Armstrong.

WHY IT IS NECESSARY TO ROCK THE DISH DURING DEVELOPMENT.

When gelatino-bromide dry plates were first introduced commercially in England, and when there were but few rival makers—either two or three—one of these declared that there was no necessity to rock the dish during development, and that, indeed, it was the reverse of advantageous to do so.

Experience soon showed that this statement was wrong, and it has ever since been customary to keep the developer in motion over the sensitive film. The reason why this is necessary has been explained more than once, but the whole of the explanation has seldom been given.

At the time I refer to—about ten years ago—I satisfied myself that it was not only an advantage to keep the developer in motion over the plate, but that it was a *very great* advantage. This was shown by exposing a plate, cutting it in two, and developing each half with half of the same lot of developing solution, keeping the dish containing one half of the plate in motion, and leaving the other at rest. The former developed more quickly than the other, and moreover, even after a much longer development, the latter still appeared thin and flat as compared with the former.

What seemed to me to be the solution of the phenomenon at that time, was simply that a developer in motion naturally acted more vigorously than one at rest, because a fresh quantity of developer was continually being brought into contact with each portion of the film. This is, doubtless, a part of the reason, but there is a deal more reason than this.

To follow fully the reason why the use of a developer allowed to remain at rest results in a thin, flat, and sometimes even foggy image, we must imagine two parts of the film—one that has received no light, the other that has received that amount of light that should make it one of the densest parts of a negative. I suppose the developer to be alkaline pyro.

The action on that part of the film that has received no light is simply *nil*, if the plate be of such a kind that it does not fog under the developer without the action of light.

Let us follow, however, the action of the developer on the part of the plate that has been acted on by light. We know that it will begin to darken, the bromide of silver of the film being reduced to metallic silver. The action that is supposed to take place is as follows:—The alkaline pyro has a strong affinity for oxygen—for that of the water constituting the solution, as well as for any other oxygen. It will not, however, decompose the water, unless there is present some body eager to take up the hydrogen, of which, in water, there are two atoms for every one of oxygen. This is at hand in the bromine of bromide of silver that has been acted on by light. The hydrogen and bromine combine, forming hydrobromic acid (HBr). This hydrobromic acid, however, immediately combines with some of the alkali to form a soluble bromide—bromide of ammonium, bromide of sodium, or bromide of potassium, according to the alkali that has been used—and this soluble bromide is a strong restrainer.

Now see what state of affairs we have. On the part of the negative that has not been acted on by light we have still the normal developer acting, whilst on the part that has been affected by light we have a developer that has been modified in the following way:—The quantity of pyro has been reduced, the quantity of alkali has been reduced, and a restrainer has been added. Moreover, over the whole surface of the negative we have a developer acting that is reduced in strength in pyro and alkali, whilst it is restrained with bromide just in proportion to the amount of light that has acted on any part of it. In these circumstances we need not expect a strong or brilliant negative. Such is only to be had if we wash out the restrainer from the parts that have been most acted on by light, whilst we add fresh pyro and alkali, and this is only to be done by keeping the developer in motion. Indeed, a more vigorous way of doing this is to continually pour the developer on and off the plate, and this will be found a good way to develop negatives when there is difficulty in otherwise getting vigorous results.

In the case of plates—and this is the case with most—which veil more or less even without the action of light, this veil will be greater in the case of development without rocking than when the developer is kept in motion, and this for obvious reasons. Of course, the result is a still further degradation of the negative developed without motion of the dish.

A phenomenon that is often seen in the case of plates that veil somewhat under the developer, even without the action of light, whether this veiling is due to the plate or to the use of too strong a developer, depends on this fact, that immediately darkening begins at any part of the film, the developer absorbed by that part of the film is both weakened and restrained, and this to a certain extent even if the dish *is* rocked.

The phenomenon that I refer to is the appearance of a *positive* image on the back of the plate. From what I have already said, I think the cause of this will be evident. Whenever this positive image appears, it shows that development has been carried about as far as there is any good of carrying it.

W. K. Burton.

—*Wilson's Photographic Magazine.*

NOTES FROM GLASGOW.

There has been a most extraordinary increase to the membership of The Glasgow and West of Scotland Amateur Photographic Society this season, over fifty new members being enrolled since the commencement of this session in October. This Association has now a very large roll, the largest perhaps in the United Kingdom. They now find it necessary to hold their popular meetings in the theatre of the Philosophical Society's Rooms, their own lecture room being too small.

On Monday evening last, Mr. Ralph Elder entertained the members to a most delightful lecture and lantern display of work done by him in conjunction with two brother workers, Mr. Morison and Mr. Taylor, who spent their holidays together last year on the Thames. Over 200 slides were projected on the screen, and Mr. Elder, in his own happy and racy manner, quite held his audience in raptures with his description of their tour.

The limelight arrangements on this occasion were entrusted to Mr. James More, of Whites, and was conducted from beginning to end without a hitch, in this respect comparing very favourably with the utter failure made by a stupid operator on the occasion of the recent visit of Mr. Paul Langé.

The Glasgow Pen and Pencil Club held one of their enjoyable social evenings on the 17th inst., when for the first time they recognised in a way the claims of photography as a fine art by giving through the agency of Mr. Lang one of the most enjoyable limelight entertainments we have ever witnessed. Mr. Lang took especial care to screen such photographs as were congenial to the artistic taste of the members; the whole entertainment passed off with much *éclat*, and reflects great credit on Mr. Lang's judgment for the selection of slides, and also on Messrs. White, opticians, for the admirable manner in which they were projected on the screen.

EDINBURGH PHOTOGRAPHIC EXHIBITION.—V.

(*From a Correspondent.*)

Exhibition Lantern Lectures.

The second Tuesday's "hour with the lantern" took place on December 16 at eight o'clock. Mr. Bashford, in opening the proceedings, stated that for this evening the Council had fortunately succeeded in securing

what he knew would prove a great treat for the audience. Mr. Reid, of Wishaw, whose fine animal studies they all knew from the examples shown in the Exhibition, would display a selection from his works on the screen. He then introduced Mr. Charles Reid, who commenced by stating that, like many others, he had commenced as an amateur, and as his natural taste led him to the study of animals and their habits, so when he began with the camera he naturally took to try to represent them and their habits. It was a great mistake to suppose that you could represent animals without knowing a great deal about their ways and habits, and to succeed with them at all required the exercise of great patience and watchfulness, and you needed to get acquainted with them; it was no use supposing that accidental chances would get the best pictures of animals, for they needed to be carefully observed. He then proceeded to show two fine groups of black-faced rams, which were followed by a group of greyhounds, and another of what he called miscellaneous dogs—a group embracing very many varieties. The next were several groups of swans from the immediate district—Duddingston Loch. He was accompanied and assisted on the occasion of getting them by a friend many of them would know, Mr. Mathieson, an old office bearer of this Society, he believed, and the day was not very promising—in fact, before they were finished it began to snow. A very curious thing he would notice about "these beasts" that lived near by towns—they seemed to know quite well when it was Sunday, for on that day they would come quite near and were very tame, quite different from their habits on the other week-days. But they would notice that one of the slides showed a pair evidently making arrangements for nesting among the reeds, and they were got quite close.

This was a very beautiful slide and a fine picture, the peculiar downy character of the delicate white feathers being perfect, while the surroundings made it a picture which must be seen to be appreciated.

From this set of pictures the lecturer passed on through various studies —*The Clydesdale Prize Stallion, Prince of Wales*, being especially good, but so were turkeys, ponies, and St. Bernard dogs. A horse showing on Deeside might rival for many points besides truthfulness those of Landseer and Herring. In showing one, a very rare bird in Scotland, at least, which formed one of the large collection of the Lords Cecil, friends of the Marquis of Salisbury, and practical farmers here, he narrated their, or one, method of contributing to one of the now popular bazaars for the benefit, or promotion, or delectation from something or other, that instead of giving, as is usual, a subscription, he threw open his extensive grounds and collections of animals, which were hardly equalled anywhere, at a price which was devoted to the purposes of the bazaar, an example which might often be followed.

On coming to one of his pictures of geese, he told the accidental way in which this, the only one of that nature in the series, was got. It was in his early time, when his shutters were not by any means so perfect as they are now made, nor was he so practised in his art, and after a lot of dodging about after them he had set down the camera in despair, when by some accident the shutter went off without his knowledge or consent, and the result was the picture they saw, which was a fine one, but rather against the lecturer's earlier statement, which only proves that such general laws must be taken *cum grano salis*. *Attack* was the title of one with a Skye terrier hesitating but yelping at a hedgehog, which had repulsed all other cats but this game one.

After a number of others were passed through came a group of greyhounds at gaze and here Mr. Reid gave the sound advice never to try to get animals' attention arrested by making any sound or sign too near to them; let it be a hundred yards away if possible, as was done with these dogs, on the face of a hill, and that attracts their attention, and keeps it.

Of his difficulties with the wild cattle in Cadzow Forest, he had also some pawky remarks as to their habits and ways of meeting and dealing with strangers, in one instance he having to climb a tree to get out of their way, and being prisoner there for a time. An excellent example of the Chillingham bull another, and the only herd left in Britain. Earl Derby was said to have some at Knowsley, but I am not certain of this. If there, they have been transported, and are not indigenous, as those are at Cadzow and Chillingham. A rather curious picture, taken near the lecturer's native town, Turriff, in Aberdeenshire, of a horse and cow yoked together at the plough, tells a tale of the progress of agriculture in that region. And so, with quaint anecdote and an occasional sparkle of wit, such as that of trying to get a retriever in the act of drinking at the village well, to which he was brought, but would not. "Oh," says his master, "we'll soon cure that!" so he was taken home and given something "most" to eat, and brought back to the same place, and was glad to drink, when the village urchin turned on the tap, and he was caught at it as you see. In all, Mr. Reid exhibited about ninety slides from his pictures, which comprised all the domesticated animals—cats, pigeons, ducks, cattle of the west Highland and other breeds, meets of hunters, terriers, and dogs, and sheep, goats, and donkeys, as well as bye-wet scenes, landscapes enlivened with cattle, &c.

The negatives are generally taken on whole-plates, and if judgment may be hazarded where all are so good, the slides do not come up in quality to the silver prints, of which there is also an album on view in the gallery. The lantern arrangements, as at last meeting, were under the management of Mr. Reid.

At the close a vote of thanks was proposed by Mr. Bashford and heartily awarded.

Foreign Notes and News.

There seem to be some rather litigious individuals in the Fatherland. A short time ago a photographer in Hamburg had occasion to take a portrait of a young lady. Without her permission he exposed one of the resulting photographs in his window. Soon, however, he received a solicitor's letter demanding the removal of the photograph—a demand to which he promptly acceded. This demand was, however, immediately followed by another for the payment of 18 mark 25 pfennige, which was *not* acceded to. Five months later an action for 2000 mark damages was commenced by the young lady. Query—for what?

The threatened photographer wrote in alarm to the Berlin Society of Practical Photographers, who have, it appears, succeeded in reassuring him as to the probable outcome of the action.

Herr Ottomar Anschütz still appears to pursue his photo-zoological studies with the same untiring energy as formerly. Only a few weeks ago he has succeeded in adding to his remarkable series a number of most successful photographs of sea-gulls and herons upon the wing, which, we understand, have been of considerable value in throwing fresh light upon the mechanics of flight.

The firm of Messrs. Riffarth in Berlin introduced a novelty which Liesegang in his *Archiv* holds up to the imitation of all whom it may concern. They have taken, namely, to nickel electro-plating of their zinc-etching blocks. The coating of nickel is said to afford excellent protection against the action of the atmosphere, and altogether to render the blocks much more durable.

Saint Florent gives a curious process for producing coloured photographs:—Bristol paper is coated with silver-nitrato-collodion, and after drying is dipped into a bath of nitric acid and exposed in the moist state to light until it turns a bluish violet. It is thereupon placed in a four per cent. bath of nitrate of mercury. When dry, it is exposed behind coloured glass for fifty seconds. The fixing is performed with chloride of iron.

GLASGOW INDUSTRIAL EXHIBITION.

Amateur Photographic Section.

Emboldened by the extraordinary success which attended similar exhibitions in other large centres, such as London, Dundee, and elsewhere, some of Glasgow's East End magnates a few months ago conceived the idea of getting up, on a very large scale, an industrial exhibition in the East End of Glasgow, where the bulk of the industrial population of Glasgow resides. A guarantee fund was at once started, which soon reached the handsome figure of 20,000*l*. An Executive was then formed and spacious buildings erected.

In conjunction with the fine art section an amateur photographic division was included, the working of which was more immediately intrusted to the following well-known local amateurs:—Mr. Archibald Watson (President of the Glasgow and West of Scotland Amateur Photographic Association), Mr. Hugh Reid, Mr. William Lang, Mr. David Glen, Mr. John Ellis, and Mr. R. H. Elder. And considering the short time at their disposal they must be congratulated on the excellent collection of photographs they have brought together.

The space set apart for the photographic section is very suitable for such a collection. The walls have been specially lagged up for the occasion, and we notice, in respect to the manner in which the lagging has been coloured, a somewhat fresh departure from the beaten track. The Committee have seen fit to adopt a light yellow, or canary colour, as the tint of their background. This extends from the floor to the top of the lagging, a distance of about ten feet, above which the walls are tastefully adorned with shields, scrolls, antlers, and other mural decorations, the intervening wall space being draped with dark maroon. The effect is very good, and reflects much credit on the gentlemen named.

Entering the outer hall, we are face to face with some enormous enlargements, and also a large and specially fine collection of Japanese photographs, exhibited by Mr. Garroway. The latter are sure to be a centre of attraction during the course of the exhibition. In this room one is reminded of the old Daguerréotype days by Mr. McMillan's large collection taken some thirty-nine years ago.

In the larger hall there is some exceedingly fine work shown; in fact, the Committee must be congratulated on the number as well as the quality of the work exhibited. Right handsomely have the amateurs of the West of Scotland responded to the appeal made upon them, nearly every worker of note being represented. In fact, in several notable instances, we were pleased to find that exception had, in the present case, been made, and pictures sent in by those who, as a rule, make it a point never to exhibit. Among such may be mentioned the names of Mr. George Mason and Mr. Alexander Robb. The latter gentleman's picture,

Morning on the Lockay, is an exceptionally fine production, and is about the best landscape in the exhibition. Mr. Mason sends some charming little studies, which young workers would do well to study and copy. *Among the Daisies* and *Feeding the Chicks* are little gems.

Mr. Archibald Watson is represented with a fine selection of prints on Obernetter's paper. Nearly all his pictures have at some time or other taken prizes.

Mr. Thomas Taylor sends his Killin Studies. The centre picture is well worthy of notice, it being about the best thing he has done.

Mr. David Clark sends his prize pictures also. We like this gentleman's work immensely. He evidently knows how to think out his subject well before exposing; they are quite a study in the way of composition. We have, however, seen better prints from his negatives than those exhibited.

Mr. John Morison, jun., comes out strong in hand-camera work. All his pictures bear the stamp of much care, and are really very clever productions.

Mr. Hugh Reid sends his Irish Studies. His sensational picture of *The Still* will be certain to attract the crowd. Mr. Reid also shows some good examples of early film work, and his exhibit is interesting on this account.

Councillor Primrose has about the best enlargement in the exhibition, and he deserves much credit for this excellent production.

We were pleased to notice that the ladies of the West of Scotland are likewise well represented. Miss Burns, of Wemyss' Castle, who is an enthusiastic photographer, sends a fine collection of Norway pictures. Miss Spiers, Miss Gibson, Miss Robertson, and other ladies, are well represented.

We notice also with pleasure that Mr. Alexander Macdonald has contributed some of his fine views of Arran. All his pictures bear the mark of great care in execution.

Mr. Frederick Mackenzie sends a good frame of platinotype, and Mr. Elder is represented by his Brittany pictures.

Mr. J. C. Oliver has also his prize picture of *Waiting for a Nibble*, which is always welcome.

Mr. Coulson, Mr. N. Reid, Mr. Nelson, and very many other local workers, have contributed much towards the success of the exhibition.

The hanging has been carefully done, and the halls are well lit.

Our Editorial Table.

Photography for Architects.

By F. W. Mills. London: Iliffe & Son.

This work is intended for those who are quite unacquainted with photography, and not for the experienced architect. Some sound advice is given, such as the exercising of care in seeing that all developing dishes and measures are washed after use and put carefully away, cleanliness being essential in photographic operations. The camera must when tilted upwards have its back swung round until the ground-glass screen is perfectly perpendicular. But what does Mr. Mills mean when laying down his "rule that must most strictly be adhered to," viz., "that the *plate must always be parallel to the subject*?" If one is photographing *The Leaning Tower of Pisa* must the plate be placed perpendicular, or should it be slanted to the same inclination as that edifice? Or when photographing a building from the corner, with which of the walls must the plate be placed in parallelism? We confess to being a little puzzled, especially as we find later on that he recommends the "cylindrograph" (or panoramic camera) as one useful to architects, a class who, we should imagine, would be its most violent opponents on account of the extraordinary perspective it gives to buildings, representing horizontal straight lines as curved. But it is in the chemical, or more strictly the physical, chapters of his book where we least understand the author. For example, when explaining the phenomenon of solarisation—a subject that has sometimes troubled our ablest photographic chemists—our author says:—

"Solarisation, or reversal of the image, is a strange chemical action caused by the continued action of light upon a photographic plate, which, after a certain point is reached in the formation of the reflected image, the exposure, so to speak, commences to 'unexpose.'

"The reason for this is at the first blush a difficult problem to solve, but upon investigation proves far simpler than might be expected.

"Solarisation is not a reversed action of the actinic rays, but of the developer.

"A gelatine film upon continued exposure to comparatively strong light becomes less soluble that it was previously. The solarisation which takes place upon a glass negative is far more pronounced than if it had been a film negative; this is owing to halation taking place at the same time, and the less iodide of silver, and the more bromide of silver, contained in the film, the more it will be present. Such parts of the negative as have been most acted upon will be the first to solarise."

Whether or not this explanation will meet with acceptance by experts we are afraid to hazard an opinion.

The book has for a frontispiece a Woodburytype print from a negative by the author; but either the print has failed to do justice to the negative or the negative to the subject, as what we presume to be meant for trees are simply black masses, totally devoid of detail. Possibly it is meant as an illustration of what the author states is a common fault with beginners—not leaving the plate long enough in the developing solution. We do not, however, find it so stated. We can unreservedly praise the printing and general get-up of the book, which sells at half-a-crown.

RECENT PATENTS.

PATENT COMPLETED.

Improvements in Optical Lanterns.

No. 18,583. Alexander Hughes, 59, Fenchurch-street, London.—*November* 20, 1890.

My invention relates to that class of lanterns generally known as "optical lanterns," such as those used for projecting views upon screens by means of artificial light.

This invention is particularly applicable for lanterns of the triunial, biunial, or single type used for producing dissolving views.

My invention consists in the construction and arrangement of the lanterns in triple, double, or single, from whereby the following advantages are obtained over the lanterns now in use, viz.:—

1st. When triple or double lanterns are used of the ordinary description, only one set of lenses with condensers and lighting apparatus are working upon the true optical centre, for, assuming that the centre set of lenses is the one working as described above, the lenses of the upper and lower lanterns have to be inclined to the other lanterns in order that they shall project the image upon the same part of the screen as the centre lantern. This is usually effected by throwing the front set, or objective lenses of each top and bottom lantern, out of the optical centre in relation to its condenser, causing distortion of the picture, and destroying the sharpness of detail on one part or other of the picture.

These evils are entirely obviated by my invention, as each optical system or lantern is complete and independent in itself, and can be tilted to any convenient angle as a whole, as may be required.

2nd. Considerable reduction in cost of construction is attained owing to the simplification of design.

3rd. The weight is very greatly reduced and much less space occupied by the lantern as a whole.

I carry out my invention in the following manner:—

Upon a stand, preferably the top of the box within which the lantern is kept, I provide two stiff uprights of metal, wood, or of any other suitable material, which may be round, square, or any other convenient shape.

The bottom frame or baseboard of the lantern may consist preferably of wood, within which slides a second frame of wood or metal.

Upon one end of the baseboard I fix a supporting frame, holding the condenser, upon the front side of which any ordinary arrangement for retaining the slide in position is made.

Upon the moveable frame, which slides within suitable grooves on the baseboard, I provide an upright frame carrying the objective lens. A set of leather bellows of round, square, conical, or parallel form is arranged between the frame holding the objective lens and the frame holding the condenser.

Suitable means of adjustment are provided either by a rack and pinion movement, or any other suitable means for adjusting the focal distance required.

The light box at the back I preferably form of charcoal-iron, brass, or other suitable material of a dome section at the top, the slides projecting downwards and overlapping the edges of the bottom frame of the lantern.

In the sides of the overlapping edges suitable slots are provided, through which screws are introduced into suitable holes in the baseboard to retain the light in position when placed at the proper distance from the condenser.

As such a system of parallel adjustment is set up between the condenser and the source of light, I attach in a fixed manner the lamp, or other lighting apparatus, either in the shape of an oxyhydrogen limelight burner, an electric lamp, or lamps burning mineral oils, upon the bottom plate of the light box, so considerably reducing the cost of the lighting apparatus in comparison with that used at the present time, and rendering the light very much easier of manipulation.

The light box is made so that it shall overlap a projection, which is carried on the frame holding the condenser, such projection being of such a length as to allow of the requisite range of movement to comply with the greatest and smallest distances of the source of light from the condenser required.

Upon each side of the condenser frame, and fixed firmly to the lantern baseboard, is arranged suitable fittings, having set-screws or other tightening arrangements.

These fittings may have a hole passing through them, and are threaded over the projecting uprights upon the top of the box as hereinbefore described.

These fittings may be so arranged to the sides of the lantern that they shall turn upon a pivot in such a manner so that when the lantern is threaded on the apparatus any desired angle of elevation or otherwise can be given to the lantern as a whole, and clamped or fixed in that position by the set-screws or tightening arrangement at the side, as hereinbefore described and in conjunction with the brass stays hereafter described.

It is very obvious that three separate lanterns, as described, can be mounted upon the upright supports so as to form a triunial lantern.

Upon the frame carrying the objective lens, or any other convenient part of

the lantern. I provide suitable fittings, turning on pivots, into which said fittings engage telescopic stays or guide rods, attached at their lower ends to the stand or box, with set or clamp screws to fix them when adjusted. The outside tube of the telescopic stays may have grippers or other suitable fixing device arranged which shall grip the inside tubes.

When, for instance, the lower lantern has been allowed to rest upon the top face of the supporting stand or box, the second lantern can have its angle set in relation to the lower lantern so as to cover the same portion of the screen, and be kept in that position by the telescopic stays in the front. The same method is, of course, adapted with the top lantern.

Great saving in weight is effected by using the bellows attachment, which gives very considerable range of the focal distance; again, the material used is much lighter than the telescope tubes usually made of brass that are now used in lanterns, and which make the said lanterns very heavy in the front part, in which part there is no support to carry such weight, and also occupying considerable space when packed up.

My lantern, when required to be packed away, closes up into a very small space by racking it in, so that the front frame is brought against the condenser frame, in a similar manner as an ordinary bellows camera.

And may, instead of using the sliding frame engaging in grooves in the base-board for carrying the frame holding the objective lenses, arrange two tubes fixed to either the condenser or to the front frame, parallel to one another, and so arranged as to slide within suitable sockets with gripping attachment, these forming a very cheap and efficient means of parallel adjustment for the front objective lenses.

My lantern, as thus described, will allow of all the various mechanical effects and slides now being used in the present form of lantern, being fitted to and worked in it, and will adjust to show pictures from the smallest up to the largest size.

Meetings of Societies.

MEETINGS OF SOCIETIES FOR NEXT WEEK.

Date of Meeting	Name of Society.	Place of Meeting.
December 31	Barnsley	Bank Chambers, Hargreaves-street.
,, 31	Photographic Club	Amateurs's Hotel, Fleet-street, E.C.
January 1	Bolton Photographic Society	The Baths, Bridgman-street.
,, 1	Leeds	Leeds Mechanics' Institute.
,, 1	Dundee and East of Scotland	Lamb's Hotel, Dundee.
,, 1	Glasgow Photo. Association	Philosophical Rooms, 207, Bath-st.
,, 1	London and Provincial	Champion Hotel, 15, Aldersgate-st.
,, 2	Bristol and W. of Eng. Amateur	Bristol Literary & Philosophical Club

THE LONDON AND PROVINCIAL PHOTOGRAPHIC ASSOCIATION.

DECEMBER 17.—Mr. W. K. Debenham in the chair.

The Hon. Secretary referred to a paragraph reflecting upon the fair dealing of the Association that had acquired some importance from having been reported in one of the better-known photographic journals. The paragraph was to the effect that the Association had not acted fairly, in hearing several papers of anti-Emersonian tendency on the focus question without having a fuller supply of papers defending the actual focus position. The Hon. Secretary said that he had written to the paper which had given publicity to this imputation of unfairness by reporting the paragraph in question, and had pointed out that the discussion had been opened by a paper by Mr. P. Everitt from an admirer of Dr. Emerson's working, and that if there were not more on the same side to refute the arguments brought forward by the opponents of that school the Association was not to be blamed. They had always shown themselves ready to give an attentive hearing to both sides of the question; further than that it was not the province of the Association to go.

A Question from the box was read:—"What are the qualities most desirable in a lantern objective?"

Mr. T. E. FRESHWATER replied that they were to be found in the lens that passed most light and had the flattest field.

In further discussion on lantern objectives, Mr. F. A. BRIDGE said that for ordinary rooms a lens of six inch focus would be most generally convenient, but where there was a distance of twenty feet an objective of eight and a half inch focus would be better, as having a flatter field.

Mr. FRESHWATER said that for long-focus lenses the condenser must be of long focus also, and then you do not get so much light.

The CHAIRMAN said that provided the light could be placed nearer the condenser without danger of cracking them there was no necessity for a condenser of longer focus with the longer focus objective.

A member inquired whether when a surface of five feet diameter had to be illuminated by limelight there was any advantage in using the optical system of the lantern.

Mr. FRESHWATER said that there was an advantage in using the condenser, but that objectives were not wanted, and the Chairman illustrated the case by diagrams on the blackboard.

Mr. R. P. DRAGE said that he had a quantity of Eastman's stripping films, and he wished to know whether there was any means of development by which they could be made to give good rich positive prints by development. He had found that he could only get weak results in this way. The general opinion was that that was the usual result of endeavouring to produce brilliant positive images with the very rapid emulsion.

Mr. J. S. TRAILL inquired whether any member could give the method of recovering platinum from developing solutions.

Mr. CLARK thought it all fell to the bottom.

Mr. A. HADDON advised placing the solution in the light, by which ferric would be converted into ferrous oxalate, and any platinum in solution precipitated.

Mr. P. EVERITT said that in a photographic publication it had been suggested to use a diffraction grating in the lens in order to soften the definition.

In a short discussion on diffraction gratings, Mr. FRESHWATER said that a diamond point would only rule one grating, and then the diamond had to be reset. He was speaking of gratings seven-eighths of an inch square.

Mr. HADDON inquired whether, under the microscope, any difference was perceptible between the lines first and the last ruled.

Mr. FRESHWATER replied that there was, and that one side of the grating would be found to be better than the other.

Mr. ATKINS said that a black diamond point was much harder than that of the gem.

A question from the box ran—"Is $\cdot 008 \times \sqrt{d}$ the correct diameter for a pinhole to give the best definition where d is the distance of the plate from the hole?"

The question was adjourned.

It was mentioned that this was the last evening in the old quarters of the Association, and that the next meeting, to be held on January 1st, would take place at their new place of meeting "Champion's Hotel," Aldersgate-street. *Developers* would be discussed.

Mr. H. K. HUMM was elected a member of the Association.

SOUTH LONDON PHOTOGRAPHIC SOCIETY.

DECEMBER 19.—The President in the chair.

A print of a group of members of the late South London Society was presented to the Society by Mr. Atkins, of Bromley.

CROYDON MICROSCOPICAL AND NATURAL HISTORY CLUB.

THE twenty-first annual *soirée* of the Croydon Microscopical and Natural History Club was recently held in the Public Halls, Croydon. The attendance was large.

Among the photographs of special interest were some taken by Mr. Weir Brown with a hand camera of his own construction, illustrating some fine effects in Epping Forest and Dolgelly. Mr. Hirst, an amateur of twelve months, had some good hand camera work. A series of fine views of condemned parts of Croydon were shown by Mr. Low Sarjeant, who also exhibited lantern transparencies from the same negatives. Some 12×10 of both the interior and exterior of Old Palace, Croydon, by Mr. C. M. Major; marine and other views by Mr. Russell; and some pretty river scenes by Mr. Gower. A fine "sunset" was shown by Mr. McKean. Mr. Straker, amongst several views, had one of a curious old quarry corner. An artistic group of three taken by Mr. Corden was very prominent. Mr. Allen, who makes a special study of animals, exhibited some interesting pictures of thoroughbreds from Marden Park Stables, and some transparencies of Highland cattle. Interiors of Smallfield Place, Burstow, including a handsome staircase, were shown by Mr. East. Mr. Brooks had a number of fine transparencies displayed on the tables, including interiors of Windsor Castle, and Mr. Oakley exhibited transparencies on Thomas's plates, which vied favourably with those of Mr. Brooks.

Some good general exhibits were shown by Messrs. Wylde, Stunt, Sparrow, Baldock, Barber, Purser, Hovenden, Collier, Carter, Gower, and Goddard.

At intervals, under the able manipulation of Mr. W. Brooks, three lantern exhibitions were given in the Upper Hall, and so great was the interest shown that even standing room was impossible after the exhibition had commenced. Many of the slides were the work of Mr. Brooks and other members.

EALING PHOTOGRAPHIC SOCIETY.

DECEMBER 18.—The chair was taken by the President (Mr. H. W. Peal).

Some new members were balloted for and elected.

A series of slides, entitled *Illustrated Boston*, were then projected on the screen. Views of Dawlish and other places, which had been prepared by members of the Society, were then shown; and several slides from negatives taken at the previous meeting by means of the flash-light apparatus were also exhibited.

The next meeting of the Society will be held on January 15, 1891, when the third set of American slides will be exhibited.

NOTTINGHAMSHIRE AMATEUR PHOTOGRAPHIC ASSOCIATION.

DECEMBER 15.—The walls of the new club rooms were covered with interesting photographs, the productions of different members of the Association, and the whole room looked pleasant and comfortable.

The PRESIDENT (Mr. S. Wells), who presided, said that the room they had lately occupied had been a great drawback to the progress of the Association, but now they had removed into more convenient and pleasant quarters he hoped they would meet with a good measure of success.

Mr. Lancelot Allen was elected a member.

Mr. G. E. Smith exhibited, by means of his oxyhydrogen lantern, the slides of *Illustrated Boston, U.S.A.*, also slides by members.

Mr. W. Burrows's notice of motion was discussed, viz., "That sons of members (under eighteen) be admitted at a reduced subscription—5s." It was carried unanimously.

GLASGOW PHOTOGRAPHIC ASSOCIATION.

THE second general meeting of the session was held on the 4th inst. in their Rooms, 207, Bath-street,—Mr. William Lang, jun., F.C.S. (President), in the chair.

Messrs. A. Lindsay Miller and Alexander Munro, jun., were admitted mem-

bers, and afterwards Mr. Lang gave his presidential address [see JOURNAL of December 12].

Mr. GEORGE BELL made a communication regarding the charges of the Corporation for water supplied to photographers.

A hand camera designed by Mr. Robb for stereoscopic pictures was shown to members, and also a series of views taken in Norway with the apparatus.

THE opening popular meeting of the session was held on the 11th inst. in the large Hall of the Philosophical Society's Rooms, 207, Bath-street,—Mr. William Lang, jun., F.C.S. (President), in the chair.

The lecturer for the evening was Mr. PAUL LANGE (President of the Liverpool Amateur Photographic Association), who described *A Tour in Norway*, fully illustrated with views taken by himself and shown by means of the limelight.

Some very fine cloud pictures and hoar-frost scenes were also thrown on the screen.

An enjoyable and interesting entertainment was brought to a close with a series of views of the Channel Fleet, taken during their recent visit to the Mersey.

GLASGOW AND WEST OF SCOTLAND AMATEUR PHOTOGRAPHIC ASSOCIATION.

DECEMBER 15.—Mr. Archibald Watson (President) in the chair.

A paper on *Intensification*, by Mr. William Goodwin, was read.

Fifteen new members were admitted.

Correspondence.

☞ *Correspondents should never write on both sides of the paper.*

SENSITIVENESS OF PLATINUM PAPER.

To the EDITOR.

SIR,—I have never quite believed in the usual statement that platinum paper is three times as rapid as silver paper, although I have been an enthusiastic user of the process since its earliest issue. Recently I made some tests in the matter in connexion with the application of my exposure meter in calculating contact-printing exposures. Printing hot bath papers from a good, dense negative, I found it not quite twice the rapidity of silver (Schölzig's ready-sensitised), the exact ratio being thirty-five to twenty. When, however, this knowledge was applied to printing-in skies in platinum, under-exposure resulted, and further experiment showed that with thin negatives hot bath platinum paper is just about equal in sensitiveness to silver.

I enclose three pairs of trial prints, each pair of platinum and silver being simultaneously exposed on the same negative for the same time; the one pair was exposed under plain glass for three periods, and made to get a graduation of tints.

Carbon I found quite up to its reputation for sensitiveness, Autotype ready sensitised tissue being, with average negatives, from two to four times the speed of silver paper, according to the length of time it had been kept. Of course this may not apply to the processes as worked in other hands, but it is the result of specific, and not general, observation.—I am, yours, &c.,

ALFRED WATKINS.

Hereford, December 20, 1890.

Exchange Column.

*** *No charge is made for inserting Exchanges of Apparatus in this column; but none will be inserted unless the article wanted is definitely stated. Those who specify their requirements as "anything useful" will therefore understand the reason of their non-appearance.*

Will exchange Ross' No. 1 cabinet lens or Ross' No. 1 C.-D.-V., in good condition, for good accessories or for 12×10 or 15×12 camera.—Address, PHOTO, 67, Rectory-road, Barnsley.

Quarter-plate rapid rectilinear or Euryscope (good make) wanted; exchange, landscape lens, seventeen inches focus, good condition. Cash adjustment.—Address, No. 14, Herbert's Factory, Radford, Nottingham.

WE learn that the Camera Club has altered its rules in regard to subscriptions, by which the subscription after January 1 next will be raised for town members to five guineas, country members two guineas, foreign members one guinea, with an exception in favour of the first hundred members proposed and elected after January 1, for whom the town subscription will be only four guineas. For members proposed before January 1 the present subscription will hold, namely, three guineas town, one guinea country.

Answers to Correspondents.

*** *Communications relating to Advertisements and general business affairs must be addressed to* "H. GREENWOOD & Co.," 2, *York-street, Covent Garden, London, W.C.*

All matters for the text portion of this JOURNAL, *including queries for "Answers" and "Exchanges," must be addressed to* "THE EDITOR," 2, *York-street, Covent Garden, London, W.C. Inattention to this ensures delay. No notice taken of communications unless name and address of writer are given.*

PHOTOGRAPH REGISTERED:—

Alfred Rogers, Bacup.—*Photograph from a painting of the late Henry Maden.*

B. R.—If you read the article in the present number you will possibly be able to account for the spots in your case.

P. COOMBES.—The dark corners are caused by the condensers not being large enough for the negative enlarged from. This will always be the case when the diameter of the condenser is less than the diagonal measurement of the negative.

LITHO.—As a rule, negatives more suitable for photo-lithography will be obtained by the wet collodion process than by dry plates. However, with plates specially prepared for that class of work excellent results can be obtained.

D. MAHON.—The foggy appearance in the negatives forwarded arises from the camera in which they were taken not being light-tight. No fault rests with plates, as the margins that have been protected by the rabbet of the dark slides are perfectly clear.

W. C. CLARK.—The sample of paper is certainly not of Whatman's make. It is a thick, rough drawing paper, probably of foreign manufacture. The spots are due to metallic particles in the paper, which reduce the silver. The material is quite unfitted for photographic purposes. Get the genuine article and you will have no such trouble.

BRUMMAGEM AMATEUR.—Thank you for the cutting, which we had not seen before. Had you read the ALMANAC more closely you would have seen that three, and not two, of the "Notes" were what you term "cribbed" from the ALMANAC without acknowledgment, either to our contributors or ourselves. Probably the practical articles in the ALMANAC will form the subject of more "Science Notes." You are correct in your surmise as to who is the writer.

A. Y. E. writes, complaining that recently he attempted to take some pictures in a conservatory, but could not get a clear and bright image. The reason he found was that the moisture in the building condensed on the lens, and when wiped off condensed again. He asks if there is any means of avoiding this? Yes, a very simple one. All that is necessary is to make the lens slightly warmer than the temperature of the conservatory. No moisture will then condense upon the instrument.

A. WILLIAMS writes: "I have been sensitising a quantity of albumenised paper, and find the silver makes my fingers very sore, although I work as cleanly as possible. Can you, through your welcome JOURNAL, tell me how sensitisers in large firms manipulate to overcome this difficulty? I find the bone forceps tear the paper when drawn over the glass rods. Your advice will be esteemed a great favour."—If our correspondent cannot work sufficiently neat, so that only just the tips of the thumbs or forefingers touch the silver solution, we should advise him to wear indiarubber finger-stalls. These will afford complete protection, and are not very inconvenient to work in.

DELTA writes: "Concerning the references to stereoscopicity on the screen in last week's JOURNAL, I am of opinion that the rapid alternation of two suitable pictures on the screen, viewed through a pair of opening and closing apertures would produce the effect sought. If these apertures operated at exactly the same rate as the alternation of the pictures, so that the sight of each eye was confined to its own picture, the 'persistence of vision' would obliterate the 'blinking' effect and stereoscopicity be obtained. Apart from the mechanical difficulty, do you agree with me?"—Sir Howard Grubb several years ago demonstrated that a true stereoscopic representation of an object on the screen could be made in the manner indicated.

THE Manchester Photographic Society is holding an exhibition of members' work this week, on Thursday, Friday, and Saturday. Prizes are offered for different classes of work, and a special extra prize has been placed at the disposal of the Council for the best exhibit shown. The judges appointed are: Mr. J. Brier, jun., Bollington; Mr. B. Mashiter, Heaton Chapel; Mr. T. Heywood, Oldham; and Mr. Wallace Thompson, Oldham.

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